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*P. Jones*

# Hi-Fi WORLD

NOVEMBER 1994 £2.00

**5 MINI MONITORS**  
**Harbeth HL-P3**  
**Systemdek 931**  
**ProAc Tablette Signature III**  
**Rogers Studio 3**  
**Rogers BBC LS3/5a**

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## **NEW SPENDOR SP3/1 LOUDSPEAKERS**

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**DIY SUPPLEMENT No. 11  
banded to this issue**

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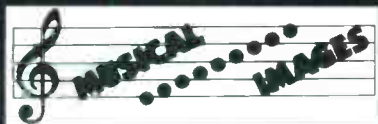
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Cardiff, Wales CF3 0EF  
Tel: (0222) 795621  
Fax: (0222) 794267

The logo for dpa Digital Ltd., consisting of the lowercase letters 'dpa' in a stylized, white, sans-serif font.

A logo for the 'dx 128 processor' featuring the text 'dx 128 processor' in a white, sans-serif font, enclosed within a white, rounded rectangular border with horizontal lines.



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Cover Photograph by  
Paul Hartley Studio 071-482 3768

## THIS MONTH'S REVIEWS

### AMPLIFIERS

- SCOOP** CHAMELEON POWER AMPLIFIER 18  
A compact but incredibly powerful amplifier from the studio world. Will its stylish casework find favour with the audiophile?



- SCOOP** ORELLE SA100 50  
Orelle are the latest to join the increasingly crowded integrated amplifier market. Will the SA100 at £379 topple the best, asks Dominic Todd?

- SCOOP** ROTEL RQ970BX 31  
This new phono head amplifier from Rotel offers superb audio grade components for a modest £129. We have a listen and then describe a few simple DIY tweaks to further enhance performance.

- KENWOOD 3020SE 35  
Can Kenwood's new 3020SE amplifier steal the limelight from Pioneer's A400X, asks Eric Braithwaite?

### COMPACT DISC

- SCOOP** ARCAM BLACK BOX 500 13  
Arcam join the elite few with their first discrete one-bit CD convertor - the most affordable yet. Does it make the grade though? Noel Keywood listens intently.

### LOUDSPEAKERS

- MINI-MONITOR GROUP TEST 21  
We test five mini-monitors and their originator, the BBC LS3/5a.

- Harbeth HL-P3  
ProAc Tablette III Signature  
Rogers Studio 3  
Systemdek 931  
Rogers Original LS3/5a

- SCOOP** SPENDOR SP3/1 44  
Replacing the much loved S20s, the new SP3/1s have a tough act to follow. We audition them closely and give our verdict.

- SCOOP** GLL MEZZO 52  
A look at the revised £159.95 Goodmans Mezzo by Peter Downs.

### TURNTABLES

- NAD 533 57  
NAD's affordable turntable based on the renowned Rega Planar 2. Dominic Todd takes a listen.



- ORTOFON VMS-2E 59  
A quality Moving Magnet cartridge - for £10! Dominic Todd marries the NAD 533 turntable with this amazing value cartridge from Ortofon

### CASSETTE

- AIWA AD-F450 64  
From Aiwa's new range here's an affordable two-head cassette deck. Eric Braithwaite listens and records its abilities.



### TUNERS

- SCOOP** BURMESTER 931 36  
A super high-end £4000 chrome plated tuner from Germany. Eric Braithwaite gets to grips with serious German engineering.



AMERICAN  
and  
CANADIAN  
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## FEATURES

- ROOM ACOUSTICS** 42  
Douglas Floyd-Douglass of RPG acoustics begins a series of articles explaining room acoustics, the effect they have on the sound of your system and how to improve your room.

## DIY SUPPLEMENT

Once again you'll find a FREE DIY hi-fi Supplement banded to this issue of Hi-Fi World. Inside the supplement there's a design for a compact standmounting loudspeaker using carbon fibre drive units for exceptional clarity, a test of the new Maplin Millennium 4-20 valve amplifier, the theory behind the legendary Tractrix horn loudspeaker explained, a test on an affordable noise meter from Valley Audio as well as letters and news from the world of kits.

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Your chance to win a superb chrome plated Aura system worth over £1150. The system comprises Aura CD-50 CD player VA-80 amplifier and SP-50 loudspeakers. 66



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For 25 Years we have created superb sound and now we have produced the perfect combination of sound and design with the Lifestyle range. To create loudspeakers which produce pure full bodied sound without coloration was an achievement, then to create stunning designs to match was a unique, unparalleled technical and engineering accomplishment.

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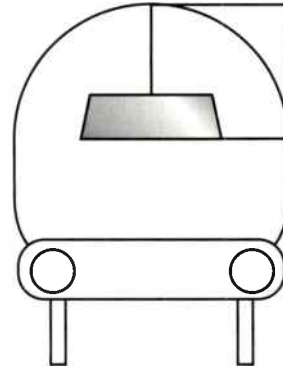
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or Pure Silver. Our main cables add weight, power and scale. Non inductive RF filtering (£10.00) and over voltage protection (£3.00) enhance performance still further. Gold plated AV cables, both RF (£19.95) and Scart (£23.52), help bring picture quality in line with NICAM sound resolution.

Valves, capacitors and transistors are all microphonic, they cannot perform optimally if vibrated. Our set of three Brass Isolation cones (£6.50) are worth their weight in gold - revealing low level resolution and dynamics hitherto hidden beneath electronic noise. We also have a cure for your noisy fridge or central heating motor (£3.50), enabling you to throw away your big mains noise suppressor, which has been giving you that "sat upon sound" for years.

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### Lumley ST70 power amp

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Hi-Fi News June '94

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## COMPACT DISC TO BE REPLACED!

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### PHILIPS, SONY AND MATSUSHITA READY TO ANNOUNCE HIGH DEFINITION CD.

After lengthy secret talks to reach agreement on a new worldwide standard, Philips, Sony and Matsushita (Technics/Panasonic) will shortly announce a greatly upgraded CD format, to be called HDCD (high density CD). Not to be confused with the HDCD (High Definition Compatible Digital) system of Pacific Microsonics in the USA, this new system relies on technology advances right across the board.

Normal 5in discs will be used for compatibility, but with a storage capacity increased to approximately four times that of current CDs, rising from 600 megabytes to an astonishing 2,500 megabytes. This has been achieved by improving the lasers and the disc production process, in order to tighten tolerances and pack more tracks onto a disc. Doubtless, a more efficient digital encoding system will be adopted too, which will also contribute to the capacity increase.

Apparently, every aspect of the CD specification will be improved for HDCD. Bandwidth will rise from 21kHz to at least 30kHz - and it may go further. The digital description of signal level will also improve, increasing to 18-bit or more. Sources tell us this tends to make HDCD sound less hard and sterile than ordinary CD - more analogue like in fact.

Old CDs will play on new HDCD players, but new HDCDs will not play on old players. After the official announcement of the new standard, due mid-October, players are set to reach the shops within a year or so.

The big question is: how will the music business price HDCDs? If they display the sort of naked avarice paraded with DAT, MD and DCC, where discs and tapes were priced from £15-£30, then HDCD may be stillborn, even in the absence of any competitive system. Otherwise HDCD will, ultimately, replace CD as we know it today.

### NEW KEF REFERENCES FOR '94

KEF Audio have announced their latest line of Reference Series loudspeakers. There are four new models to start with, all using a revised Uni-Q driver. It combines a 160mm midrange cone with a 25mm cloth dome tweeter mounted co-axially.

Features of the new range include gold plated terminals, OFC copper wiring, gold plated solid brass feet, and a rigid plinth-like base that can be loaded with lead shot. Unfortunately, prices were unavailable at the time of going to press, but a KEF spokesman did say that the new Reference Series should be available by the middle of September, to coincide with Live '94.

**KEF Audio**  
Tovil, Maidstone,  
Kent. ME15 6QP  
Tel: 0622 672261



## **SUPER SIMPLE NAD**

NAD have just announced a new budget amplifier aimed at the first time audiophile and students alike. The NAD 310, released at the end of August, costs just £129.95 and offers 20watts power output, but with very high current ability due to a hefty toroidal transformer, allowing it to drive low impedance speakers. NAD claim that the low price and high performance are a result of their new 'Super Simple' circuit topology which uses fewer components than usual.

### **NAD Marketing**

**NAD Building, 410-405 Nether Street,  
London. N3 1QG  
Tel: 081 343 3240**

## **TANNOY'S NEW PROFILE**

Tannoy have launched their new range of loudspeakers, the Profile series. There are six loudspeakers in the range, two stand mounters and four floorstanders. Tannoy claim they offer an enormous step forward in design, aesthetics, materials, technology, sound quality and value, so with all this going for them they ought to be something special.

The range extends from the £149 631s up to the £599 638s, all benefiting from low diffraction rounded baffles, rigid side rail cabinets and quality drive units. We hope to bring you reviews of the Profile series loudspeakers in the coming months.

### **Tannoy**

**Rosehall Industrial Estate,  
Coatbridge, Strathclyde.  
ML5 4TF  
Tel: 0236 420199**

## **A NEW CLAVIS FROM LYRA**

Scan-Tech have announced a replacement for the Lyra branded Clavis moving coil cartridge. A range of improvements are said to give the Clavis D.C. more resolution, dynamics, and improved sound-staging. The Clavis D.C. will cost £995.

### **Path Premier**

**Unit 2, Desborough Industrial Park,  
Desborough Park Road,  
High Wycombe, Bucks. HP12 3BG  
Tel: 0494 441736**

## **INTERCONNECT SOLUTIONS**

Acoustic Solutions, a new company based in North Staffordshire, have launched into the hi-fi market with what they claim is an innovative range of interconnects. There are six cables in their range, from the entry level copper Nexus cable at £24.95 for 0.3m terminated with phono plugs, up to the silver plated, solid

screened Intrinsic Link at £189.95.

### **Acoustic Solutions**

**46a Market Street, Longton,  
Staffordshire. ST3 1BS  
Tel: 0782 595330**

## **THE ART OF NOISE**

The omni-directional Art Noise loudspeaker, using the unique omni-directional Top 101 drive unit previewed a few years ago in Hi-Fi World, has finally been formally launched by Tabula Rasa.

### **Tabula Rasa**

**Tel: 0302 772218**

## **ORANGES & LEMONS**

No, the old rhyme hasn't been launched as a single just yet, but a new hi-fi dealer going by its title has just opened in Battersea, South London. Oranges & Lemons has comfortable home-like demonstration rooms in which equipment from Arcam, Meridian, Mission, NAD, Naim and many others can be auditioned.

### **Oranges & Lemons**

**61-63 Webbs Rd,  
Battersea, SW11  
Tel: 071 924 2040/3665**

## **SON OF ORPHEUS**

Following the £8500 Orpheus with its own dedicated CD convertor and valve drive amplifier, Sennheiser have launched a more affordable headphone, the HE60. The HE60 headphones feature an advanced electrostatic driver which Sennheiser claim offers almost perfect piston motion. The foil polymer diaphragm is coated with a 1-micron thick layer of gold and then dynamically suspended between two gold-plated counter electrodes.

Power is delivered to the HE60 headphones via the dedicated HEV70 pure Class A high voltage amplifier. Other touches include leather and velvet ear cushions and a Kevlar reinforced headset lead. The HE60/HEV70 headphone system is priced at £995.95.

### **Sennheiser**

**12 Davies Way,  
Knaves Beech Business Centre,  
Loudwater, High Wycombe,  
Bucks. HP10 9QY  
Tel: 0628 850811**



## **SHOWS**

### **SCOTTISH HI-FI SHOW**

Scotland will be having its own hi-fi show at the Royal Scot Hotel, Edinburgh, over the 4th, 5th and 6th of November 1994. Organised by Hi-Fi Corner, who have stores in Glasgow, Edinburgh and Falkirk, a wide range of exhibitors will be present, including Hi-Fi World, together with World Audio Design kits.

If you'd like to see and hear real esoterica, like our zero-feedback 300B valve amplifier or carbon fibre loudspeakers - come along. Impecunious? (skint!) Don't worry, 'cos we'll have our budget 4W Single-Ended and K5881 valve amps too.

Exhibitors - Arion, Audiolab, Arcam, Aiwa, Audioquest, Audiomeca, Bose, B&O, Beyer, Chario, Cyrus, Counterpoint, Finlux, Jamo, Kenwood, Kelvin, McIntosh, Mission, NAD, Onkyo, Project, Panasonic, Ruark, Sennheiser, Target, Teac, Tannoy, Triangle, TDK, TDL, Technics, World Audio Design.

(Linn will be exhibiting at the Edinburgh Sheraton on Sunday

6th - see below)

Royal Scot Hotel, Glasgow Road, Edinburgh.

Friday 4th November 11am - 7pm;

Saturday 5th, 10am - 7pm; Sunday 6th, 10am - 6pm.

Admission free. Contact Hi-Fi Corner: 031 556 7901

### **HEAR LINN LIVE**

Linn go on the road soon, demonstrating their entire product range in one-day shows held in conjunction with Linn dealers. There will be seminars and live performances too. They kick off at the Grosvenor House Hotel, Park Lane, London on Sunday October 16th, 1994, then move on to the Crown Plaza Holiday Inn, Manchester, on Sunday October 23rd. The last venue is Edinburgh's Sheraton on Sunday 6th November 1994, at the same time as the Scottish Hi-Fi Show at the Royal Scot Hotel (see above), Edinburgh

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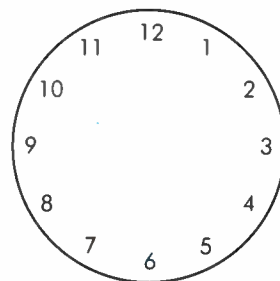
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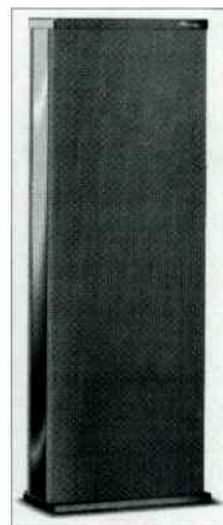
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# ARCAM'S CONVERSION

**Noel Keywood assesses Arcam's conversion from silicon chips to in-house circuitry in their new Black Box 500 CD convertor.**

**A**t first I thought the Black Box 500 CD convertor was a sort of goodied up Black Box 50 - same electronics, but with more gizmos. It has lots of inputs and outputs, remote control of volume and looks very busy. I was wrong. With Black Box 500 Arcam have quickly followed in the footsteps of Pink Triangle and DPA Digital who, with Da Capo and 1024 respectively, have sought to improve on current one-bit convertor chips - especially Philips'

TDA1547. The new Arcam Black Box 500 has its own one bit convertor inside, which makes it quite a lot different from most other digital convertors - and potentially better too.

In Arcam fashion, the Black Box 500 seeks to be competitive - it's priced at £749.90, which is quite a lot lower than the Pink and DPA convertors. Put it with the Arcam Delta 250 transport and you've got a top flight two-box CD player costing just under £1500. Yet

even with this pricing, Black Box 500 offers a host of user friendly facilities, most notably remote control. It has no fewer than seven digital inputs and two digital outputs for recording which can be switched to any input, giving separate record and listen functions. All switching can be carried out by remote control.

In providing so many inputs it appears Arcam have tried to cater for every whim. There are so many, not because they expect owners to possess

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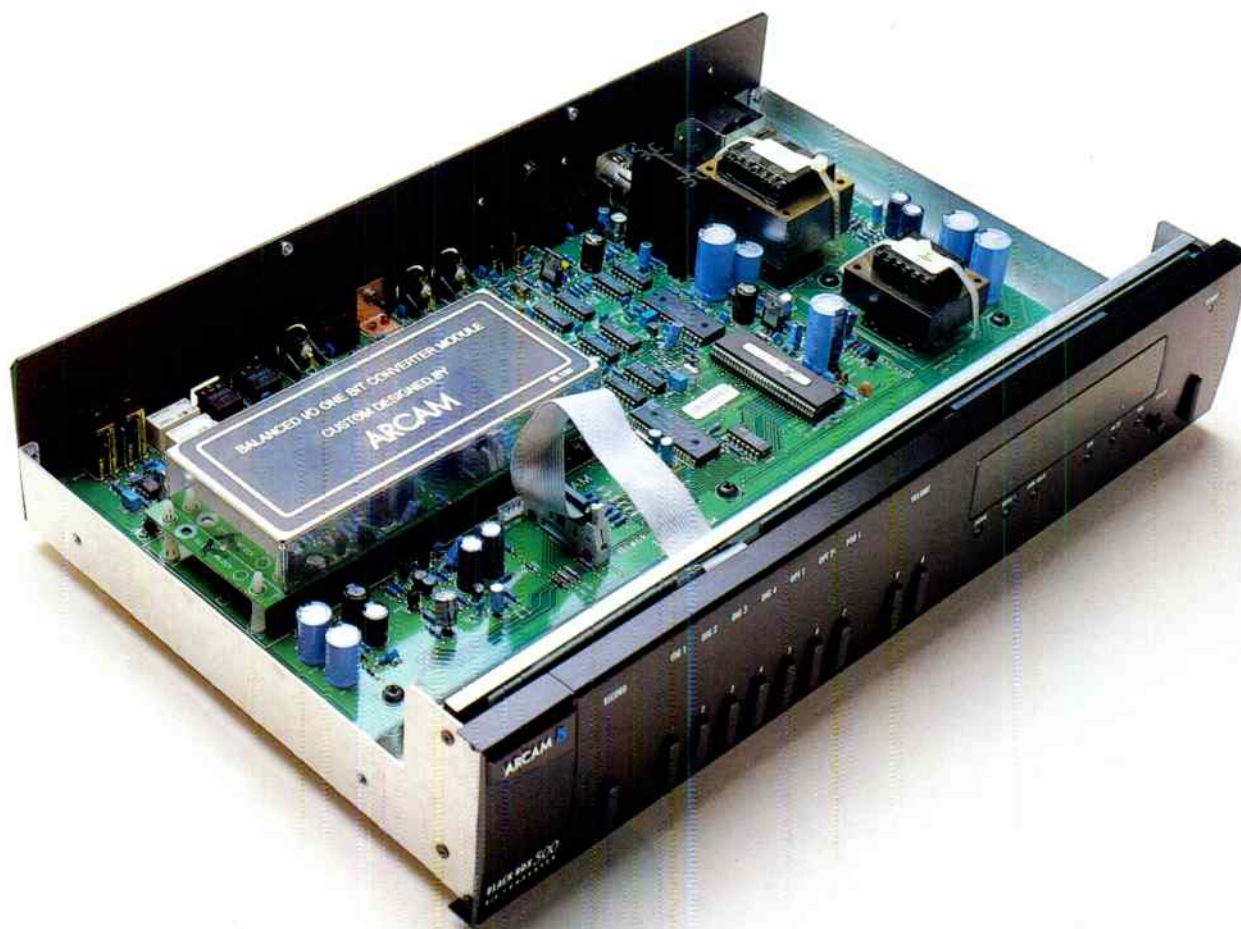
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seven CD transports and will want to switch between them, but because enthusiasts buying equipment at this level have specific ideas about what they want and will bypass products that can't provide it, so all options have been provided. There's a balanced AES/EBU standard input (50/15 $\mu$ S de-emphasis) through an XLR socket, two electrical inputs through normal phono sockets, another two electrical inputs through BNC sockets (75 $\Omega$ ) and two optical inputs through TOSLINK cables.

Arcam rate XLR/BNC most highly, phono next and TOSLINK last. However, whilst TOSLINK has become a little discredited lately I would suggest it is an option always worth trying, giving an easier and often more fulsome sound than the generally more precise electrical connections.

The BB500 has its own remote control handset, which is different to that supplied with the Delta 250 transport. Since the two work together Arcam give owners conflicting options here, but the difficulty isn't a major one. Main differences are that the transport handset has a numerical keypad for track selection, but no input selector for the BB500, whilst the BB500 handset lacks a keypad,

but can input select, as well as control an Arcam amplifier and tuner. Not wanting to do any of this I found the transport handset most useful. Both have volume control and both have Display off too.

The transport also has the most useful display, showing track and time simultaneously in large green numerals. BB500 shows the input selected and volume control level, available in 1dB steps from full output (2.3V) down to -90dB. Whilst remote control of volume is very convenient, it always carries drawbacks. Arcam have decided to employ a hybrid solution giving digital control of volume over a 17dB range, with switched analogue attenuator steps. It's been very cleverly implemented. The attenuator pauses momentarily whilst the analogue part kicks in. However, digital volume control reduces resolution and increases distortion. It's generally best to leave these things at maximum and use an ordinary volume control - and this was very much the case with the BB500. Only at maximum and -10dB (-28dB/-38dB etc) did the volume control produce no extra distortion.

### SOUND QUALITY

I used the BB500 against a Pink Triangle

Da Capo and EMF Crystal to assess it, finding some distinctive properties and fairly strong system dependency - much like Black Box 50. Put bluntly, this means you can love it or hate it, depending much upon the system you use. Black Box 500 certainly has a bright sound, one that at times I found acidic and hard, yet you may never notice. It all depends upon the tweeter of the loudspeaker: if it goes all the way up to 20kHz, flat, like our KLS4 or the Tonigen ribbon of the Heybrook Sextets - both of which I used with BB500 - then BB500 can sound unpleasantly bright, producing piercing treble from some CDs in particular. I ran into trouble with Londonbeat's Katie, thin sounding guitars and sharply sibilant vocals making listening difficult. The closely miked guitar strings of Steve Earle on *Guitar Town* are incisive at the best of times, but from BB500 they developed a graininess that was none too pleasant.

However, many loudspeaker tweeters don't reach 20kHz smoothly; they either roll off gently or dive down precipitously above 16kHz or so. This makes for fairly amenable - often sweet - treble. It also removed the obvious sharpness from BB500 I found. The convertor worked well through many of



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the loudspeakers in our loudspeaker group test this month.

So much for the BB500's brightness.

There was more to it than just this however. Two fine properties that I'd attribute to its in-house designed one-bit convertor are excellent denseness of timbre (I'll explain!), plus an ability to keep separate musical strands apart, making for better than usual intelligibility.

Somehow, I couldn't say the BB500 has richness of timbre. This could be misleading, because it doesn't have a rich sound - nor does Da Capo - as such; both convertors are very analytical and perhaps a trifle remorseless. All the same, BB500 gives vocalists and instruments a good sense of solidity and timbral denseness. Perhaps this comes from the way it finds and separates detail; John Lee Hooker's gruff tones come over well and the band members stayed apart on Boom Boom; on some convertors/players this track descends into a muddle. BB500 could not quite match Da Capo for sheer clarity or dynamics, but it came very close most of the time, which is a fine performance for the price (Da Capo is more expensive and, in my view, one of the best convertors available).

A dry, almost reticent bass quality became apparent in contrast to EMF's Crystal convertor. The Crystal chip set is known for its powerful bass; it was a pity that BB500 couldn't rustle up a bit more in order to achieve a better sense of balance.

Violin and massed strings seem to stress hi-fi components like no other instrument, probably because of the high frequency energy they possess. It was with strings that I found BB500 sounded least happy. The massed strings of the Royal Philharmonic merged together and sounded compressed during crescendos in the 1812. Here, Da Capo showed it was in another league altogether.

Also, I more clearly began to discern something almost subliminal that had been bothering me about BB500 - its peculiar 'greyness' of tone. With strings this character became more obvious, seeming to be a combination of upper midband muddle and compression producing a hardness and greyness in the sound. Unlike EMF's Crystal, or Quad's 67 CD player, the BB500 possesses little sweetness.

Perhaps after cataloguing a litany of weaknesses I need to get some perspective into this review. Black Box 500 does sound clearer in its portrayal of instruments than most CD players and equivalently priced rival convertors. It also comes over as full bodied in its sound. In these important areas it can

battle it out with the best of them. But with me it ran into heavy waters. I just happened to listen to CD through

Heybrook Sextets (flat to 20kHz), our own KLS3s (same) and KLS4s (same). I'm sensitive to treble quality and BB500 doesn't do very well either with such loudspeakers and a listener of my outlook.

Paired with, for example, Rogers

Studio 3s it sounded much more amenable, except with orchestral strings, when strain obviously set in.

Pink Triangle's Da Capo is an impossibly hard act to follow, but I can say in its favour that BB500 stayed close

*“The BB500 gives vocalists and instruments a good sense of solidity and timbral denseness.”*

on rock music, falling behind conspicuously only with classical. That's a great performance for the price. Had I used BB500 after an ordinary CD player, with a system less analytically revealing at high frequencies, then this review might have been altogether more flattering.

As it stands though, I have to say that whilst this convertor is good value, some of its characteristics are a little less than aurally friendly and, put into the wrong system, it won't please. It's definitely worth a listen, but preferably in a complementary system able to make the most of its strengths whilst concealing its weaknesses ●

**Arcam BB500** £749.90

**Arcam 250** £749.90

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MEASURED PERFORMANCE

Our frequency response analysis clearly shows a steady treble rise above 5kHz and even though the total lift amounts to only +0.15dB or so, our experience shows that such a lift is audible as brightness in the sound. With CD, tonal neutrality comes from a slight fall in response, something Arcam have traditionally offered with their players, so the BB500 is something of a departure in this respect. In line with past experience I identified brightness in the sound before measuring this convertor, so the treble lift came as no surprise.

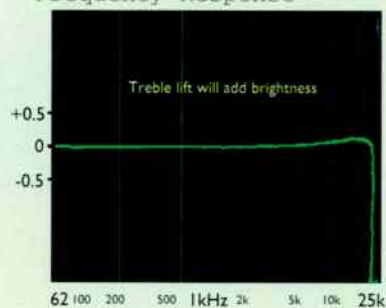
Along with brightness I felt there was a hint of treble coarseness in the sound. This is more difficult to explain, but there was some uncorrelated quantisation noise in one channel of our review sample and the digital volume control produces additional noise and distortion. The other channel was clean, however, and overall distortion levels proved very low right through the convertor's dynamic range providing the digital volume control was set to maximum and left there.

There were virtually no unwanted spurious products above 21kHz; Arcam have used excellent filtering. Channel separation was high, output normal at 2.2V and noise low. Low distortion helped toward a high dynamic range value of 107dB.

The Arcam Black Box 500 measured well, but there are indications as to why it has the sound I heard. All the same, few companies in the world are able to design and produce a dedicated one-bit convertor and wringing this performance out of an original design is impressive. **NK**

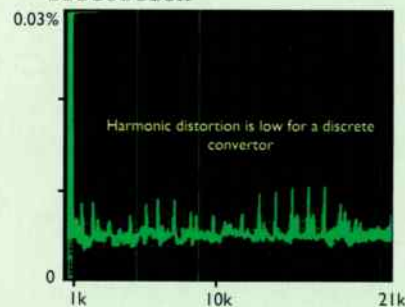
Frequency response	3Hz-21.2kHz	
Distortion %		
-6dB	0.003	0.002
-30dB	0.007	0.006
-60dB	0.4	0.4
-90dB	29	30
-90dB dithered	5	8
Separation dB	left	right
1kHz	100	106
20kHz	82	88
Noise		-97dB
with emphasis		-97dB
Dynamic range	107dB	
Output	2.2V	

Frequency Response



62 100 200 500 1kHz 2k 5k 10k 25k

Distortion



TEST RESULTS

"The audio levels generated by Chameleon can cause serious hearing damage. Suitable ear protectors should be used in any high audio level environment." I pushed my Cerwin Vega ear plugs into place and pressed play on the remote control. After a few seconds I realised all was safe: the Quads were still standing. Instead of a vicious onslaught of harsh treble, hard and cold midrange and massive bass - something I was partly expecting - a surprisingly subtle, sweet and gentle rendition of Primal Scream appeared from the Quad Electrostatics.

Looking at the front panel of the Chameleon 900S I noticed that the signal indicators weren't lit, even though the insensitive Quads were filling the room with sound quite nicely. Pushing the volume control up a notch higher gave a brief flicker: obviously the Chameleon wasn't delivering what Malcolm Hill, the designer, deems as an "adequate signal". As far as the Chameleon was concerned, driving the 82dB sensitive Quads to high levels in a domestic environment was a walk in the park, not even worthy of bothering the signal indicators.

This was just a hint of what the Chameleon could offer; Noel later measured 288watts into 8ohms and an impressive 440 into 4ohms. Malcolm Hill calmly mentions that when monoblocked, the Chameleon can deliver a full 2000watts. This is the kind of power you'd

with the pro style front panel attenuator controls on the fascia. If you have to have insensitive loudspeakers, the Chameleon provides the tonic needed to get them going.

Something had to be missing, and it was - the hype. There is no techno jargon in the handbook, just helpful information and a circuit diagram so that any engineer can quickly service and repair anything that may go wrong. This is a no-nonsense power amplifier: you can plug it in and forget it. You need never worry about the load your loudspeakers are presenting nor of running out of power at one of those noisy parties you have now and again.

As I mentioned above, the most surprising thing about the Chameleon is its smooth and rich sound, almost more valve than transistor. It was noticeably warmer in the treble and richer lower down than the DPA 50S I normally favour for review purposes. The DPA is one of the cleanest sounding transistor amplifiers I've come across in the treble, and although the Chameleon didn't have quite the same ultimate level of clarity, it had a similar ability to steer clear of the semiconductor coarseness that plagues many solid state power amps.

The atmosphere of Counting

Crows' August and Everything was captured beautifully by the Chameleon. This recording was made in the living room of the band's house in Los Angeles, then mixed at a local studio. Much of the atmosphere of the room survived the production process and the result is a superbly live acoustic, helped along by energetically played Hammond organ, harmonica, pedal steel guitar and a wealth of other well recorded instruments. Vocals were produced with a liquid fluidity, forward and textured giving the sound stage real scale.

As you'd expect, bass was pretty good too. The Quads have a tendency to flap here if left to their own devices. The Chameleon was having none of it though, gripping the diaphragms firmly and producing a taut and staunch bass line from bass guitar and drums. Again, as with the upper registers, it had character too, the resonant strings of Lou Reed's Walk on the Wild Side allowed to flourish and grow without becoming hard or forced in any manner.

## KILLER

expect from an amp the size of a small fridge, not the slimline and elegant 1U (42mm) height alloy case sitting between the speakers.

Whilst I'm talking about the casework, you may have noticed it's a little out of the ordinary. The whole amplifier is made from a complex arrangement of alloy extrusions, to give an aerodynamic space age style; it wouldn't look out of place in Star Trek: "watch out Captain Kirk, the Chameleons are attacking from the starboard bow".

So, stylishly built, immensely powerful, and with a delicate and detailed sound - what price for such an amplifier? If I told you it was £2000 I doubt if you'd be surprised. But it's not, and you will be surprised to learn that it could be yours for just £760. In fact, if you wait a month or so, there'll be a £699 version that does away

William Baker inserts his ear plugs to  
enjoy the Chameleon 900S 300W  
professional power amplifier.

**MEASURED PERFORMANCE**

It's been a long time since I've seen an amplifier as radical as this one, at least in chassis design. Some areas of performance are startling too. Power output, for example, measured no less than 288watts into 8ohms and an astonishing 440watts into 4ohms. Before you gasp and ask how they do it, let me say that technically it isn't so difficult, providing the amplifier is Class A/B or B. It's the heat sinking and dissipation that's potentially a problem and in this respect the Chameleon is meant strictly for music. With test signals its all-alloy case, which doubles as a heatsink, rocketed in temperature, the heat sink area is so small.

Traditionally, the trouble with big power amps has been a lack of subtlety in their sound. Quite often, piercing treble, caused by crossover distortion, has been the culprit. The Chameleon avoids this problem quite effectively, producing predominantly second order harmonic

distortion at high frequencies, albeit with some small contribution from higher order crossover components, shown in our analysis of a 10kHz signal at 1W output. Distortion levels were low all round, even at high frequencies and high power outputs; I measured a maximum of 0.1%.

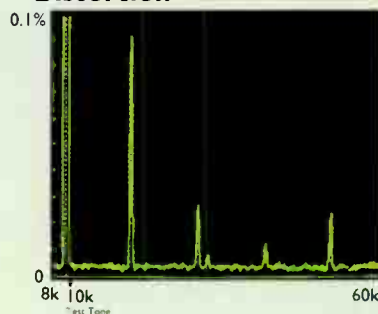
Sensitivity was low at 1V, meaning the Chameleon needs a preamplifier with gain. Bandwidth stretched from 12Hz up to 70kHz, -1dB - a fairly wide window at high frequencies. It's certainly appropriate for hi-fi work. There was a small amount of d.c. output offset at the speaker terminals, but at -40mV maximum it was low enough not to be a problem.

The Chameleon is very well engineered and very well suited to hi-fi use, for those that want something different, when different means just that - not worse! **NK**

**TEST RESULTS**

Power	288watts
CD/tuner/aux.	
Frequency response	12Hz-70kHz
Separation	80dB
Noise	-109dB
Distortion	0.035%
Sensitivity	1V
dc offset	-40/-21mV

**Distortion**



Where the Chameleon does draw some criticism is in its ability to resolve fine detail. The DPA excels here, resolving low level information that passes most amplifiers by.

The Chameleon, although good, couldn't retrieve quite as much from a recording. The main lead instruments were clear and focused, and not compressed in any way, but behind these there wasn't quite the depth of information that a few of the better solid state designs can reach.

# CHAMELEON



It could sound a little two dimensional in this respect, if that's the best way to describe it. I doubt if this would be quite so obvious on average-sensitivity cone loudspeakers, but both the Quads and highly sensitive cone loudspeakers can be ruthlessly revealing in this area. As a partner for any of the lower sensitivity mini-monitors in this month's group test though, the Chameleon does the job as well as any hi-fi amplifier could, if not better ●

**Chameleon 900S** £760  
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# SPACE SAVERS

Here are five high quality mini-monitors for those with space problems.

Dominic Baker finds little boxes can make a big impact. Alestar Kells gives a second opinion.

Not everyone has space for a large floorstanding loudspeaker, but that doesn't mean that you can't enjoy high quality sound reproduction. There are a large number of high performance miniature speakers available that can be stand, bookshelf or even wall

bracket mounted. Here's a group of some of the finest.

First of all, I should introduce the BBC LS3/5a, which is as much a specification as a loudspeaker. For those who are new to hi-fi, or have somehow missed out on this compact little monitor, it's the

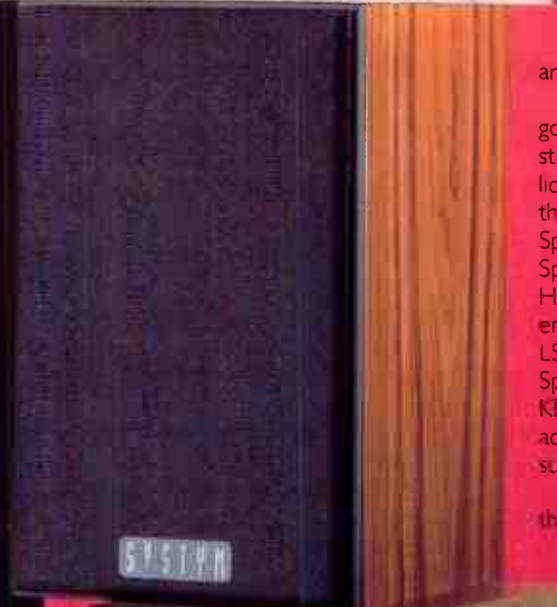
miniature 'speaker that set standards back in 1974. Developed by the BBC for Grade II outside broadcast monitoring, it found its way into studios and other areas where accurate monitoring was expected. It used, and still uses, high quality KEF drive units and was engineered to give a particularly neutral

and accurate sound. The level of engineering was so good in fact that three companies still produce the LS3/5a under licence today, Rogers (who supplied the review samples for this test), Spondor and Harbeth. In fact, Spencer Hughes and Dudley Harwood were the original BBC engineers responsible for the LS3/5a and went on to form Spondor and Harbeth respectively. KEF also hold a licence, but don't actually build the LS3/5a, but do supply the drive units.

The other four that make up this test group of mini monitors are Harbeth's HL-P3s, Rogers Studio 3s, ProAc's Tablette III Signatures and Systemdek's System 931s. All use high quality drive units and crossover components in a compact enclosure in similar style to the original LS3/5a, but each reflects their designer's outlook.

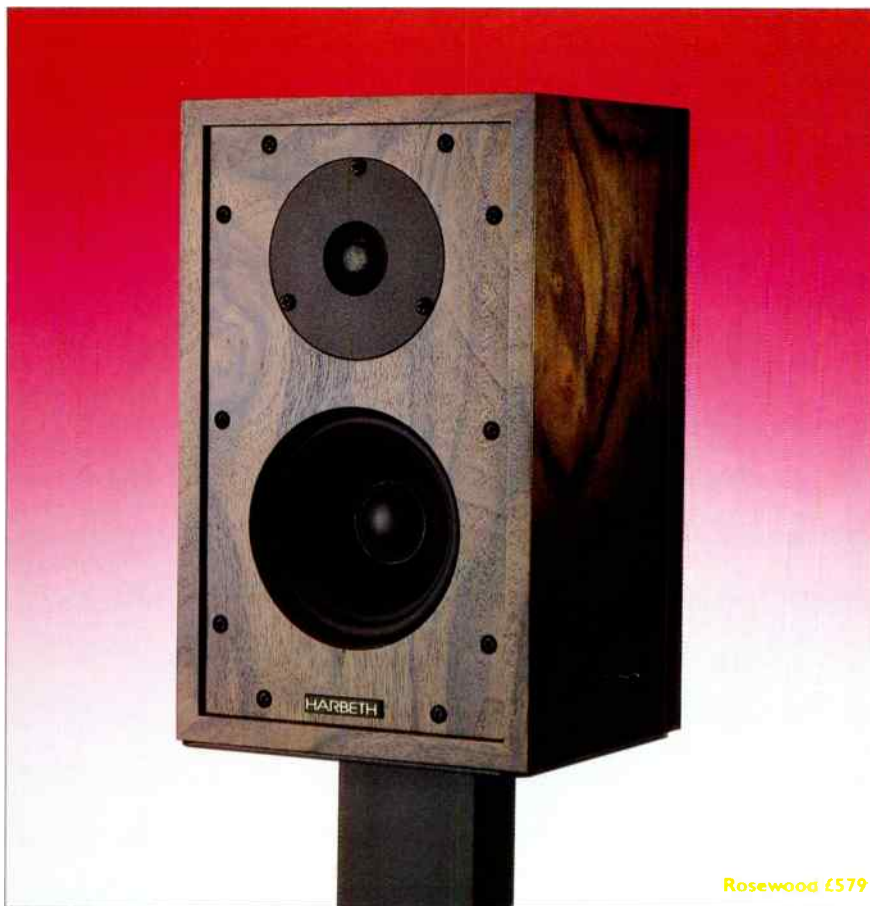
All of these mini monitors were treated to a 20hour run in period and were used with a powerful solid-state DPA power amplifier. This gives them a chance to show what they could do, regardless of the load they present. But beware, because some are an

awkward load and care with amplifier matching is necessary.



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HARBETH HL-P3



Rosewood £579

From the first few bars of Lou Reed's *Transformer* I knew that there was something unmistakably right about the HL-P3's sound. On the intro of *Walk on the Wild Side* they went low enough to catch the fundamentals of the double bass complete with its resonating fret board, giving it a rich, woody character. Whilst the low bass was a little muted and softer than it really should have been, what was happening above caught my attention.

The highly pitched, soaring violin sounded smooth and unbroken as its notes slowly slid into each other. The treble possessed the ability to clearly differentiate each individual note, yet at the same time convey a tune. Lou Reed's voice had real body, the full contribution of his chest and throat revealed when he sang into the closely positioned microphone. The HL-P3s offer strong insight into recordings, drawing my attention to an error about three minutes into the track where his voice becomes muffled on the left loudspeaker, caused by what sounds like a sloppy bit of tape editing.

But the slow bluesy nature of *Transformer* isn't the only style in which the HL-P3s excel. Blur's upbeat pop songs on *Parklife* fared equally well. The punchy upper bass of the P3s was used to the full by the speedily plucked bass strings and cymbals, aided by a suitably metallic ring from the metal dome tweeter. The richness in the upper midrange that suited Lou Reed so well wasn't quite as successful with Damon Albarn's higher pitched and dryer vocal tone, removing a touch of clarity. This was a minor point though, and considering how well focused the

midrange is, not one to worry unduly over.

These 'speakers knit a performance together, working extremely well to produce a firm and believable image that stretches to fill either side and back-to-front on the soundstage. I suspect that this effect is produced by a combination of accurate pair matching and coherent phase between the two drivers in each cabinet.

This ability to see into a recording couldn't be more noticeable than with the Cranberries' album *Every One Else Is Doing It, So Why Can't We?* The airy and ambient atmosphere of Dolores O'Riordan's rich folksy tones at centre stage were delivered as a complete and cohesive whole. Cymbals sounded sweet, vocals pushed out from the midrange and kick-drums punched forwards in the bass, collectively uniting to present a realistic performance **DB**

The HL-P3s struck me as a well balanced speaker capable of dealing with most types of music. Going in with a touch of Billy Idol proved rewarding, marred by a slight treble colouration I found a little undesirable. On rock tracks in general the bass can really drop to a low frequency. Carly Simon's vocals sounded beautiful through these speakers; they give natural vocals. As Dominic mentions, the HL-P3s are revealing, making them unforgiving of bad studio engineers. They give a good feel for what is going on in the studio. **AK**

**Harbeth Acoustics Ltd., £479**  
**Unit 1, Bridge Road,**  
**Haywards Heath,**  
**W. Sussex. RH16 1UA**  
**Tel: 0444 440955**

## MEASURED PERFORMANCE

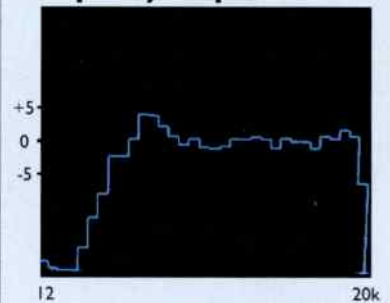
Under measurement, Harbeth's HL-P3s had a smooth and well controlled frequency response. From lower midband through to upper treble there is only around +/-1dB of variation - a superb result. Treble does show a slight lift, but I'd suspect this to add a pleasant brightness to the sound rather than a sharp sting.

The bass peaks up in similar fashion to that of the original LS3/5a, which should give the HL-P3s a similarly speedy, punchy bass. I'd expect the HL-P3s to sound tonally smooth and neutral, with good bass attack.

Of the group though, the HL-P3s are the most awkward load for an amplifier. Loudspeakers are always a trade-off and this is the one Harbeth have chosen for the HL-P3s. Sensitivity measured at 1m using a nominal watt of pink noise was just 83dB, only 1dB higher than the original LS3/5as. So, straight away you are going to need plenty of volts to get good volume levels. But for amplifiers, things get worse with the impedance characteristic.

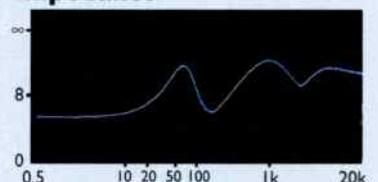
The overall figure of 6.7Ω hinted that the 'P3s were going to need an amplifier capable of delivering a healthy dose of current. Looking at the impedance curve it is easy to see where the 6.7Ω overall figure comes from, at 200Hz and again below 50Hz impedance falls to a crippling 3.5Ω. I'd recommend searching out a high current, solid-state 150watt power amplifier for optimum results. **DB**

### Frequency Response



Smooth response, but bass peak will add good bass punch and treble lift some brightness.

### Impedance



Impedance dips to 3.5Ω in the bass so use an amplifier that can deliver plenty of current.

## MEASURED PERFORMANCE

ProAc's Tablette III Signatures had the least flat response of them all, which is surprising. Firstly, because they are the most expensive and, secondly, because this is one area where ProAc are usually very good. Their bass was flat with no lift so I'd expect lighter bass than the other speakers in the test.

Between 1kHz and 5kHz there was a wide dip in output, 2-3dB below the bass and tweeter level. This I would almost certainly expect to reduce midrange presence and attack, possibly causing the Tablettes to sound a little soft or recessed. Above this you can see the tweeter come in, rising in output to a peak at 16kHz. This rising treble response usually results in a bright or sharp character, but in this case the use of a high quality soft dome tweeter should ensure the former rather than the latter.

As far as driving the ProAcs is concerned, they are one of the easiest in the group. The sensitivity measured at 1m using a nominal watt of pink noise was 84dB, lower than most loudspeakers, but higher than all but the Systemdeks in this mini-monitor test. Impedance was high too at 11.2Ω, so they will not demand much current from amplifiers. Use an amplifier of at least 80watts for best results.

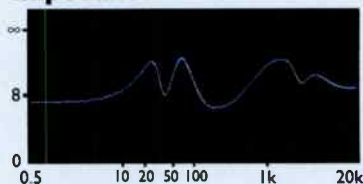
The ProAcs don't have the smoothest response, but they are one of the easier miniatures to drive, in this group at least. They are probably best suited to bookshelves rather than stands in free space due to their limited bass output. **DB**

### Frequency Response

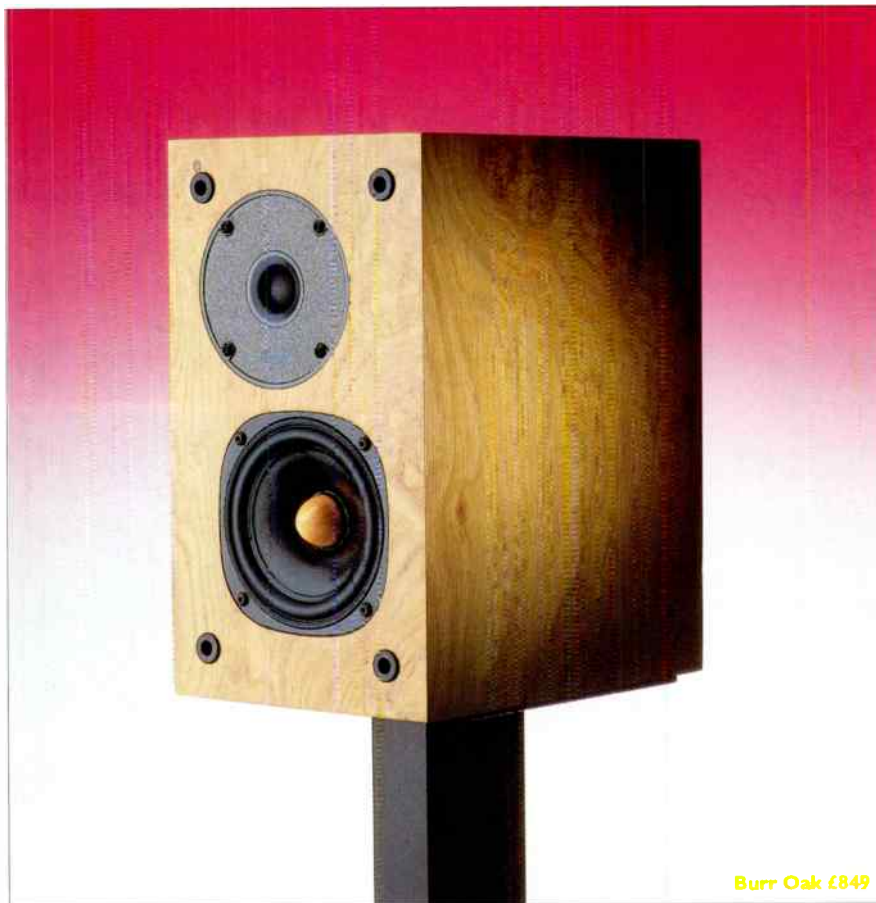


Rising treble level will give the ProAcs a bright balance and dip in midrange may reduce projection.

### Impedance



High overall impedance of 11.2Ω means the Tablettes will not demand much current.



Burr Oak £849

The most surprising thing about the ProAc Tablette III Signatures is the way they produce reasonably deep and, for the size of the cone, extremely powerful bass. The impact of foot pedal against drum skin on the intro of the Cranberries' 'Pretty was fast 'n' clear' with a real kick behind it. Admittedly, some of the deeper resonances were missed altogether, but what they do produce comes across with real verve. Occasionally, bass could become a little detached from the rest of the mix, tending towards a one note 'thud', but even then it was fast and agile.

The Tablettes suffer a similar trait at the top end. Their treble is clear but bright too, which tends to draw attention to itself. There is a slight phasey quality in the upper midband that moves into the lower treble, suggesting the two drivers aren't perfectly in tune with each other. This will probably present more of a problem with solo violin and vocal work, which tends to be centred right on the crossover point, moving up and down to either driver.

Taken as separate entities though, both the midrange and treble are exceptionally clear and clean. The midrange has the ability to project tremendous detail, propelling it forwards for the listener to revel in. Coupled with the crisp and similarly detailed treble and firm bass below, the Tablettes have a fantastically energetic and exciting sound. It is here that the Tablette Signatures have their strength, suiting the more forward and upbeat nature of rock and jazz.

Recordings really came alive with the Signatures. Crash Test Dummies, that I'd written off as mournful and dull, both in

performance and recording terms, was given a new lease of life. Percussion gained attack and a sharpness that made it sound far more pronounced, pushing its way forwards to lead the tracks along. With the treble sparkling away above and the solid bass below, this album gained some impact and speed.

The soundstage produced by the ProAcs wasn't in quite the same league as some of the others in this test, possessing a slightly two dimensional portrayal of depth. But the bright treble gives them an airy and open quality which goes some way to ameliorate this.

Imaging wasn't especially convincing either, despite the handed tweeters. The Tablettes tend to keep the two channels of a stereo signal separate, rather than blending them to fill in between the speakers. Having said this though, they still image better than most larger stand-mounters and floorstanders, if not as well as the best in this particular group.

**DB**

These speakers look good. You rarely see veneer looking this good. Pachelbel's Canon had a real dreamlike quality - it was easy to forget about hi-fi and drift away. Stereolab's Ping Pong was reproduced wonderfully, only marred by a grumbling bass line that kept interrupting the rest of the music, rather than co-existing with it.

**AK**

**ProAc**  
130-132 Thirsk Road,  
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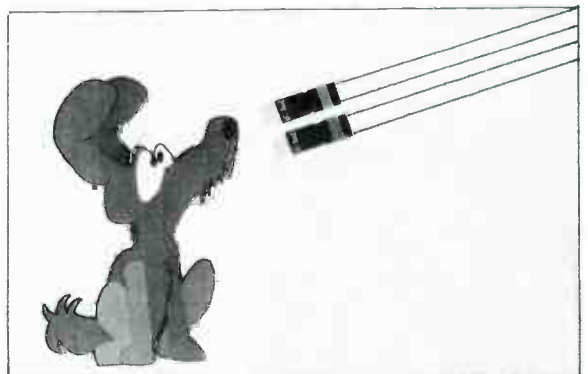
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## MEASURED PERFORMANCE

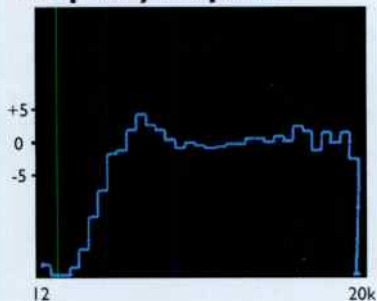
The BBC LS3/5a must be one of the longest standing loudspeakers in production today. The samples supplied for this test by Rogers use the same classic combination of KEF B110 Bextrene bass unit and T27 tweeter, which fill the front baffle. They were engineered to be an accurate near-field monitor for top quality studio work. The smooth, flat response they engineered some 20 years ago would still cause many to blush even today.

There is, however, a strong peak in the bass which gives them their characteristic bass speed and punch. A smooth, but gently rising response through the midband and up into the treble is responsible for providing an even and apparently balanced sound that is, at the same time, clear and open. The treble response does get a little lumpy, but not enough to cause serious problems.

By today's standards though, sensitivity is desperately low. Measured at 1m using a nominal watt of pink noise, I could just squeeze 82dB level from them. That's 1dB less than the notoriously insensitive Quad ESL63. Overall impedance was quite high at 10.2Ω and the impedance curve has no strong dips where heavy current would be drawn. So the LS3/5as don't actually need a lot of current, but they do need volts. I'd recommend at least 100 watts for decent levels and good drive.

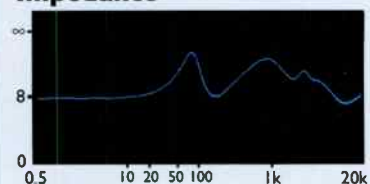
The original LS3/5a still measures well technically and in this respect the newer contenders in this test have made little progress. **DB**

### Frequency Response



Bass peak will give the LS3/5as punch and speed and the smooth response with rising treble a bright and open sound.

### Impedance



Impedance is high overall at 10.2Ω and never dips below 8Ω so the LS3/5as will not demand much current.



The LS3/5as go surprisingly low in the bass for their size. It was solid too, with plenty of weight behind it. At times it did become a little confused though, hanging around on one note a little too long, which detached bass from midrange. The deep bass kick at the beginning of the Cranberries' *Pretty* had the little Bextrene core wallowing around trying to catch itself in time for the next beat. This waffle had a tendency to set in whenever a heavy, continuous bass line was played.

The treble however, was surprisingly good. It changed from note to note precisely and without any associated resonant ringing. It has a fast, but damped character. Cymbal crashes, were quickly damped out, leaving a clear path for the following strike. This effectively separated one note from another, giving the impression of clear and articulate treble, but some of the upper harmonics that describe the atmosphere and give an openness to the sound were lost, leaving the LS3/5as with a sterile character.

The harpsichord on Blur's *Clover Over Dover* had a lovely delicate touch, but some of the 'zing' from its complex harmonic structure was missing from the top. With a more processed pop track though, the damped and speedy treble suited quite well. With strongly vocal pieces, the sheer brightness of the tweeter could add some unnecessary and unpleasant 'spitch'. Suzanne Vega suffered at the hands of this, her normally dry and hollow voice gaining a wispy sibilance in the upper reaches and a chesty thickness in the lower octaves.

Totally, the LS3/5as still came over as

accurate, though, Rogers Studio 3s, with their dryer, cooler midband are more faithful to the original, but the 3/5as weren't far behind.

Where these speakers have always been good and still compare with the best is their coherent and focused sound. A wide soundstage is created with good depth detail, giving an insight into the music. They don't produce quite the same level of information in this area as the Harbeths, which really excel, but they do enough to conjure a convincing picture for the listener.

The image focus is impressive too: they have a very directional sound which sets up a stable image without interference from reflected energy confusing things. Ultimately, more modern mini-monitors all find higher energy and more atmosphere in music, but the 3/5as have aged well and in some areas still manage to come close to modern rivals. **DB**

Although the smallest on test, the LS3/5as can kick out a good tune and plenty of bass. Any group with a guitar in their midst had a lovely sound, due to crisp upper midband projection. In my opinion, the vocals were in general a little coloured. It really didn't help to form a great overall opinion. I would class the LS3/5as as a good vintage design. There aren't many who can still perform so well twenty years on. **AK**

**Rogers, Swisstone Electronics, £690**  
**310 Commonsides East,**  
**Mitcham,**  
**Surrey. CR4 1HX**  
**Tel: 081 640 2172**

£690

ROGERS LS3/5a

£499.90

ROGERS STUDIO 3



I found Rogers Studio 3s have a softer, more laid back presentation than their competitors in this test. Whereas ProAc's Tabletes were on the verge of becoming too intense, the Studio 3s occupied the opposite end of the field. Bass was soft and warm, albeit staying tuneful and articulate throughout, whilst the midrange seemed so smooth that after some of the more forward speakers in this group it could be considered over relaxed.

However, although the midrange sounded a little less forward and lacked some of the projection of the other speakers, it was possibly the most tonally accurate of the bunch.

Bass was deep and powerful enough to give a good, balanced sound and treble came over as sweet and detailed, without justifying any accusation of being bright or peaky. The Studio 3s are very balanced in this respect, not altering the tonal balance of recordings either for better or for worse.

The super smooth Free from Primal Scream's latest album had an aura of class to it. The richly textured vocals were free from coarseness or undue colouration. Lightly strummed acoustic guitars were delicate and full bodied with a lovely resonant bloom from the thin, wooden guitar body. The Studio 3s are the kind of loudspeaker you could listen to for hours, managing to be both relaxing and informative without becoming intense.

Out of interest I tried Blur's Parklife to see if the Studio 3s were perhaps just a little too smooth to do justice to this pacy pop album. Listening to the title track, their muted upper bass punch did remove a little force and immediacy.

However, the midband and treble gained considerable numbers of browny points. The Studio 3s are very well integrated in this area, giving the correct amount of prominence to individual performers and allowing them to form a cohesive whole.

Another notable asset of the Studio 3s is their ability to fill in the gap between the two speakers. There is a solid spread of sound right across the stage.

This quality is most noticeable and convincing with performers such as Grant Lee Buffalo. Here the whole performance is held together by the solid, centrally placed image. The atmosphere of the studio was convincingly reproduced too, with a defined soundstage staying focused right to its outer edges.

It is this blend of accuracy, together with a smooth presentation that gives the Studio 3s their enjoyable and musical character. **DB**

There is always a favourite and this speaker turned out to be mine. When something actually sounds like fun it becomes hard to fault it. Only on one Angelique Kidjo track, Idje Idje, did I find the bass plodding a little. That apart, the Studio 3s were brilliant. No boxiness or colouration crept in, especially on a tricky Geoffrey Oreyama track which can kill most speakers. On all types of music there was a lovely forward projection - a little 3D is rather marvellous. **AK**

**Rogers, Swisstone Electronics, £499.99**  
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## MEASURED PERFORMANCE

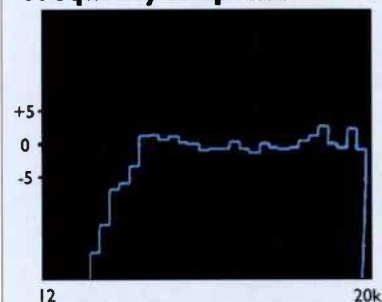
Rogers' Studio 3s possess a smooth, flat response from the bass up through to the midrange. There are a couple of peaks in the treble, at 8kHz and 16kHz, but these may well serve more to add a little brightness and sparkle rather than an unpleasant sharpness.

As with nearly all of the monitors in this test, there is an overall trend toward a wide, shallow dip through the midrange. This may remove a little projection from the midrange, but thanks to the small, rigid enclosure, I'd doubt if box colouration will result. Bass rises gently towards lower frequencies, which is likely to give the Studio 3s a firm bass quality, if not an overpowering one.

Of the bunch, the Rogers had the most well mannered impedance curve, one exhibiting a high overall impedance of 12.5Ω; both factors ease drive requirements. It was smooth and remains above 8Ω across the entire audio band, making the speaker an easy load and one of the few that will perform well with valve amplifiers. In fact, good results are likely with a zero feedback amplifier; the rising impedance through the midband will alter frequency response, pushing vocals forwards. Sensitivity was low at 83.5dB, making a good 80watts necessary for decent volume levels.

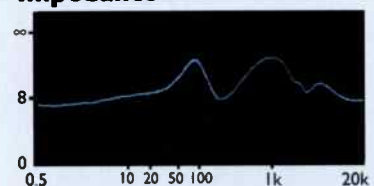
Rogers have combined a smooth response with reasonably easy drive characteristics to produce one of the best compromises in this test of mini monitors, but low sensitivity is a drawback. **DB**

### Frequency Response



Frequency response is smooth which should give a neutral balance. The treble peaks may add some brightness though.

### Impedance



Impedance is high at 12.5Ω and smooth so the Studio 3s will not draw much current.

## MEASURED PERFORMANCE

Systemdek's 931s have the flattest overall frequency response of the group. There is neither bass nor treble lift, and the midband in between is even too. I'd expect them to have a neutral balance and a reasonably faithful sound as a result.

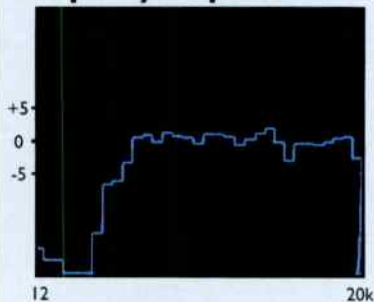
Lack of bass or treble emphasis may give the 931s a slightly less exciting balance than the others in the group, but a smoother and more polite balance can also be an advantage. There is a small lift in the upper midband that may help to project vocals out of the box, but following it is a small crossover dip, although I suspect it is not wide or deep enough to have any serious effect.

The Systemdek 931s are the most modern miniature in this group and they show it in the load they present to an amplifier. Sensitivity measured at 1m using a nominal watt of pink noise was a healthy 85.5dB, some 1.5-3.5dB more than others in the group. They will go significantly louder for the same volume control setting.

The impedance curve was also high and reasonably smooth, so the extra sensitivity hasn't been gained at the expense of drawing more current from the amplifier. Overall impedance measured 12.5Ω, a high value. In combination with high sensitivity it is feasible to use the 931s with an amplifier of 50watts or so.

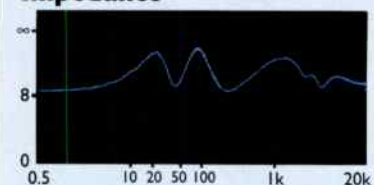
The Systemdek 931s are well engineered, combining a flat response with easier drive characteristics than the other speakers on test in this group. **DB**

### Frequency Response

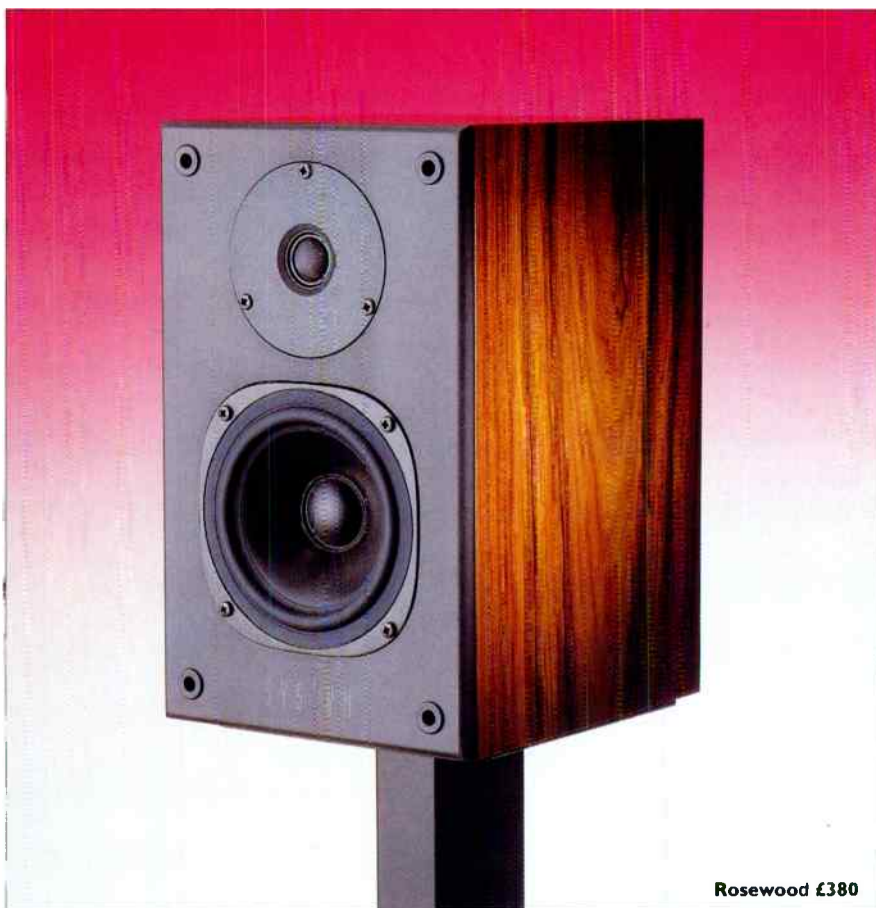


Frequency response is very smooth and flat. This will give the 931s a neutral balance without treble emphasis.

### Impedance



Overall impedance is high at 12.5Ω so the 931s will not draw much current. They are reasonably sensitive too making them the easiest load in this test.



Rosewood £380

The Systemdek System 931s are a more exciting version of Rogers' Studio 3s. They share the same balanced sound and polite, inoffensive delivery, but they do it with more enthusiasm. The midrange gains a little warmth in comparison to the dryer Studio 3s, but they were also a touch more forward, projecting midrange detail with more confidence.

With Pink Floyd's *The Division Bell* the most noticeable difference was the extra weight and authority the 931s put behind each note. Here, the 931s were only outclassed by the more expensive Harbeths. Don't take this as meaning that they're aggressive or harsh in any way, they just project so well that a performance becomes so much more real.

The bass of the Systemdek 931s benefits from a larger cabinet and reflex loading. This gave them deeper bass than I'd expected, without softness or loss of articulation appearing. It also explained why the midrange had better projection and detail. The extra bass the 931s produce allows the midrange to be pushed a little further forwards without it becoming tinny. The double bass intro on Lou Reed's *Walk on the Wild Side* had good weight and scale behind it, never becoming monotonous or overblown.

The live atmosphere of Counting Crows' *August and Everything After* was opened out by the 931s, their strong midrange projection conveying the atmosphere of the room where this album was recorded. Dry vocals, and the wide range of instruments including piano, harmonica and steel guitars, were all produced with superb focus and clarity,

only a slight thickening of tone making itself known in the upper midband. The extra brace fitted to the new 931s does seem to damp the box well in this area, leaving only the cone material's character to colour the sound.

The treble of the 931s was clear and sweet and played a tune respectably well. It didn't have quite the same ability as that of either the Harbeths or the ProAcs, both of which could change from note to note in the treble precisely and cleanly, and with a dexterity normally found in more expensive designs. The 931s weren't far behind, but didn't seem to have quite the same number of notes in their vocabulary. Having said this though, their treble was less forced, adding a delicate brightness to the upper midrange without drawing attention away from it. **DB**

As the 931s are very similar to the Rogers Studio 3s, their sonic performance was familiar. You can tell that these speakers are close partners. Differences between Dominic's observations and my own are attributable to differences in partnering equipment. I heard a definite boxiness, especially with Joan Baez and Zouk Machine. Deep bass, however, was apparent. This is always an eye opener when you're dealing with a speaker of this size. You can't fault the 931s for their big sound. Partnered correctly I feel they perform competently. **AK**

**Systemdek,** £330  
**34 Kyle Road, Irvine Ind. Est.,**  
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DOUG BRADY HI FI	0943 467689
<b>PETERBOROUGH</b>	
THE HI FI COMPANY	0733 892231
(ALSO IN LEAMINGTON SPA)	
<b>READING</b>	
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<b>SHEFFIELD</b>	
SOUND WITH STYLE	0742 737893
(ALSO IN DONCASTER)	
<b>SHREWSBURY</b>	
CREATIVE AUDIO	0743 241924
<b>SWINDON</b>	
AUDIO T	0793 538222
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# CONCLUSION

This was one of the most interesting group tests I've done for quite some time. All five of the loudspeakers on test have been very well engineered, but each one has been optimised slightly differently. With loudspeakers of this size, there is always a trade off between the level of bass produced and ease of drive. So all five are a compromise, and it was interesting to see the different compromises each designer had chosen.

Unsurprisingly, the LS3/5a shows its age against its newer rivals. After twenty years it is still an impressive piece of engineering in some respects. It has a smooth response and high overall impedance, but is very insensitive. The drive units are well made, but there are lighter, faster more transparent sounding materials available today, making the LS3/5a sound coloured in comparison.

It still has a clear and focused sound and bass is surprisingly deep and punchy, but recordings don't open out to give a convincing atmosphere and there is a lack of fine detail to the sound. This gives them a sterile balance, one that doesn't exactly make for the most exciting performance, but they stand testament to good engineering when it has taken twenty years for the others to catch up.

On sound quality alone, the HL-P3s are out there ahead of the group. The bass isn't quite as good as say the Systemdek 931s, being a touch oversize and soft, but the way they pulled together to create a clear, wide soundstage and a

captivating performance was simply superb. Treble was sweet and detailed and played a tune impeccably well, giving them a level of detail that few can match. This is integrated extremely well into a similarly detailed and cohesive midrange to give an almost seamless transition between the two units. The down side is that if you like the sound of the HL-P3s, you're going to need a powerful, high current amplifier to drive them to their full ability.



Next, in sound quality terms alone, come the Systemdek 931s. In fact it was a pretty close run thing between these and the Harbeths, the HL-P3s just taking it for their superb coherence. For classical, the HL-P3s had the superb integration and tonal neutrality needed, but for rock the 931s offer solid bass and a more energetic

sound. The midrange was especially good, being notably more forward and clearer than the others, but still sounding balanced.

Rogers' Studio3s come close behind the 931s, having a lovely relaxed and unforced presentation. They lacked the solid bass and some of the attack of the 931s, but the midrange was super smooth and refined. They are the kind of 'speakers you could sit back and listen to for hours, but ultimately I preferred the more upbeat and energetic presentation of both the HL-P3s and the 931s.

The ProAcS Tablette III Signatures are just plain bright. I don't mind a bright loudspeaker; in fact I prefer it to a dull and over-warm balance, but I must say that the ProAcS were just too bright for me. Going some way to saving this was an incredibly deep and powerful bass for such a small driver, but midrange projection did suffer as a result of these raised frequency extremes. They have other qualities that are certainly of merit, such as excellent detail resolution and a lively sound, but the sting from the tweeter was just a little too much.

The Harbeth HL-P3s, Systemdek System 931s and Rogers' Studio 3s are all worth a careful audition, each producing a superb sound in their own right. If you are looking for value for money, the Systemdek 931s win hands down. Not only are they more than a hundred pounds cheaper, but they are the easiest to drive, making it feasible to power them with a good integrated amplifier ●

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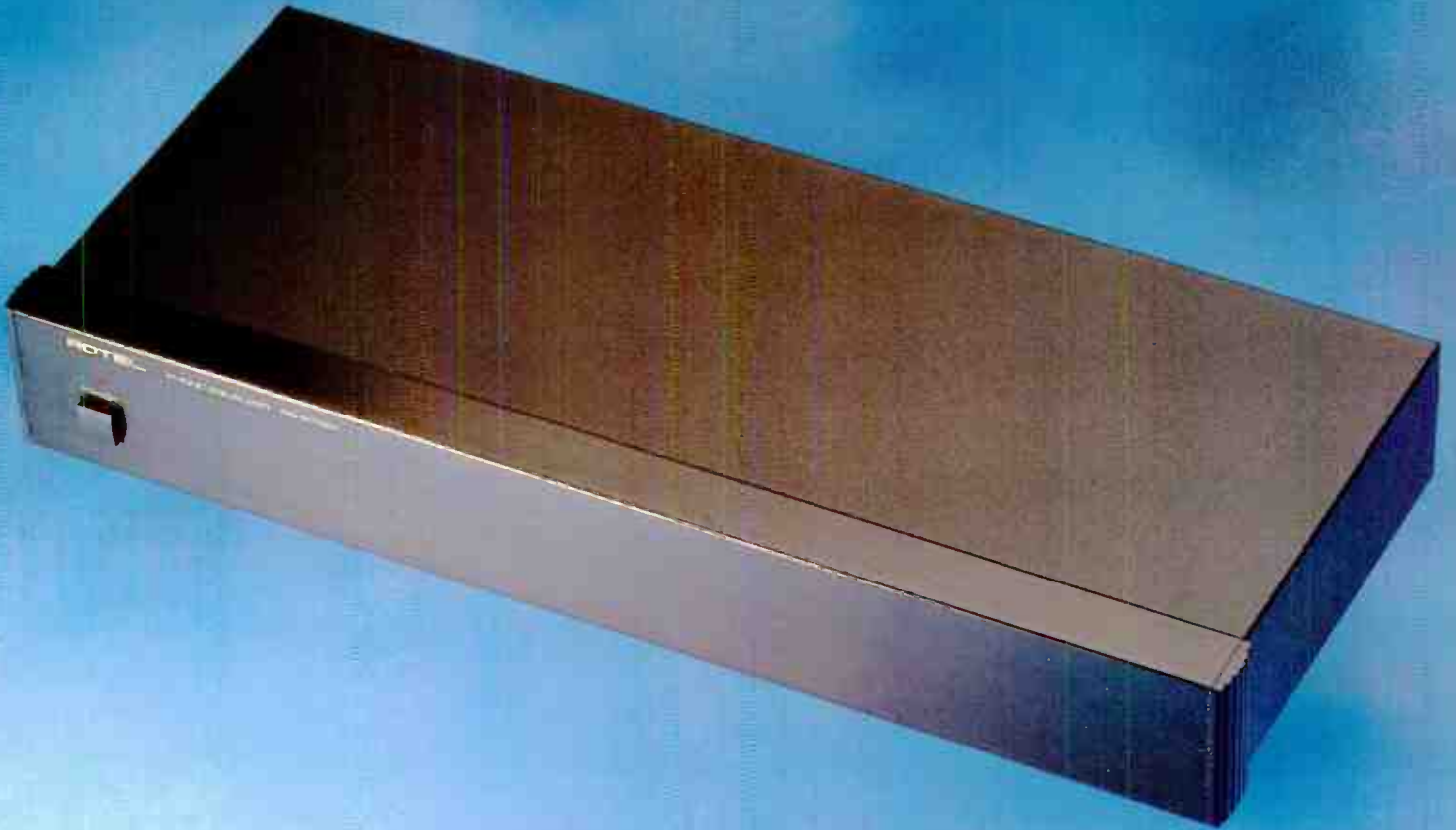
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# VINYL DRIVE



**Rotel's new RQ-970BX phono-stage has Eric Braithwaite blowing cobwebs from his LP collection.**

Vinyl didn't exactly die, it just faded away from the display racks in the shops. But the turntable soldiers on. There are still millions of black discs around, and more and more companies are licensing the classic Decca and RCA recordings of the fifties and sixties.

Rotel, being sensible about affordable audiophile electronics, has stepped in with what is probably the most affordable mainstream company phono stage around. For a mere £130, the RQ-970BX Phono Equalizer makes vinyl replay through a line-level amplifier as accessible and as cheap as a plug-in module - and with a sound better than most.

Switchable between moving magnet and moving coil, its performance on both was very respectable, not in the least cheap-sounding. Unadulterated, for this review covers Hi-Fi World's modifications as well, its showing with a Goldring

1042GX was very vivid. On both MM and MC, the Rotel displays a very fleet-footed turn of speed, rhythmically adept and controlled. Common to both was a top-rank degree of depth definition, albeit on MC with a tinge more hollowness in the mid-range which tended to make second violins a spot more laid-back than is really correct.

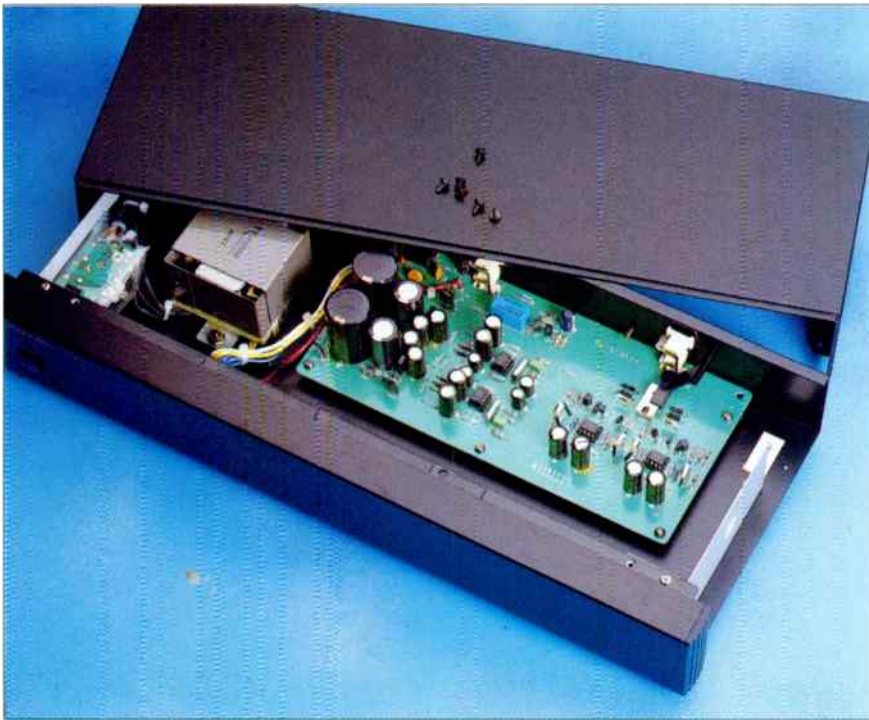
Less distinguishable on jazz or rock recordings, this actually produced a concomitant benefit, with the studio echoes of a drumkit neatly defined so that a listener could enjoy that rare detail of spotting where the baffles were placed; usually the province of much more expensive phono stages.

Only two traits say that the Rotel was built to be affordable rather than cost-no-object. On MC, the RQ-970BX lacked that ability to flow into and fill out the upper registers of the treble clef that the

top-ranking stages have. There was a feeling of dynamic restraint there. And while the breadth of the soundstage is creditable, it couldn't quite find the extra bit of distance between brass instruments or cellos and double basses at its further extremes, on MM particularly putting a boundary within the outer edges of the speakers. But the Rotel is as far ahead in sound quality of the average amplifier phono stage as a Williams is in advance of a Fraser Nash.

## WORLD UPGRADED RQ-970BX

The Hi-Fi World-modified Rotel made a noticeable improvement, especially on MC. My Morch da Capo tended to push the original a little too hard dynamically, but this, you will note, was also true of more expensive stages. On the revised



Inside the RQ-970BX is a wealth of high quality components, including polystyrene and Rubycon Black Gate capacitors.

version, there was a more dynamic top end, albeit still somewhat restrained.

The most marked alteration was the now more discernible separation between instruments both physically and in tonal colour. Cellos and basses close to the same note on the staff were now clearly distinct, brass instruments and strings now more laterally separated. Vocals - this is either a change in the plus or minus side entirely dependent on taste - now projected forward, having been more on a plane with the 'speakers' before. The Rotel's already fast subjective speed was marginally even tighter, with the lower resonances of

instruments that bit more defined. Individual images, too, had just that bit more of a perceptible outline than before. While the modifications still don't put the Rotel into the £400 league, and I don't expect that was anticipated, they do turn a very good disc stage into a worthy one. If they put it into the £200-ish bracket, it's worth every penny and more. Meanwhile, all those people with LP collections and a good quality cartridge in the £40-£200 range, need look no further than a Rotel RQ-970BX to blow the cobwebs off their discs. Buy a good £250 line-level amp to go with it and even that minimalistic

combination will surprise you with how good vinyl can be. Like going from a midi-system deck to a Systemdek.

### UPGRADING THE RQ-970BX by Andy Grove

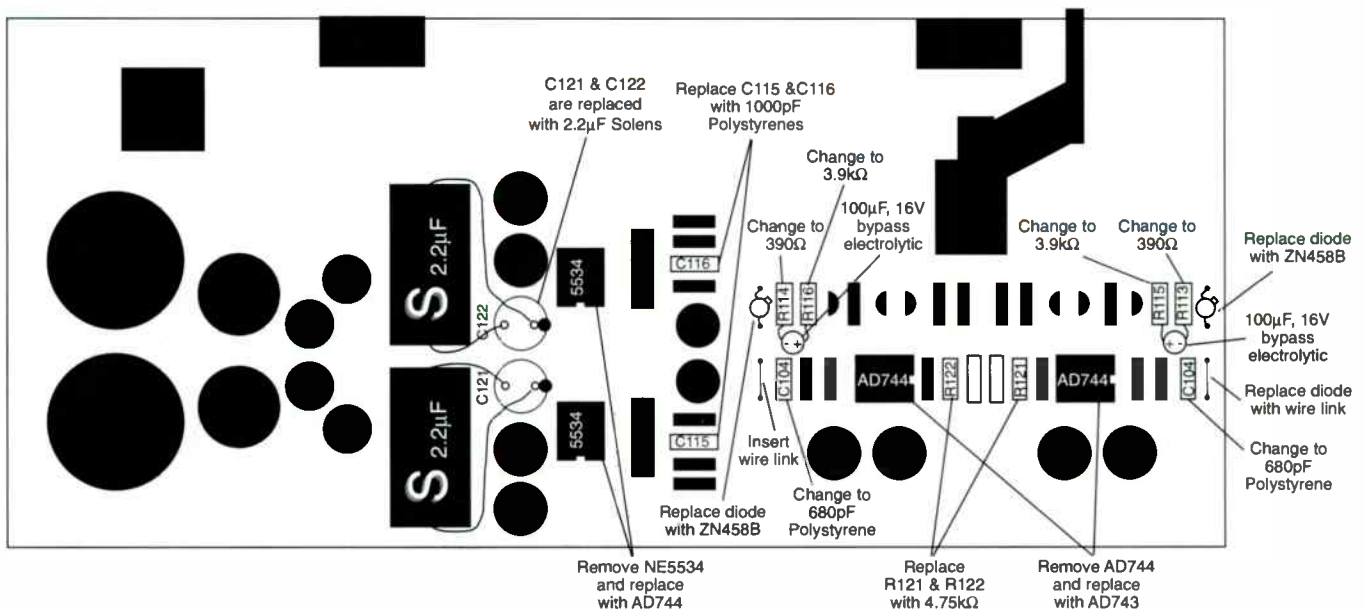
The modifications to the Rotel RQ-970BX turned out to be simple but effective. The most straightforward modifications are the component substitutions, although the component quality is already excellent with Rubycon Black Gate power supply bypass capacitors and 1% polystyrenes in the EQ network.

The first mod is to remove the two NE5534 (yuk!) op-amps and replace them with the AD744s which are currently being used at the front end. Fill the gaps left by the AD744s with AD743s (available from Electromail), a rather costly op-amp, but one of excellent sound quality. Be sure to remove and replace these very carefully. A solder sucker and good quality temperature controlled soldering iron are absolutely essential.

When you remove the AD744 and NE5534 op-amps you may like to fit IC sockets in their place which makes it easier to change the op-amps around or experiment with different types. Be very careful to make sure, whether you use sockets or solder the op-amps directly to the board, that they are the right way around. One end of the chip is marked either with an indent or small dot.

C121 and C122 are the output decoupling capacitors (10µF, 50V), these are Black Gate electrolytic types as standard. In my view, even though the Black Gates are excellent, they aren't really suitable here because of the lack of DC polarization voltage across them. A high

## Schematic of Modifications.





quality polypropylene such as a Solen or Ansar (available from Falcon Acoustics) will give a clearer, less grainy sound, 2.2µF is plenty. The physical size of these is an order of magnitude greater than the original so you need to use your dexterity and imagination to get them in. C115 and C116 (1000pF) are polypropylene in the original circuit, which although good, can be replaced with 1% polystyrene capacitors for better sound quality.

The gain of the original was too low on both MM and MC for many preamps. I changed R121 and R122 from 2.74k to 4.75k, which reduces the feedback and increases the gain to a more useable level.

The final modification is the most comprehensive. It reduces the noise at the input stage and allows the input op-amp to operate more optimally by reducing the DC common mode input voltage. The main change is to increase the current through the input Long Tailed Pair. As standard it is about 2.5mA total, 1.25mA per transistor. I have increased this to 4.5mA total, 2.25mA per transistor. The two 1N4148 diodes which provide the

1.4V reference voltage for the current source are replaced by a precision bandgap reference IC of 2.45V (type ZN458B from Electromail). This increased voltage also improves the performance of the current source. So D101, D102, D103, D104 all go, R113 and R114 change from 274R to 390R, R115 and R116 change from 22.1k to 3.9k. For some reason the original diodes were left unbypassed, injecting noise into the Long Tailed Pair. 100µF, 16V capacitors are added to bypass the voltage references, soldered to the legs of R113/115 and R114/116 (note polarity). These changes to the input pair increase its transconductance and extend its frequency response. To keep the stage stable C103 and C104 should be changed from 330pF to 680pF 1% polystyrene ●

### Component List.

Capacitors:  
 2 x 680pF 1% Polystyrene  
 2 x 1000pF 1% Polystyrene  
 2 x 2.2µF Polypropylene  
 2 x 100µF 16V Electrolytic

Resistors:  
 2 x 390R 1% 1/4W  
 2 x 3.9k 1% 1/4W  
 2 x 4.75k 1% 1/4W  
 Semiconductors:  
 2 x AD743JN  
 2 x ZN458B

Hardware:  
 4 x 8-pin IC sockets

### SUPPLIERS

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## MEASURED PERFORMANCE

Relying on silicon chips, like most disc stages, the RQ-970BX has a maximum output of 11V. Most competitors give 9V-11V or so and this largely determines most other parameters. If a designer wants good overload figures - and it looks like Rotel have placed a priority on this - then overall gain must be kept down. The RQ-970BX has very low gain values of x67 for moving magnet (MM) cartridges and x700 for moving coil (MC) cartridges. That's just enough for amplifiers with sensitive line inputs.

For example, with a 300mV line (i.e. Tuner/Aux/Tape) input sensitivity this pre-amp offers 4.4mV input sensitivity for MM and 0.42mV for MC. Most disc stages have twice as much gain (x150 MM/ x 1500MC) but less overload headroom. Anyone considering the RQ-970BX will need a good modern amplifier and they must expect to turn the volume up. It cannot be used to drive most power amps through a passive volume control, except those that are very sensitive (like our own or Leak TL12, for example).

Interestingly, Rotel have omitted the IEC recommended warp filter, so there's plenty of gain right down to 10Hz. Equalisation was accurate, giving a measured response on both MM and MC of 10Hz-100kHz (-1dB). Those with compliant moving magnet cartridges, heavy-ish arms, warped records and reflex loudspeakers should beware of cone flap.

Input hiss values - the only valid way of specifying noise - were good at 0.5µV and 0.086µV (CCIR) for MM/MC respectively. It is possible to get -6dB quieter MC stages from Audiolab, EAR, so for this reason and low gain the Rotel is best off paired with

high-ish output moving coil cartridges, not the very best low output types. **NK**

### TEST RESULTS

Frequency response	10Hz-100kHz
Separation	90dB
Noise (MM/MC)	0.5/0.08µV
Distortion	0.003%
Sensitivity (MM/MC)	4/0.4mV
Overload (MM/MC)	164/16mV

### MODIFIED VERSION

The biggest change Andy made to this phono stage lies in its increased gain, which improves sensitivity and general application. Moving magnet gain has increased from x77 up to x100 and moving coil gain has increased from x700 up to x1100. When feeding an amplifier with a line input of 300mV sensitivity - about average these days - the RQ970BX then has effective sensitivities of 3mV for MM and 0.27mV for MC. This is far more appropriate for high quality, low output cartridges - especially quality moving coils. For example, an Ortofon MC15 Super II produces 0.53mV at 5cms/sec rms, typical average music level from LP, so the amp system has enough gain to reach full output.

Andy changed the feedback compensation capacitors to ensure a good stability margin at the new higher gain, bringing bandwidth down to 50kHz - there's no need to reach 100kHz in our view. His increase in current into the long tail pair causes noise to decrease by -1.5dB from 0.5µV to 0.42µV (CCIR weighted

equivalent input noise) on MM, and -1.2dB from 0.08µV to 0.07µV on MC. (Note for engineers: this noise improvement has nothing to do with bandwidth reduction, since CCIR weighting concentrates on noise around 7kHz only).

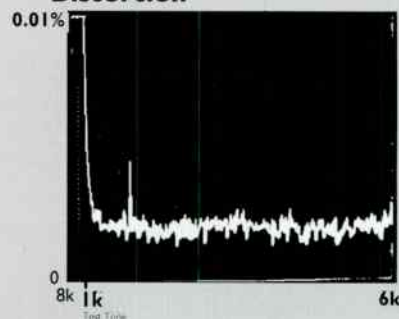
Distortion remained very low, measuring just 0.004% at 1kHz (MC), second harmonic only - as our analysis shows.

So there you are. Courtesy of a very tolerant Rotel, Dennis the Menace Dominic and Amplifier Andy, you can buy a straight RQ-970BX and apply tweaks when you feel ready. **NK**

### TEST RESULTS

Frequency response	10Hz-50kHz
Separation	90dB
Noise, MM/MC (CCIR)	0.4/0.07µV
Distortion	0.003%
Sensitivity (MM/MC)	3/0.27mV
Overload (MM/MC)	110/10mV

### Distortion



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# TWEAKED UP



Eric Braithwaite auditions Kenwood's 3020SE integrated amplifier.

Though Kenwood's 3020SE has the usual Japanese bulky case, inside beats a slimmer British heart of gold. There's none of that burly but brash syndrome that used to be associated with sound of the big Japanese names, though it has to be said, that is the impression it gave with Gary Moore through the MM phono stage. Rather on the harsh side, however fast and vivid that made it, the phono stage squeezed the refinement out of a very good cartridge and left it forceful and sharp, but on the whole rather brutal.

On CD, though, this is a refined performer. On classical music, for smoothness and evenness, the KA-3020SE could even be a little too restrained. It is rare to hear a perfectly proportioned amount of air and space in a recording venue from a budget amplifier. Yet this is what you hear, with every instrumental section spread around fore, aft and sideways with a cogent realism and total lack of artifice. Beethoven's Eighth could have been a live Radio 3 broadcast, sans compression, of course.

The restraint comes in not in a washed-out top end or woolly bass, but in dynamics. Dynamically, as a full orchestra swept up to a fortissimo the Kenwood seemed to need a bit more muscle. The 3020SE did sound a trifle confused in deciding how much power to allocate a full chorus while it's being tormented by all the strings and brass sections in full flight, but conversely it pulls off the trick of knowing the difference between trumpets and trombones that others seldom cope

with.

In other respects the Kenwood's discriminatory ability is of a high enough order to be as off-putting as the best at twice the price. Slot in one of these wretched be-limited and gain-ridden rock recordings that abound these days and the boring old pan-potting and cheap mixing quality will not be glossed over. If your taste runs to Apache Indian, however, then the Kenwood does unleash a raw

spirit that thunders out a strong deep beat and plenty enough power to keep even Notting Hill Camiva' goers happy ●

**Kenwood 3020SE** £199.95  
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## MEASURED PERFORMANCE

I was surprised at the low output power I measured from the Kenwood, but the handbook quotes it at just 30watts per channel. Clipping was strongly asymmetric, suggesting poor factory adjustment, peculiar for an amplifier posing as a 'special'. Power increased to 56watts into 4ohms, a reasonable performance.

Frequency response was satisfactorily wide, stretching from a low 5Hz right up to 82kHz. This will give a brighter sound than amplifiers band limited to 20kHz.

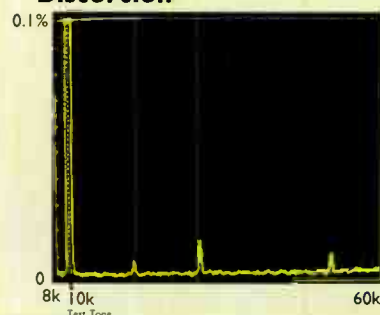
Sensitivity was high at 220mV and distortion low at all outputs and frequencies, not rising past 0.02% (full output at 10kHz). Our distortion analysis shows predominantly odd order components. This also suggests a bright, possibly sharp sound.

The Kenwood KA-3020SE is a budget amplifier in a big case. **NK**

## TEST RESULTS

Power	36watts
CD/tuner/aux.	
Frequency response	5Hz-82kHz
Separation	70dB
Noise	-97dB
Distortion	0.004%
Sensitivity	220V
dc offset	4/2mV

## Distortion





# BURMESTER TUNE-IN

**Can Burmester tune into the competitive British market? Eric Braithwaite scans the airwaves with a top tuner from Berlin.**

In the bad old days of the Berlin Wall, one of the targets of consumer envy from East Berlin must have been the glossy chromed Burmester hi-fi made on the Western side. Quite how many Trabbies would have to be put together to raise the Deutschmark equivalent of the £4,347 this Burmester tuner costs I don't know. Probably all that were ever made. Even for the Brits, this is luxury hi-fi.

Burmester, from the evidence of the tuner, is a luxury look company, though in design a little on the old-fashioned side compared to, say, Meridian. Also somewhat on the old-fashioned side, in an FM-only tuner, at this price, is the lack of anything other than the simplest facilities.

There is no provision for RDS, let alone RDS EON, now becoming common in tuners that cost little more than a thirtieth of the Burmester, though Revox included it in their high-end tuner years ago. There is no narrow/wide IF band switching. Tracking through the thirty-odd presets requires searching up or down rather than direct

numerical entry. Though effective visually, the signal strength indicator is only a row of green LEDs, and the tuning indicator, rather Arcam T-60 like, is one central green LED with a red one either side to indicate being off-tune.

*“ What marked out this tuner as high-end quality was the accuracy of tonal shading, instrumental colour and tempo. ”*

Remote control, however, is possible: an optional handset, costing £170, will scan through the memorised stations.

Neatly, a couple of the five controls are dual-purpose. Pressing the mono/stereo button while switching on from standby turns off the display except when station-hunting, hiding the LEDs and associated circuit board behind a silvered window like the mirrored shades which were once street fashion. Deleting stations from memory was a minor puzzle until the instruction manual compendium - which covers the pre/power amplifiers and CD players in the same 'Basic' range as well - arrived. With the instructions to hand, the answer was simple: pick the Station with the search button and hold down the Memory button until the unwanted station like Kiss FM (well, OK, Melody) is forgotten.

Though there is little in gadgetry and flounces to justify a price tag that would set my chequebook bouncing like a cricket captain's treated ball, Burmester's tuner has a luxury sound. The review period coincided with the

Berlin Philharmonic playing Mussorgsky's Pictures at an Exhibition at the Proms. The unmistakable high-gloss technique came over loud and clear. Extremely clear, with marked mic amplifier hiss on the left channel, and the only drawback being a coarse string quality on upper notes, attributable, cross-checking with my Quad FM4, not to the normally silky violins of the BPO going off, but to the microphones and mixing. If the 'Great Gate of Kiev' lacked some of the fierce dynamic range when it's on CD, it was at least comprehensible as limiting, inevitable in broadcasting a work of this scale.

What marked out this tuner as high-end quality was the accuracy of tonal shading, instrumental colour and tempo. There was no doubt, for example, of the BPO using a gong in 'Pictures' rather than a set of tubular bells; nor of its superbly synchronised string and brass playing. If it also showed that the performance was technically exact, but lacking in 'Russian vigour' in the early movements, that was a judgement confirmed half-an-hour later by friends who went to the live performance.

Most impressive, even more so than the Naim NAT 01 tuner, was the sheer expanse of sound-stage, very wide and

very cohesive. The Quad is no slouch, but sounded almost anaemic by comparison, with the Burmester unleashing a veritable rainbow of orchestral colour. Burmester claims that listening to the wireless can be almost as good as CD and, since this expansiveness was almost as grandiose as my favourite Sugden SDD-1 DAC, no-one who has a chance to hear this tuner would deny it.

*“ Most impressive was the sheer expanse of sound-stage, very wide and very cohesive. ”*

A studio broadcast of Biber confirmed this tuner's supreme ability to deal with very tricky tonalities and downright weird violin tuning with some extraordinary harmonics that few replay systems would have a hope in hell of reproducing. The Burmester showed not the slightest sign of faltering or skirting round the notes. The combination was entrancing.

The Burmester doesn't just pull off this trick with classical, it is just as adept and flourishes as well with Rock. Allowing for some vocal hollowness -

detectable, again, as compression - Four Non Blondes on GLR came through the speakers with tremendous clarity, precision and vigour, as though there was nothing more than a metre of interconnect (vdH The Second, at that) between the tuner and the studio CD cartridge player.

This is not a cheap tuner, even when the cost of the high quality flight case it's supplied in is allowed for. We are in the rarified air of the Day Sequerras. But it is very serious: rich, subtle, dynamic, superbly detailed, a wide open window into the recording studio. It's the modern Marantz 10B of tuners. And it's cheaper than

buying a broadcasting company, which is just about the only possible alternative ●

**Burmester 931** £4,347  
**Tabula Rasa**  
**No. 1 Silkin,**  
**Dalton Close,**  
**Crawley, West Sussex,**  
**RH11 9JD**  
**Tel: 0293 531 190**

**MEASURED PERFORMANCE**

The Burmester 931 needs a reasonably strong signal from an aerial for best results - it isn't really meant to cope with fringe reception conditions. This is justifiable with a quality audiophile tuner even if, these days, sensitivity need not be traded against sound quality. Hiss sank to a low -75dB with 2.5mV or more from the aerial, but this is half the sensitivity of other tuners, most of which need 1mV. So the Burmester must be paired with a good aerial able to provide strong signals.

Sensitivity apart, the 931 returned very good performance figures in all areas. It has a flat audio frequency response that reaches 16kHz (see our analysis), very deep pilot tone (19kHz) and sub-carrier (38kHz) filtering and super low distortion of around 0.08% (50% mod.) on mono and stereo signals. Channel separation was wide at all frequencies, lack of degradation at high frequencies being unusual but impressive. Burmester have also engineered this tuner to be very selective yet mute gracefully when overwhelmed by a strong signal.

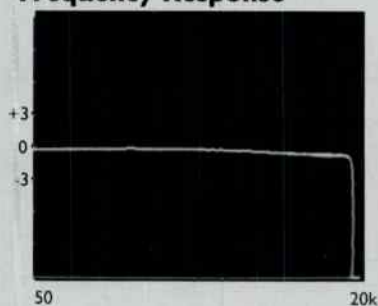
The 931 tuner measures very well, but it does need a strong signal from the aerial for optimum results. **NK**

**TEST RESULTS**

Frequency response	10Hz-16kHz
Stereo separation	40dB
Distortion (50% mod.)	0.08%
Hiss (CCIR)	-75dB
Signal for minimum hiss	2.5mV

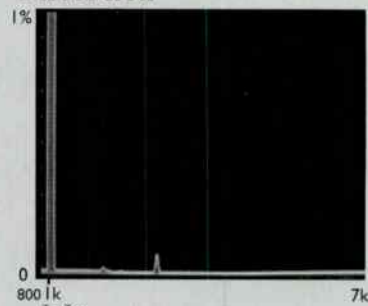
Selectivity (at 0.4MHz)	80dB
Sensitivity	
mono	3µV
stereo	60µV
signal strength meter	
LED No.level (µV)1-9	0.5µV-250µV

**Frequency Response**



Flat response reaches 16KHz

**Distortion**



Very low distortion



### CD SOUND QUALITY

In your interesting and informative review of the Audiolab 8000CDM CD transport (Hi-Fi World, August) you discuss various factors which influence the sound quality produced by a particular CD transport mechanism. My own experiences in upgrading my hi-fi system may be of interest to you.

My main source of music is a 5-year-old Cambridge Audio CD2 compact disc player (the purchase of which was, incidentally, influenced by your enthusiastic review in Hi-Fi Review). Over the years I have since made worthwhile improvements to my system by upgrading interconnect and loudspeaker cables, and by placing it on a proper equipment stand.

After making what was, I thought, the last possible improvement by powering my system via a Lynwood Advanced mains conditioner (my mains supply is rather 'dirty'), I began to think about upgrading the CD player, an exercise which I dreaded since it would probably involve spending upwards of £1000 to get the sound quality I want. I then speculatively borrowed a Townshend Audio Seismic Sink from my hi-fi dealer.

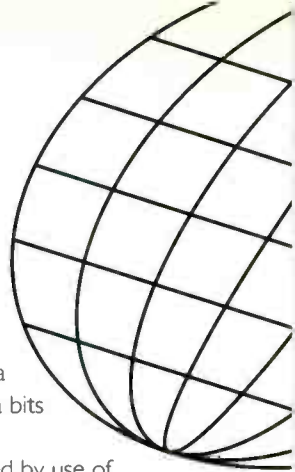
The improvements in sound quality from my CD2 were dramatic, to say the least. Not only did it produce deeper bass, smoother midrange and cleaner, grit free treble, but other improvements such as better retrieval of detail and clearer instrumental separation became apparent with longer listening trials. The separate musical threads of a Bach prelude or fugue played on piano became more obvious,

for example. How on earth, I wondered, can putting my CD player on a lump of metal resting on an air bag make such an improvement?

I work in the computer industry, and so have a slight technical interest in how information is stored and

retrieved from compact disc. I have briefly looked at the underlying standards for audio CD and am appalled at the relative laxity of the standards regarding 'error correction' compared to what would be required for the safe retrieval of 100% of the original data.

Loss of a few data bits can be corrected by use of redundant data held on the CD, but greater losses have to be covered up by a process of error concealment which has to interpolate between



# World

## Letter of

### GETTING INTO HI-FI

Every hi-fi buff has a tale to tell of how their interest started; I hope mine will be of interest.

It was in 1963, when I was five years old and on holiday in Cayton Bay with Mum and Dad. In the caravan site where we were staying there was a coffee bar with an amazing machine. It had a glass dome with a row of buttons on the front and the machine was covered in chrome and festooned with lights. When someone put a sixpence in its slot and pressed a few of the buttons it would click and whirr into life. A round black object would be picked out of a stack by a robot-like arm, to be set down on a rotating circular platform. Another arm would come out and plonk itself onto the now revolving black object with a sort of 'boof' noise. Then Cliff Richard, Gene Pitney, Joe Brown or The Tornados would play one after the other.

To a child aged five years, standing on a stool,

staring through the dome and watching the fascinating mechanism at work was something unforgettable and is my first real memory of being exposed to recorded music and the machinery that reproduces it.

Our home machine was a Kolster Brandes 'Junior' radiogram and throughout the '60s and on into the early '70s it provided the family with musical entertainment. Opening the mahogany veneered, french-polished drop front of the cabinet revealed a BSR 'Monarch automatic record changer.' The autochanger sported chunky brown, gold-lettered knobs, a brown ribbed-rubber turntable mat and bounced like a trampoline at the slightest touch. When the whole thing was fired up and ready to rock it seemed to have a life all its own. It gave off a wonderful warm odour of lavender polish, rubber and shellac and hummed expectantly to itself whilst it waited for Dad to choose the music. All in all it was pretty neat.

The KB continued to give sterling service all the way through the 1960s. Christine and Ray, our babysitters, used to bring their Beatles and Stones records around to play them on it whilst Mum and Dad were out. But as the '70s dawned, Dad decided that the KB was old hat. He bought a fancy new Ferguson 'Unit Audio' with separate speakers, a brushed aluminium fascia and a smoked plastic dust cover that hid a puny BSR 'Superslim' autochanger with a tonearm barely thicker than a drinking straw. It sounded just as feeble as it looked, even though it was stereo. Small wonder the Japanese took over!

The KB? It was passed into my custody. We heaved it upstairs to my teenage bedroom where it happily blasted out The Sweet, Slade, Garry Glitter, T Rex and Alice Cooper for all it was worth. As I grew older I was able to keep it going when it broke down by replacing valves or the bulbs behind the tuning dial

Send your letters to Hi-Fi World Letter Page,

# writes



adjacent samples. This process means that subtle details in the original recording are lost, and extra harmonics are presumably introduced which can produce the coarse, gritty, sound quality for which CD players used to

be notorious.

The simplest explanation for the improvement produced by the Seismic Sink, I believe, is that it allows my CD player to retrieve more information from the disc without the need for error concealment, by reducing the

harmful effect of airborne vibrations on the transport mechanism and disc, and by damping vibrations due to imperfections in the balance of the disc itself. The upshot of all this is that I now see no need to upgrade my CD player in the near future, and virtually every CD in my collection sounds better.

I propose the following technical challenge to you: devise a test which enables you to measure the percentage of the original recorded data which a CD transport can retrieve under normal playing conditions. This is presumably difficult to do, since the only way to take account of the quality of the disc itself is to play it in a CD player! If this could be achieved, however, then the differences between low-tech budget CD players and their more expensive, better-engineered, competitors would become more apparent, and perhaps manufacturers would be

encouraged to produce better-engineered products which don't need a second mortgage to buy.

Thanks for an interesting review. I look forward to reading more of your thoughts on the factors contributing to CD sound quality.

**Mr. A. J. Rew  
Didcot,  
Oxon.**

I too have found similar results when using a Seismic Sink, although with not quite such a dramatic effect. Judging from other readers' letters and speaking to people who have tried the Seismic Sink, its effect seems to vary from system to system. Some, like you, experience a dramatic improvement, others only hear a small change.

The most obvious explanation for the effect the Seismic Sink has on CD transports does appear to be related to a reduction of

continued on page 41...

## the Month

where required. It provided radio listening via a long wire dangled out of my bedroom window.

I'm now a 36 years old former B.T. engineer turned student teacher and own an excellent Linn hi-fi system, hundreds of records and CDs and have a love of music and hi-fi that is undiminished after more than twenty years. The whole family use the Linn system. It has pride of place in our living room, just as the KB did in Mum's and Dad's.

I owe all of my early musical education to that KB radiogram, the BBC and to Christine and Ray. It wasn't stereo, it wasn't even hi-fi, but as Mum used to say, it had "a lovely tone." The thing simply played music superbly well: end of story. 21 years and thousands of pounds later, I have finally found a system that plays music better than that radiogram did; well most of the time anyway!

**Steve Cresswell  
Mexborough,  
S. Yorks.**

I'm sure a lot of readers have interesting formative experiences like yours. We all do. Mine include being pushed into a fancy dress contest, aged 8, dressed as a ship, wired up with port and starboard lights on my shoulders, on a liner somewhere in the middle of the Indian Ocean. I could have done without the funnel, but the lights fascinated me!

Next came train sets with lots of red and green signals then, after seeing my frantic efforts with crystal sets, around the age of 14, my Dad gave me something I'll never forget - a small brown box with a green label on top with the capitals HAC, short for Hear All Continents. That was a one-valve receiver that got me hooked. Soon there were valves everywhere, amplifiers following radios when the Mullard Circuits for Audio Amplifiers (8s 6d) was discovered in a bookshop in Exeter. I exchanged oscillation for music - magic. I was hooked. **NK**

64, Castellain Road, Maida Vale, London W9 1EX.


### WIN HI-FI WORLD INTERCONNECT CABLES

### OR PERFECT PITCH'S FRANCINSTIEN CD

### ENHANCER





The writer of the most interesting or funniest letter will receive a choice of either: a free set of Hi-Fi World's silver plated copper interconnect cables, worth £69.95, or a Francinstien CD convertor enhancer worth £150.





# A QUESTION OF QUALITY



 If you enjoy the touch of injection-moulded plastic, you'll probably go to pieces when buying loudspeakers  The Castle customer never falls for fools mate and his strategy allows the choice of seven handcrafted models in nine real wood veneers before making an important move  To play the game, advance to your local Castle dealer or contact us for his position 



**CASTLE**



.... continued from page 39

vibration that could disturb the laser and therefore result in less error correction. If this is the case, and it certainly seems to add up, then all CD players could be improved by paying more attention to the effect of vibration and the design of the transport mechanism itself.

To try and get an idea of what effect reducing the vibration to a CD transport would have on its error rate, I set up a little test system. Using our Cambridge CD1 QA unit which measures errors, i.e. the number of times the error correction circuitry has to be called upon, and a loudspeaker placed on the same surface playing a constant level of pink noise to introduce constant vibration, I ran three tests.

Firstly I ran a disc through the Cambridge to count the total errors with the loudspeaker disconnected, which gave me the error count for the disc. Then plugging in the loudspeakers to vibrate the transport, I ran the test again to find the number of extra errors caused by vibration. I then repeated the whole test with the transport on Sorbothane feet.

Sadly, the vibration, even from high levels of pink noise (the whole transport was vibrating and buzzing like mad), didn't appear to upset the error correction circuits. Whether the loudspeaker was on, off or the transport sitting on Sorbothane, the error count was identical every time. So, either the Cambridge isn't sensitive enough to detect such errors, the vibration stimulus wasn't realistic enough, or Sorbothane has some other property that alters the sound.

However, we are still as keen as you are to discover what does make a difference to CD transport sound

quality, and why things such as Sorbothane feet and Seismic Sinks make a difference. We hope to be able to offer further discussion on this subject in the near future. **DB**

Unfortunately, the Cambridge CD-1 was one of the first players to recognise this problem, so it has an isolated transport with a lead weight to add mass. But it's also the only CD player to come with an optional QC unit. **NK**

### **ANALOGUE FOR ADDICTS**

Like Mr Hall (Letters, September '94), I discovered The Record Shop in Kingston-upon-Thames as a result of their advertisement in Hi-Fi World. I can only concur with his endorsement. That, however, is not why I am writing.

He, and other readers of like mind, might be interested to learn of a recent discovery of mine. There is an organisation called Analogue Addicts, and it exists for those of us who prefer the sound of vinyl discs.

The principal direct benefit of Analogue Addicts membership is the newsletter, Voice. Amongst other things, Voice includes a list of recommended dealers who stock vinyl (both new and second-hand).

Anyone interested can contact Analogue Addicts at 22 High Street, Keighley, West Yorkshire, BD21 2AA. Membership costs £10, and covers four issues of Voice.

**Peter Miles.  
Reigate,  
Surrey.**

We are aware of Analogue Addicts and have printed their details previously, but as it is such a worthy organisation devoted to vinyl, here it is again for those who missed it. **DB**

### **RECORDING QUALITY**

I'm writing in response to your

article "Where's Hi-Fi Going?". I work in pro audio design and sent the letter attached below to one of the UK pro audio mags which had recently run an article asking whether any people working in the pro audio industry, i.e. the recording side, applied or considered applying hi-fi concepts to their work. It was never published, but you might find it interesting:

I have just finished reading your questioning article as regards hi-fi concepts in the pro audio industry. It makes some nice points, but what amazes me is that the question needs to be asked at all, as if hi-fi and music lovers as a group need justification. This seems to betray a certain professional smugness, as if 'we' professionals were the ones who truly know about sound. This is a complacent attitude and one which I feel relies on concepts of technical prowess which have not always fulfilled their promise. At its worst, our dedication to our learning gives rise to what I call the "Tomorrows World" syndrome, namely that the sound industry just keeps getting better and better.

This seems not true. I have a reasonably large collection of recordings covering 1965 to 1994 (mostly vinyl). When I compare recordings of the nineties with earlier recordings I don't feel they are better. Well, they are better in two respects. They have lower background noise and a wider frequency response. So what? If older recordings are lacking at the ends of the spectrum, this can be easily compensated for by judicious use of the tone controls. What about background noise? The one thing that human beings are really good at is ignoring background noise. We learn it as part of life. It's no trouble. In many other respects the recordings are not as good. And they are not as good in ways that I have no ability to compensate for. To demonstrate this it's necessary

to do some listening and here is what I'd suggest as essential listening:

Desire Walks On, Heart, 1993  
BeBe Le Strange, Heart, 1975  
After Bathing at Baxter's, Jefferson Airplane, 1967

Play the albums in reverse chronological order. Heart is a fantastic band. They don't show any tendency to lie down and release a greatest hits album. The music on their latest release, Desire Walks On, is every bit as good as anything they've ever put out. The album sounds good. It sounds like what you'd expect it to sound like.

Now play their BeBe Le Strange album. Immediately the sound is thicker and more dense. Cymbals sound really like cymbals. The lead singers come out of the speakers and inhabit the space in front of you. They taunt and tease, threaten, frighten, and soothe. This album involves you in a way that the 1993 album just can't. But not for musical reasons.

Now finish with the Jefferson Airplane album. What a feast! Immensely complex harmonic vocal structures full of power without that annoying little sizzle that seems to hang out just below many backing vocal tracks. Electric bass! Electric guitar! The eerie wail of Grace Slick just breaking free of this wall of sound. This isn't meant to be a record review, but I have no technical terms to describe what is happening here. This thing is so powerful it could change you.

If you're thinking I've gone native, all I can say is that something is happening here. Ignore it at your peril. Hi-fi people may have been the first to notice it, or the first to speak about it, but it's there. So here we are - 1994 - no reason to be complacent at all.

What I'd like to say to you at Hi-Fi World is to fight your

**continued on page 47 ....**

**D**evelopments in audio component design, loudspeaker performance and the transition from analogue to digital sources have all contributed to the high standards of playback quality to which we have grown accustomed. However, even the finest combination of equipment, accessories and isolation plinths cannot, and do not, guarantee a perfect listening environment.

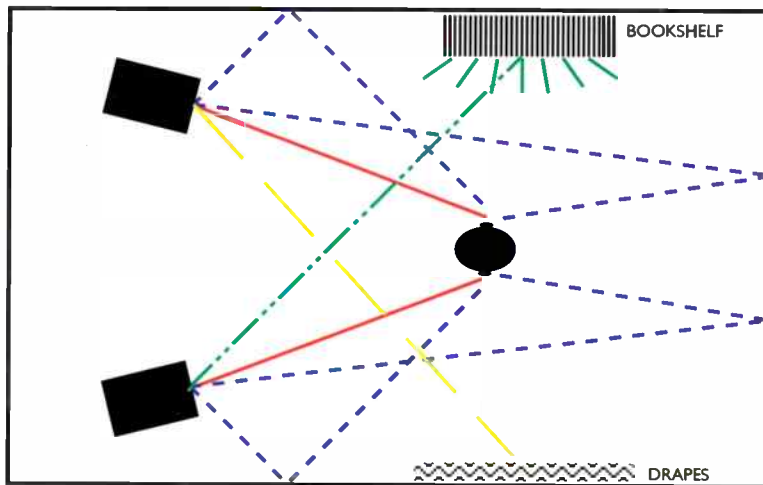
Sound heard at the listening position is a combination of direct sound from the source and the reflected sound from the room, which is heavily influenced by the furnishings, structure, and surfaces.

During a recent visit to a colleague in Wimbledon, I had an inspiring experience. Glenmorangies in hand, we settled down in his well stocked library to discuss a project. He had selected some music for a conducive ambience, when I found myself drifting away far from the work at hand. The music seemed entrancing, simply because it was so listenable, so uncomplicated, open and seeming to caress the ear in the way that a baroque flute sonata would. The cello and harpsichord played in an almost tangible sound stage. I was gently lulled into a euphoric state of suspended audiotopia.

What made this system sound so

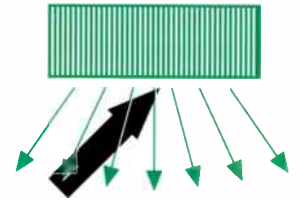
different was not entirely down to the mix of components. It was not even the compatibility of the speakers, amplifier, DAC and transport, or even the interconnects. This room, with its many shelves heavily laden with books in organised irregularity held a vital secret: acoustical diffusion.

### ENERGY DISTRIBUTION IN A TYPICAL LISTENING ROOM



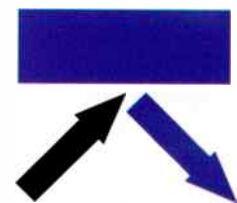
DIRECT ———— DIFFUSION ————  
 REFLECTED - - - - ABSORPTION - - - -

### DIFFUSION e.g. bookcase



Diffusion occurs when sound waves are scattered off surfaces in random directions. Diffusion is extremely important in listening rooms and music rooms. This is because when satisfactory diffusion is achieved, listeners have the sensation of equal amplitude ie. sound coming from all directions at equal levels. A library, with all its irregular surfaces, dips and wells within the shelves, is an audible example of diffusion at work. Imagine a single point light source flashed in front of your eyes. Your immediate reaction would be much the same as to a piercing directional sound in front of the ear drums. Then imagine the torch shone at you through frosted glass. The energy is the same, but pleasantly diffused.

### REFLECTION e.g. glass



Reflection as implied, is the re-direction of a sound from a surface or object. Reflection is highly directional and can impair the sound stage significantly. In reflective areas, there are noticeable problems which are easily recognisable in both the high (treble) and low (bass) frequency domains. Conjure in your mind, the acoustical characteristic of a bathroom. An abundance of tiles, hard surfaces and mirrors create an environment where great excitation of sound occurs. The adjectives 'echoy' and 'reverberate' spring to

# HOW TO TUNE YOUR ROOM

**Douglas Floyd-Douglass of European Acoustic**

**Repertoire explains what effect your room's acoustics will have on the sound of your hi-fi and how to make simple improvements.**

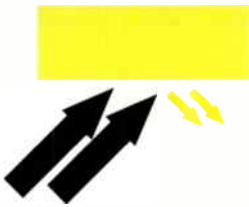
mind. Whilst large reverberant spaces (cathedrals, churches) have their place in some choral works, they are quite unsuitable for audio playback.

A simple favourite bathtub rendition of 'Summertime' may find you gawping at a certain note where the volume increases suddenly and unexpectedly. The bathroom comes to life and appears to resonate involuntarily (probably in sympathy with your co-habitants!). This is called a standing wave. The note you are singing has a proportionate or equal size wavelength to one or more of the dimensions of the bathroom or shower. Try singing the note one octave higher and the room will react in much the same way.

This is a fine experiment for pulverising Pavarotti, but reflection and standing waves alike can wreak havoc in the pursuit of audio fidelity and listening enjoyment. Much the same may be experienced in listening rooms with parallel, reflective surfaces. These can however be treated, and sometimes with great success. In the high frequency domain, a handclap produces a "flutter" or fast echo. Lower resonant notes are referred to as bass boom.

In contrast to absorption where a room is characteristically 'dry' reflective rooms can be described as 'harsh' or 'bright'. This environment is uncomfortable to sit in for long periods resulting in listening fatigue. A combination of diffusion and careful placement of absorption can usually provide an inexpensive solution to this problem.

### ABSORPTION e.g. drapes



Not unlike a sponge to water, absorbing materials soak up musical energy. Different surface areas of absorption affect different frequencies. In days past "absorption" was synonymous with acoustical treatment. We now know this to be largely untrue. Whilst absorption has its uses (where trained acousticians would use materials to reduce reverberation and high sound pressure levels), it is by nature highly selective. This means that it will affect only a portion of the music programme, but not all and not simultaneously. Imagine a thirty band graphic equaliser with a flat setting

across the spectrum with five or so bands completely attenuated in the crucial mid-high frequencies. A noticeable gap in the sound occurs which in turn gives rise to a change in the balance of the other parts of the material. In the quest for a linear or natural soundfield, this sometimes extreme effect can be quite unpleasant. For example, thick velvet drapes hung around a recital area may seem to improve the 'boom' of a timpani or resonance of a trombone. But this same 'remedy' then also removes the subtle nuances of cellos, strings and woodwinds. In modern music, ambient reverb or digital delay may be added in post production to ensure that original recordings preserve energy across the entire frequency spectrum. Generally, domestic absorption affects higher frequencies more than the lower order, producing a sometimes 'boomy', 'dull' or 'dry' environment, as if the treble control has been turned down. This can be remedied by introducing diffusion, and careful relocation of room furniture. Absorption is used to best effect in tandem with diffusion.

### THE MIRROR TEST

Using a mirror to reflect an image of your loudspeaker, the sound path can be traced to your listening position. This can accurately determine the room's reflections. All loudspeakers have unique dispersion characteristics. That is, soundwaves leave the 'speaker cones at different times and intervals, travelling until they meet a surface where this energy is either absorbed (where it virtually disappears), reflected (sometimes causing bass boom or flutter echos), or diffused, where as discussed the preferable redistribution of sound is randomly

scattered, creating a soundfield that sometimes can appear to extend beyond the physical boundaries of the room. By the nature of its dimensions and furnishings, the room has characteristics of its own and indeed forms a relationship with the loudspeakers.

The experiment below will assist in optimising your room/speaker relationship. Using diffusion to treat early reflections will result in a new, open and natural sound stage.

Have an assistant run a mirror at your ear level in your favourite listening position along the side walls of your listening room (Fig. 1). At some point, out of the corner of your eye you will see a "reflection" of the tweeter or HF driver. Mark this spot with masking tape/blue tak, and repeat this exercise on the front and rear walls, and if absolutely fanatical, the ceiling and floor as well. (Don't worry, you may not be able to walk in this room, but it's going to sound fantastic!)

Having marked these areas, you will have located primary areas of early reflections. This is the sound system/room relationship's erogenous zone. Treat carefully and the results will be amazing. In order to create a diffuse environment, strategically place diffusive materials or objects (bookcases, CD/LP racks and to a lesser extent tapestries and plants) where your Xs are marked. This should result in an immediate and positive change. If sufficient diffusion is achieved the room boundaries will seem to disappear. If your room has inherent structural problems, we can treat these with combinations of diffusion, reflection and absorption ●



**The mirror test: the mirror leaning against the chest of drawers shows an image of the loudspeaker. This identifies the position of an acoustic image - a source of reflections.**



# A LITTLE SPLENDOR

Master Skills borrow no time  
www.spendor.com  
Spendor.

Spendor's new SP3/1 loudspeakers are a replacement for the much loved S20s. A lot of attention has been paid to detail in this new model, using components normally found only in more expensive speakers, something that usually makes for an interesting product. Combined with an attractive Rosewood veneer cabinet, these SP3/1 'speakers look enticing, even at £890.

They are bi-wireable with smart looking gold terminals. Removing the grills (with some difficulty) revealed Spendor's own homopolymer bass driver, along with a ScanSpeak soft dome tweeter - a potential recipe for success. The Spendors will sit on any medium size stand, but they looked and sounded best on Epos ES11 open frame stands.

The running-in time for the Spendors was considerably longer than I would normally expect, but they performed well enough to keep my attention fresh from the box, which is important for any product in my opinion. It was only after a few days though, that they really started to sing.

I paired the SP3/1s with a basic system of Micromega's Stage1 and the Naim Nait, which produced a very fast and clean sound. Angelique Kidjo's Agolo had well defined vocals and smooth, fluid bass. But it didn't reach down especially low, which was a little disappointing. Deciding more running-in was called for, I left them playing for a further few days, after which the initial weaknesses started to disappear.

Also, moving up through the Naim equipment range proved far more rewarding, using the 92/90 pre/power with a CD3 player was much better. Crash Test Dummies' MMMMM track came into its own, sounding well balanced in most respects - it was hard to pick out any real flaws.

In true BBC tradition it was obvious that whatever equipment was put with the Spendor's, treble and midrange were never going to be a problem. The 'speakers are well balanced in this area, being neither too bright nor forward, but staying clear and detailed all the same.

Trying to squeeze the best possible from the SP3/1s, I used them in a high-end Naim system, the cost of which was veering towards silly money. Here Propaganda's Jewel was startling, soundstaging was remarkable, percussion, driving and powerful. The keyboards really started to flow, and indeed the real acid test of whether a new piece of equipment truly performs is if my mock stage diving antics don't just upset my

dog, but leave him genuinely disturbed. These Spendors have a real 'turn up the volume' feel to them, but the bass unit couldn't quite keep up. I frequently had to turn down the volume, or risk waving goodbye to the drive units. I was listening in quite a large room and expecting high levels, so I wouldn't anticipate such a

problem in normal use.

Moving over to Linn's own Mimik and Magik proved a rewarding experience, Propaganda took on a bit more power in the bass, the deep bass lines had, plenty of oomph, I could have easily have been listening to more expensive speaker's, so

much so that there was constant temptation to be stupid and review them only with top end equipment.

Trying Carly Simons' Nobody Does It Better had the SP3/1s singing, and me drooling, and dog upset again. The clarity

was amazing, bass became a little restrained, but that could be easily ignored. Working up through the Linn range and finally reaching the top wasn't futile. The upper ranges are so good that the SP3/1s can perform well in any system, never disgracing themselves. Partnering them with the full Linn entourage of Karik/Numerik/Kaim/Klout they could still hold their own and turn in a tidy performance. With something heavier like Jellyfish's, Ghost Of Number One, the swinging really started.

Other manufacturers should take a leaf out of Spendor's book. When replacing a product that is already well regarded, padding it out with flavourless stuffing is not enough. Spendor's SP3/1s turned out to be a lovely little speaker. And as a replacement for the S20s, they're really jolly good ●

**Spendor SP3/1 Rosewood**  
**Spendor Audio Systems,**  
**Station Road Ind. Est.,**  
**Hailsham,**  
**E. Sussex. BN27 2ER**  
**Tel: 0323 843474**

£890

*“The upper ranges are so good that the SP3/1s can perform well in any system, never disgracing themselves.”*

#### MEASURED PERFORMANCE

Spendor's new SP3/1s are designed to update and replace the S20s. They use Spendor's familiar homopolymer bass cone and the same ScanSpeak soft dome tweeter used in the more expensive SP2/3s.

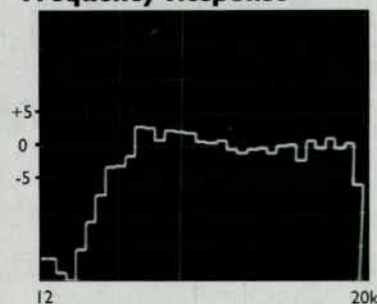
These units are used to good effect, as can be seen by the smooth and nicely integrated frequency response below. There is a slight dip as the tweeter comes in, but it is neither wide enough nor deep enough for the effect to be especially audible. Bass peaks up a little towards low frequencies, which should add some useful speed and punch as well as giving a firm bass. Overall, the trend of the response suggests that midrange detail will not project as far forward as with some loudspeakers, but the cabinets are very solid so I wouldn't expect a boxy colouration to prevail.

Overall, the impedance measures a high 12.5Ω and the curve only dips down as far as 6Ω in the bass, so the SP3/1s are an easy load - as far as current delivery is concerned at least.

As expected for the high overall impedance figure though, they are insensitive. Using a nominal watt of pink noise measured at 1m, I could only get 84dB from the SP3/1s, 2dB below average. This means that a powerful amplifier will be needed if you want decent levels in a reasonably sized room. I'd recommend 80watts or so.

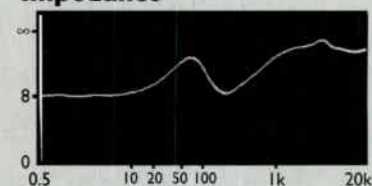
The new SP3/1s have a well engineered and smooth frequency response. They are not the easiest load for an amplifier though, meaning they do need a good, high output amplifier. **DB**

#### Frequency Response



The SP3/1s have a smooth frequency response and bass lift should give them a solid bottom end.

#### Impedance



Impedance is high overall at 12.5Ω

# close your eyes and see



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World Radio History

HWAS1194

.... continued from page 41

corner harder. I've seen authoritative and angry articles in the AES journal (Audio Engineering Society) which prove beyond a shadow of a doubt that all this business with different types of wire is a load of bunkum. One day I too changed over to a set of linear crystal etc leads I made up. I expected no difference and I made the changeover casually and without interest. The first music that reached my ears stunned me and yet I freely admit I have no idea what to measure to explain what I was hearing.

Nevertheless the manufacturers, even the pro audio ones, are now offering equipment with linear crystal wire in it. They may only be doing it because the 'punters' want it, but they are doing it. So if you roll over and accept whatever is on offer people will take your word for it, i.e. this is what music sounds like. If enough people insist on better formats, or equipment, or whatever, then that equipment will first be available through small dedicated and esoteric suppliers. If it's seen to be a small success it will survive and grow. I do hope though that we never see a Japanese midi valve system. Maybe I'm being snobby.

**David J. Mate**  
**Long Compton**  
**Warwickshire**

**MAKING THE BEST OF THINGS**

It's an ill wind init? I'm sittin' here, having committed heresy of the worst kind and feeling rather pleased with myself.

The ill wind bit is bankruptcy. I'm half way through, still unemployed and on my own again. Common enough story these days I'm sure, but still not recommended.

Anyway, during the move to the present slum (I had to move back to London from sunny Suffolk and I miss it badly) a very kind and helpful

personage dropped one of the Electrostatics (old style) down three flights of stairs (I live at the top of course). The speaker didn't appear to appreciate the therapeutic intentions behind this treatment and refused to work on both bass panels. Now, in the good old days of wine, women and song (well two out of three ain't bad) I would have gaily sent the bits to Quad and three days later they would be singing happily again. Here comes the bankruptcy bit - NO CASH.

I realise that living at the top of the building offered an instant remedy to my problem, but there was no point as the receiver nicked all my life insurance policies. The thing is of course that it's only music and books that are keeping me sane (ish). So what could I do?

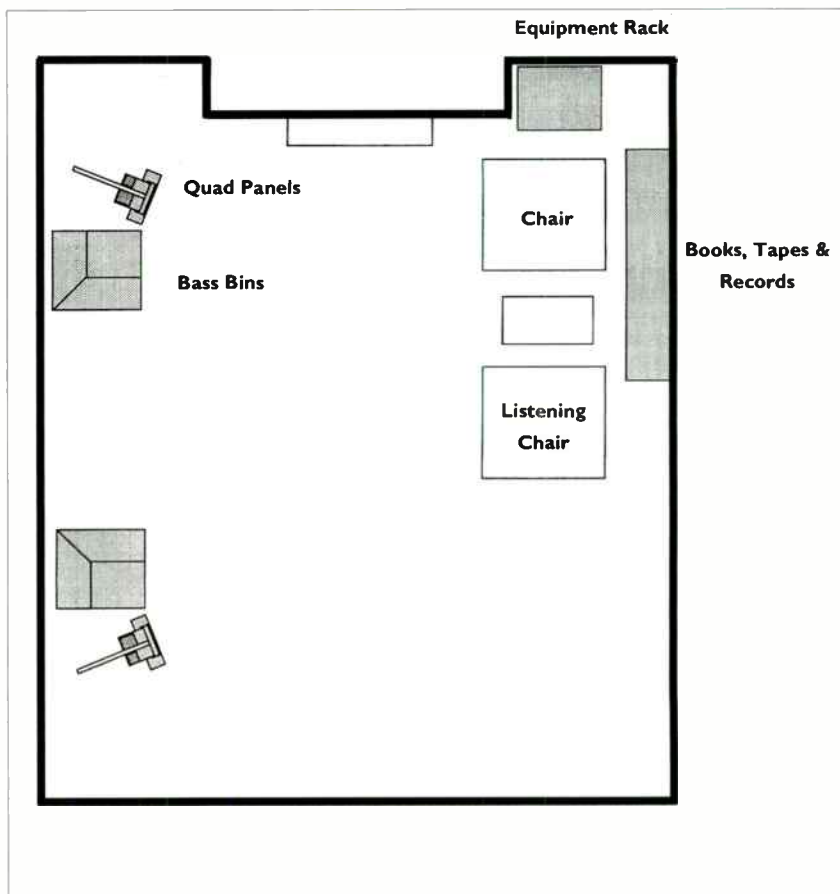
What have we all done since time immoral? Bodge that's what. But with Quads! Bloody 'ell. I had two working treble panels, two working bass panels and miraculously, considering the number of bounces, two sets of working transformers. Obvious really, but what would it sound like? (see drawings of result!) From my limited knowledge of acoustics, there would be cancellation effects in the bass because of the narrowness of a single panel. It seemed likely however, that the else's wonderful imaging would be enhanced as the two panels were vertically in line and there would be less interference between them. From way back, I had a bass bin with two old shape KEF B139s in it. This was duly cut up and I now have two odd shaped speakers which sit

inside the Quads (can I still call them that?) With the bin came simple crossovers that bring the bass in gradually at around 400Hz.

I tried it with just the treble panels but preferred the slightly warmer result using both. I wrote to Quad expecting the same response as your query regarding Tim De Paravicini's Valve powered ESL 63, but they proved that they live in the real world and confirmed that the crossover point wouldn't be too far out so why spend any money on experimenting. I never fail to

hate to claim that I have improved anything but whereas before, I could tell exactly where each instrument was, I can now tell how wide it is, how high it is and how it's being played. It's amazingly obvious which way round a piano is recorded for example - the instrument is now its proper size, the B139s giving the sound real weight. The Leak Stereo 20 has no trouble at all with the strange load it must be seeing - the speakers are run in parallel.

This is where I started - it's an ill wind! I realise that no-



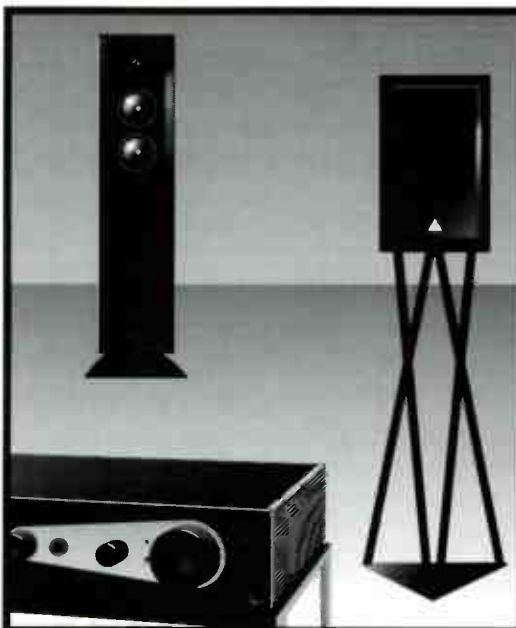
**Gordan Steadman is making the best of things with modified Quad electrostatics and KEF B139 bass units.**

be impressed with the service they provide, but I thought this kind of butchery would be just too much in spite of the mitigating circumstances.

The room I have to use is over square (about 15') and has an awful boom everywhere but in the main listening chair where everything sounds very natural. I couldn't fit everything in with any other arrangement of the room. Now I would

one should start cutting up Quads or any other fine equipment, but all is never lost given a willingness to experiment and a bit of imagination. My imagination is quite vivid and I saw myself sizzling away merrily on the high voltage bits - I was very, very careful! I knew the rubber gloves would come in handy sometime. I must protect the

continued on page 49 ....



# TRIANGLE

ELECTROACOUSTIC

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Jonathan Kettle. *AUDIOPHILE*. November 1993

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WHAT HI-FI?. March 1993

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WHAT HI-FI. October 1992

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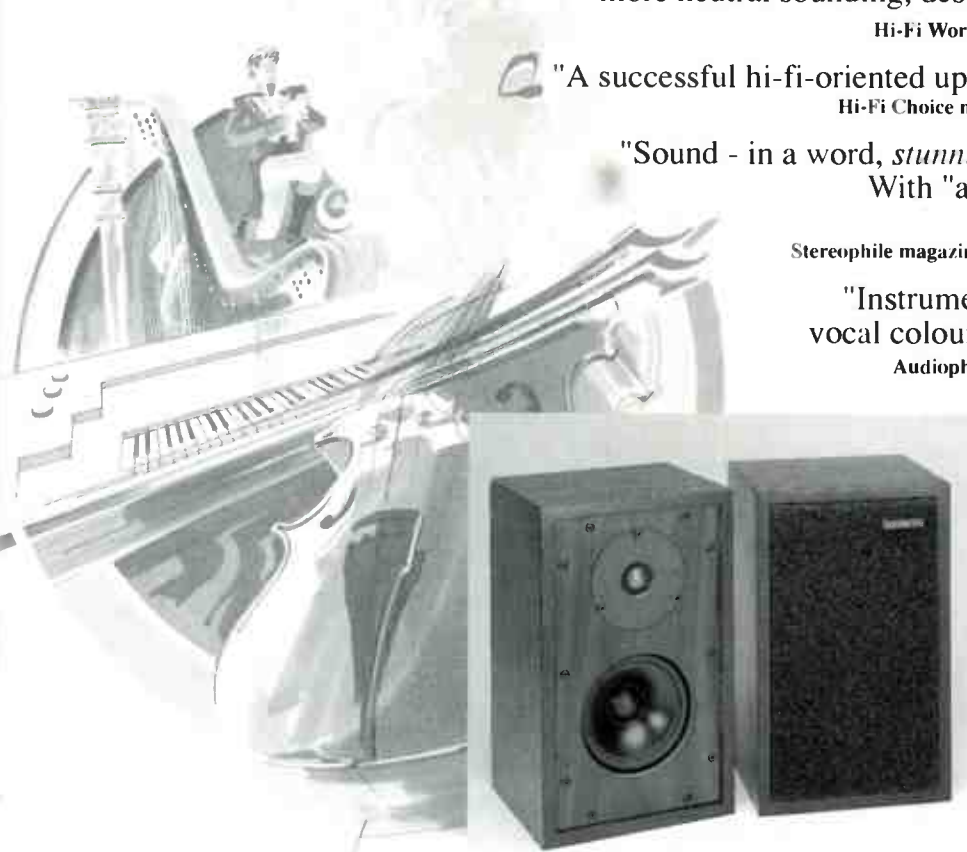
Jimmy Hughes. *AUDIOPHILE*. March 1994

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Hi-Fi World magazine - Alan Sircom - February 1993

"A successful hi-fi-oriented update on the revered LS3/5A."

Hi-Fi Choice magazine - Recommended - September 1993

"Sound - in a word, *stunning*. In another word, *clean*."

With "an astonishing amount of bass for such a small speaker."

Stereophile magazine (USA) - John Atkinson - December 1993

"Instruments had near perfect tonality; vocal colour and intonation is excellent."

Audiophile magazine - Eric Braithwaite - July 1993

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.... continued from page 47

nasty bits before the cats come to live with me! I always did get tired of telling guests not to warm their hands on the 'radiators' but that takes on a new meaning at the moment.

So real music is restored to the Steadman household. If I was still with my ex it would be instant divorce! The design and finish could be improved somewhat, but I tell myself that these are the prototypes and I'll finish them off properly later - have you heard that one before?

I would be grateful if you will do one thing for me. The bass bins seem to work best with a reflex port even though I expected them to be best fully sealed. The tube is 8cms wide and 12cm long. Could you ask your computer if I could do better? The boxes are 2.5 cu feet, hopefully you know what the resonant frequency of the drive units is.

**Gordon Steadman  
South Wimbledon,  
London.**

I ran the Thiele-Small parameters of the KEF B139 through our computer box designer to come up with the following results. At present it appears that you have a 1.5dB peak in the bass response around 60Hz. This is almost certainly the cause of the boom you get at other positions in the room. The predicted response of the bass system at present is shown in Fig. 1.

Fortunately, you have chosen a wide diameter port, making it easy to re-tune the bass. By lengthening the port to nearly double its existing length, this peak will be reduced without taking away any bass depth. I found that a 21cm length port of the same diameter gave the result shown in Fig. 2, which reduces the bass lift. You can continue lengthening the port to get a dryer and more taut bass if necessary. I hope this is of some help. **DB**

## AUDIOQUEST ALBUMS

First I would just like to say how much I enjoy reading your magazine. I find it to be just the right balance between technical and how equipment actually sounds. I have been an avid reader since the first issue, and have bought every issue since. Though I admit I was victim of the mad rush for the April 1993 issue, I wasn't able to get my hands on a copy.

Now to my query. I notice that you no longer sell records or CDs by mail order, which is shame because having purchased the Audioquest sampler from you some months ago, I now wish to purchase some of the actual titles, and maybe some that have been produced since.

I found these recordings to be the best I have heard in a long while, easily outdoing anything available on the record market as a whole. I'm talking about the recordings that the shops sell. I have not been able to hear many other audiophile recordings, except at hi-fi exhibitions.

Back to the query. I was wondering if you know of any other distributors of the Audioquest label. I have tried a few likely outlets and so forth, with no luck. I was advised to try a "top quality hi-fi shop". Perhaps you know of one.

I would be sincerely grateful if you could help me in my quest.

**Tim Peary  
Bolton  
Lancs.**

For any information regarding Audioquest releases call Stuart Perriam at Arcam on 0223 440964 who will be pleased to help. **RJ**

## SINGLE-ENDED POWER

I am a Hi-Fi World reader of about two years now, having defected from two previous hi-fi magazines due to their repetitive coverage of uninspiring black box, mass-market, Japanese noise-making machines. I feel the

improvements in reproduction quality and the sheer interestingness of serious, dedicated equipment and its circuitry really can make music and thus hi-fi far more appealing and involving. Further improvements over the dial-laden-and-all-look-the-same boxes and freedom to sonically proportion sound to one's own taste can be had by building proven circuitry from specialised components whose price and thus quality really only depended upon the depth of your purse or the length of the bank manager's employment contract.

It is in regard to the liberty which DIY gives that I write. As a bit of a budding electronics chap, I decided to have a go at designing an amplifier. Fully believing in the principle of single-ended working and deciding it was this principle upon which my design would function, I sat down and began the intensely recondite mathematics. Firstly, I wanted the output transformer to reach 20kHz at least, to keep treble body. Also, I wanted response to go to about 10 Hz for CD subsonics. To top it all off, I wanted a little more than the average 9-25 watts usually on offer for such designs. Ask old Tim and he'll tell you such a beast of a component isn't easy to design, so I didn't, I settled on two already constructed, from the substation down the road.

Having run them in with the patch I have into the flat below's electrical supply, I took measurements and found that they were just the ticket. To drive the transformers in quasi-complementary auto-bias anode cathode zenode tetrode pentode mode, I calculated the design of valve would have to be a little unusual, as is always the case with the best hi-fi, so I'm told. I decided to build the valve from a fridge motor, a section of zinc-plated wire fencing, fifteen wire-tensioned, auto-balanced, super-bright filament bed springs, a lawn-mower, and a specially coated hexagonal fish tank to serve as

the enclosure, the formulation of the coating of which I do not wish to divulge.

The Results? - Outstanding! When partnered with a pair of electrostatics I designed and built earlier this year and powered by my own silver-wound nuclear reactor PSU in the kitchen- magnificent! The revolving anode lawn-mower cylinders glow as bright as the sun. The 400 MW heaters - blistering! Such now is the quality and ease with which music is conveyed, the 15 square metres of ultra-light polyarsenide-doped 600 GV mylar sound diaphragms of the electrostatics become completely invisible, conveying concrete-fracturing dynamics and unbelievable imaging. It really must be heard to be believed, such is the system's utter completeness and musicality.

Finally, connecting back to an old three-phase amp and sixteen-pole moving-cabinet speaker system I built last year really was an eye-opener. The distortion I hadn't noticed before - ugh! How painfully obvious the single-ended design makes such lesser equipment's foibles starkly known.

So it seems the problems of designing a high-power single-ended amplifier are very real. Indeed, the fiendishly complex mathematics and poor measured performance would make the most capable of designers think twice before attempting such a design. But then again, with designs like the Yoshino, Ongaku, and now the Subaroo (measuring markedly better than both of these two - output: 12.2 KW; Freq. -3 dB: 0.01 Hz- 19.88763 GHz) clearly demonstrating what the technology has to offer, perhaps designers may think twice and consider the enormous advantages of such technology.

**Royston Briggs  
Moxley,  
Wednesbury.**

continued on page 55....

**A**fter having much success with their latest offering, the CD480, in the mid-range CD market, Orelle now plan the same for the amplifier market. Until now Orelle haven't had much luck in the amplifier market as a whole (at least in this country) despite a worthy range of integrated and pre/power amps.

Their latest offering, SA-100, pitches into a market where there's even greater competition than the equivalent CD sector. Priced at £379, the Orelle looks conspicuously good value next to rivals such as the Audiolab 8000A (an old timer, but still highly regarded), Cyrus 3, Arcam Delta 290 and literally dozens of other hopefuls from Britain, Japan, France and Scandinavia. Which ever way you look at it, the Orelle is going to have its work cut out convincing thick-skinned reviewers, dealers and the public alike that the SA-100 is different from the rest of the pack.

In terms of build quality and styling, the Orelle creates the right impression. The slim grey casing that was beginning to look slightly dated has given way to a new look reminiscent of Sugden (and none the worse for that), although some of the details are a matter of taste. The specification is good too. Although internal wiring is no longer by van den Hul, there are still silver plated switches, chunky gold binding posts and phono sockets on the back, and a hefty toroidal transformer which supplies a claimed 50W. The one thing there isn't, however, is a phono-stage, which is rapidly becoming the norm in this price range.

I coupled the Orelle up to my usual Cambridge and Roksan sources. As far as the 'speakers were concerned, my usual SL600s were substituted for something a little more efficient, in this case Castle Durham 900s.

Grace Jones' Nightclubbing and Slave to the Rhythm albums proved good choices to test the amp's low level bass retrieval and dynamics. The SA-100 breezed through the tracks, showing the ability to unravel complex bass rhythms and putting plenty of weight and substance into the mix too. The downside of this particular characteristic is that the bass could occasionally drag on faster tracks, as I discovered later. However, in this respect it's superior to previous Orelle amps which could really sludge up the bass. The Orelle had a greater "grip" on the music than many budget pre/power amps I've heard. More to the point, it's rather too close for Orelle's comfort to



**Dominic  
Todd assesses  
Orelle's mid-market pitch,  
with its new SA-100 amplifier.**

their pre/power amps in this respect.

As a whole the balance could, if anything, be accused of being slightly restrained, but not to the extent of, say, Quad or Albarray. The treble was clean and reasonably detailed, but without the "stripped bare" analytical nature of some of competitors. Yet this quality lends the amplifier to brighter systems and to long term listening, where the Orelle is totally relaxed.

Brighter recordings also benefit from the SA-100's easy going nature. All About Eve's, Scarlet and other Stories is one such recording, and can sound overbearing on some systems. The Orelle refined the recording, whilst at the same time retaining the finely

detailed guitar work. Vocals were a little recessed in comparison to an 8000A or Alchemist Kraken, but not seriously so. For

and it didn't seem to suffer the timing difficulties of its ancestors. The Orelle also showed good separation, a broad sound stage with plenty happening and with no particular frequency seeming to be masked. I was impressed too, by the Orelle's ability to unravel complex bass lines into something that resembled the particular instruments that actually produced the bass in the first place. Again the SA-100 was reminiscent of a much more expensive amp here.

Orelle have certainly made an effort with the SA-100. It's enough like the rest of the pack in terms of build quality and conservative design not to be shunned by a similarly conservative buying public at this price level. Yet, it produces an overall sound quality that is unlike most of its competitors. It possesses the smooth easy going nature of Quad or Albarray, yet at the same time, manages to pull out far more detail than you'd expect from such a balance. Overall, it works well and is exceptional value at the price. All it

really lacks is the ability of some of its rivals to get the best out of any system. It doesn't have the drive of, say, an



those used to such amps, however, I could see how Orelle could be seen as being just too polite and there were times when I wished the SA-100 would "let rip" a little. The guitar in Only One Reason had me turning up the volume as a substitute for the slight lack of blood and guts.

But then not everybody wants rip roaring excitement. With a gentler mix of the Little Feat and Acoustic Alchemy, the Orelle proved to be an involving and enjoyable performer. The bass lines always integrated smoothly with the rest of the mix, something which couldn't be said of previous Orelle integrated amps,

Audiolab, to tackle difficult speakers, or that final degree of raw emotion you'd get from a Nait 3 or Kraken.

Nonetheless, it's an exceptionally well-rounded amp, and a big step forward for Orelle. Now they finally have a competitive product battling it out in the mid-market amp war - and it's a good 'un ●

**Orelle SA 100**  
**Orelle Hi-Fi,**  
**Unit 11, I-MEX House,**  
**6 Wadsworth Road,**  
**Perivale,**  
**Middx. UB6 7JD**  
**Tel: 081 810 9388**

£379

## MEASURED PERFORMANCE

The SA-100 is a MOSFET amplifier with a useful output of 50watts. This is enough to drive sensitive loudspeakers (86dB or more) loud in normal size rooms, if not shatteringly loud. Power output into 4ohms rose little, reaching just 56watts. However, we're told that in production a mains transformer with better regulation will be used, giving more power into low loads.

Bandwidth was satisfactorily wide at 5Hz-50kHz through the Aux, Tape and Tuner inputs. Sensitivity was normal at 260mV and noise low at -100dB. Separation also proved fine at 82dB.

I wasn't especially impressed at the amount of crossover distortion though, which rose to 0.2% at 10kHz, from just a few watts of output. With an extended harmonic structure, this is likely to tinge the sound a little and be subjectively discernible as a little coarseness or hardness.

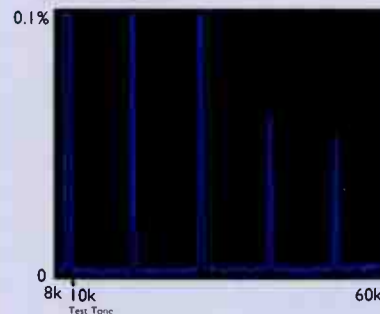
Another dubious feature which Orelle need to look at was d.c. bounce when the volume control was adjusted, with offsets of up to 80mV occurring, accompanied by a long settling time of around 10seconds before a (satisfactory) quiescent value of around 10mV was reached.

The Orelle SA-100 is a neat, simple design that uses good components. There are some areas where I feel it would usefully benefit from a little tidying. NK

## TEST RESULTS

Power	50watts
CD/tuner/aux.	
Frequency response	5Hz-50kHz
Separation	82dB
Noise	-100dB
Distortion	0.025%
Sensitivity	260V
dc offset	10/8mV

### Distortion



Extended harmonic distortion may give a sharp sound.

# INTERMEZZO



**Goodmans have interrupted production of the Mezzo loudspeakers to improve the crossover. Peter Downs is first to listen after the intermission.**

The Goodmans Mezzo has been reviewed in these pages before, "so why again?" I hear you ask. Well, following our comments about the first pair, Goodmans have improved the balance of the speakers. They are still a two-way, rear-ported design, featuring a 6.5inch polypropylene bass/mid range unit, but with the addition of a concentric ring in the cone to improve the midrange. The treble is handled by a 19mm metal dome tweeter, which is horn loaded, complete with a phase correction plate, ferrofluid cooling and what Goodmans call "DRD damping" to suppress the ultrasonic treble peak which metal dome tweeters exhibit.

The crossover is hard-wired to the back of the nickel plated binding posts which is surprising at the price - push on tags are usually used for production speed. The 12mm chipboard carcass, with MDF front baffle, is unbraced and quite resonant when tapped with a knuckle, but the enclosure is lightly filled with BAF wadding which does help damp out some of the 'boing'. Both drive units are bonded to the front panel. This may aid rigidity, but it won't make servicing particularly easy. The large port, positioned behind the tweeter, tunes the enclosure down to 50Hz. The plastic framed grill, with bevelled edge, clips over a plastic-leather look-a-like finished baffle to create a neat looking package. The review pair were finished in rosewood effect vinyl.

The system used with the Mezzos comprised Pink Triangle PT TOO with SME IV tonearm and AT-OC30 cartridge, PS Audio 4.6 pre-amp running passive into a pair of Audio Innovations First Audio monoblocks. Also used was a Myst G Ohm Mosfet power amp. Interconnect cable was plaited 19 strand silver plated copper, with solid core speaker cable.

Goodmans recommend that the Mezzos are placed on 15-18inch high stands positioned 9-12inches from a rear wall. In my room, I ended up using the Mezzos on 22inch open framed stands, around 4ft from the sides and 2ft from the back wall. This gave me the best compromise between bass reinforcement and an open presentation. Toeing them in so you could just see the inside edge of each speaker from the listening position gave the best image with clearest focus.

The first record onto the turntable was Beethoven's Fifth Symphony (Walter Weller, Chandos). This is a very good disc for checking whether bass boom is present; the massed strings produce an awful lot of energy and can sound confused and boomy. I am happy to say that the Mezzo didn't have a problem in this area, in fact they handled the recording with a gusto I wasn't prepared for. Switching to Mahler's Ninth Symphony (Sir John

Barberolli, EMI ) produced a similar effect, the brass on the opening side conveying the excitement and tension of the performance well. This is a speaker that's not frightened when the music starts getting difficult. David Sanbom's "Hideaway" is a good Jazz Funk record, foot tapping stuff with the music fairly bouncing along. While not entirely neutral the overriding message was fast and tuneful.

Bass went quite deep, being slightly one note at times due to cabinet resonance, but the difference between double bass and kick drum was clearly discernible. The individual notes of the double bass on Rickie Lee Jones' Pop Pop also came over vividly, and on Mary Black's No Frontiers the track The Shadows has some deep synthesizer under the violin and piano which was also handled well, although it was a little more obvious than I am used to.

Moving up to the mid-range, piano on both jazz and classical fared quite well. This is a difficult instrument to get right; it can sound as if it is made from concrete - not wood - on some 'speakers. The Mezzo had a slight hollowness in the lower midrange, changing as frequency increased, getting brighter and harder as the metal dome came in.

Acoustic guitar fared much better though. A roundness of tone was there and plucked strings broke free from the rest of the mix. Robben Ford's nylon strings on Pop Pop could easily be identified and Joni Mitchell's guitar was beautifully formed. Sax and trumpet were also handled with verve. Listening to John Coltrane and Lee Morgan on Blue Train, I could readily hear the studio atmosphere around the instruments as each came forwards to the microphone for his solo.

Vocals had clear diction, but were slightly squashed in the lower mid-range. Joni Mitchell, Mary Black and even Old Blue Eyes were given a crispness without it becoming brightness. Treble was not overpowering, which it can be with some metal domes. Being used to a ribbon tweeter the difference was mainly a graininess which was always present despite different recordings.

Regarding imaging, compared to my usual speakers, SD OBSR, the acoustic window was much reduced, but not absent. Rimsky-Korsakov's Scheherazade (Chandos) had the orchestra well laid out in an arc between the speakers, if slightly veiled when compared with the best. Going back to the Blue Train album I still felt the intimacy of the performance. Likewise Billy Holiday's Songs for Distingue Lovers shows analogue at its best, her frail voice backed by the dreamy quality of Ben Webster's sax. The depth in this recording is fantastic, 'Sweets' Edison sometimes standing miles behind the band, but unfortunately this effect was

not entirely recreated by the Mezzos. Their shallowness was not an overriding problem though.

The Goodmans Mezzo reminded me of a young pup with bags of energy, wanting to be loved, but sometimes showing its immaturity ●

**Goodmans Mezzo** £170  
**Goodmans Loudspeakers Ltd.,**  
**3 Ridgeway Havant,**  
**Hampshire. PO9 1JS**  
**Tel: 0705 492777**

**MEASURED PERFORMANCE**

The GLL Mezzos have undergone subtle crossover refinements since we last reviewed them. Originally, we criticised their soft treble, so the new Mezzos have the treble better aligned to the midrange. There is still a bass lift towards lower frequencies which will add good weight and punch.

The frequency response plot shows that although the treble level better matches that of the midrange, there is still a shallow dip through the upper midrange which will pull vocals back into the box a little.

Elsewhere little has changed. Impedance has gone up from 7.5Ω to 7.8Ω, along with a corresponding fall in sensitivity from 88.5dB to 88dB. This will make little difference in terms of an amplifier's ability to drive the Mezzos - they are still an easy load.

Overall, the Mezzos have changed little in terms of their measured performance. Treble level has been raised slightly, which may have quite a strong subjective effect, giving some needed sparkle to the top end. **DB**

**Frequency Response**



**Impedance**



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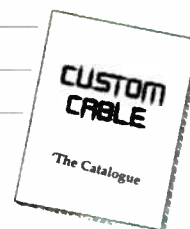
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## Pentachord – classic speakers



### Hi-Fi World reviews 1991

#### Pentachord System (May)

"...The subwoofer appears to have integrated beautifully, with no obvious gaps at the frequency extremes"

"With particular reference to the Pentachords' imaging properties, the loudspeakers are up there with the very best ...Strongly projected sound stage, replete with clear, sharp images of vocalists and instruments.... The manner in which the soundstage was constructed seemed quite unlike that from most cabinet loudspeakers; it had an engagingly lifelike quality dramatic enough to demand attention"

"Amongst the most refined and integrated subwoofer/satellite systems on the market today"

"We all felt they sounded superb, a measure of unanimity that is rare for any loudspeaker" (*The Editor*, June 1991)

#### Pentacolumns (December)

"...one of the finest loudspeakers to grace my system to date"

"Once the pentacolumns were running in a well balanced system, their imagery was remarkable"

"It was difficult to find a single area where the Pentacolumns excelled; they were good at everything"

"The Pentacolumns are among the most revealing loudspeakers that I have heard"

"The price is more than matched by their superior sound quality"

These speakers have also received superb reviews from other discerning experts. The Mark II versions are even better. Send for details and arrange for a demonstration.

**Pentachord Loudspeakers, 49 Rusholme Road, London SW15 3 LF; 081 788 2228**

... continued from page 49

PS: Can you recommend a suitable loudspeaker cable?

I was most interested in your letter, especially the rotating blade anode structure of your valve. I am sure that the swirling electron stream inside will convey as yet unrealized sonic performance from single ended operation. I have also found that to get optimum performance from amplifiers of this type a separate mains spur is advisable. Running the spur from the flat below however may cause some problems as the electricity will have difficulty climbing up the wires, I suggest making the mains cable into a superconductor by running it through the freezer compartment of your fridge.

I have found that the intense neutron bombardment of the membrane in nuclear powered electrostatics can cause deterioration of the mylar film - this is something to watch out for. Don't pay any attention to the pseudo-audiophiles, the only way to listen to these is "stripped down". To do this chisel away the metre or so of concrete, then carefully cut away the lead to reveal the reactor inside. The bright blue glow you will now see is ionization of the air by the massive radiation emissions, this will illuminate your room and save money on haircuts, any blistering of the skin should be treated with Tweak or Cramolin.

Finally, you may like to try making a valve using Strontium 90 as a cathode material, it is a very powerful emitter of Alpha particles which may work better than the usual electrons, and as an added bonus Strontium 90 has a half life of 10 trillion years so your valve will still be working when there are troglodytes inhabiting the earth like in The Time

Machine by H.G. Wells., and it may well be responsible for their existence.

In answer to your question on cables - I generally don't bother with speaker cables as the output voltage of my amp is sufficient to jump the 6 or 7 ft gap between it and the speakers. **AG**

### SEEING THE LIGHT

On a recent visit to one of my local audio specialists (Norman Audio of Blackpool) I was pleased to find that they had both the Audiolab 8000A and Cyrus III amps available for demo. I had already listened to both these amps and favoured either of them as a replacement for my Pioneer A400, but this was to be my first opportunity to listen to them together and perhaps to reach a decision for purchasing later in the year (when funds permit). I also noticed a second hand Audio Innovations A200 pre-amp, and enquired as to the possibility of using that with the A400 as a power-amp. I have fancied the idea of valves, having liked what I have read in Hi-Fi World, although I had no experience of them at that time. Also, many dealers had suggested that to get a worthwhile improvement on the A400 I needed to be listening to pre/power combinations.

I booked an appointment for the following Saturday morning, and turned up with a good selection of classical music (and some rock) both on CD and vinyl to give all three amplifiers a good trial. I started with the pre-amp and never got any further. The vinyl, as was to be expected with valves, sounded beautiful - still very detailed yet much warmer, the stereo imagery was clearer than I was used to and the overall ambience breathtaking. Bass sounded softer but it was still went low with plenty of control, which I liked. I played one particular track that I had never warmed

to on any system I have had (Sir George Solti conducting "Ride of the Valkyrie") and enjoyed it fully.

The vinyl was well beyond my expectations but the CD was not expected to be anywhere near as good since the line stages on the AI A200 are passive, so no valves to help out. However, even the two sales assistants who were eagerly listening along with me were taken aback by the sound of the CDs. I'm not sure why, I can only assume it is because of the pre/power split, but even CD was a great improvement on the Pioneer's usual performance. It sounded much more natural and vinyl like, with the same sort of improvements as I found with vinyl. It took a lot to convince me that the valves were not used, but the pre-amp does not even require switching on when not using the phono stage. Pagannini's Caprices proved that it still retained a good range, but I had lost the shrill accompanying some of the higher bars that now sounded sweet and transparent.

Having spent nearly two hours being fully entertained I did not bother with the other two amps as I knew from previous listening sessions they could not match the A200/A400 combination. The cost was a mere £200 - less than half the cost of the others and I was able to get it now rather than later. Installed at home I am still impressed - even my wife can tell the difference (no mean feat I assure you). I have the pre-amp resting on a Cyrus Isoplat (just overhangs it nicely) and it is linked to the A400 CD input via Ixos 103 interconnects; the A400 is set with volume at half level.

The rest of my system consists of Revolver Rosewood turntable and arm with Corus Blue cartridge, Pioneer PD-S901 CD Player (Ixos 102 interconnects), Marantz SD60 cassette deck and Sony ST5370 tuner; I also have my Nicam TV/Video

linked through the auxiliary input. I have found great improvement on all these sources with the new combination. My speakers are Mordaunt Short 3.30 supported by Foundation FRED (Budget) 18" stands and connected by Supra 4 cable.

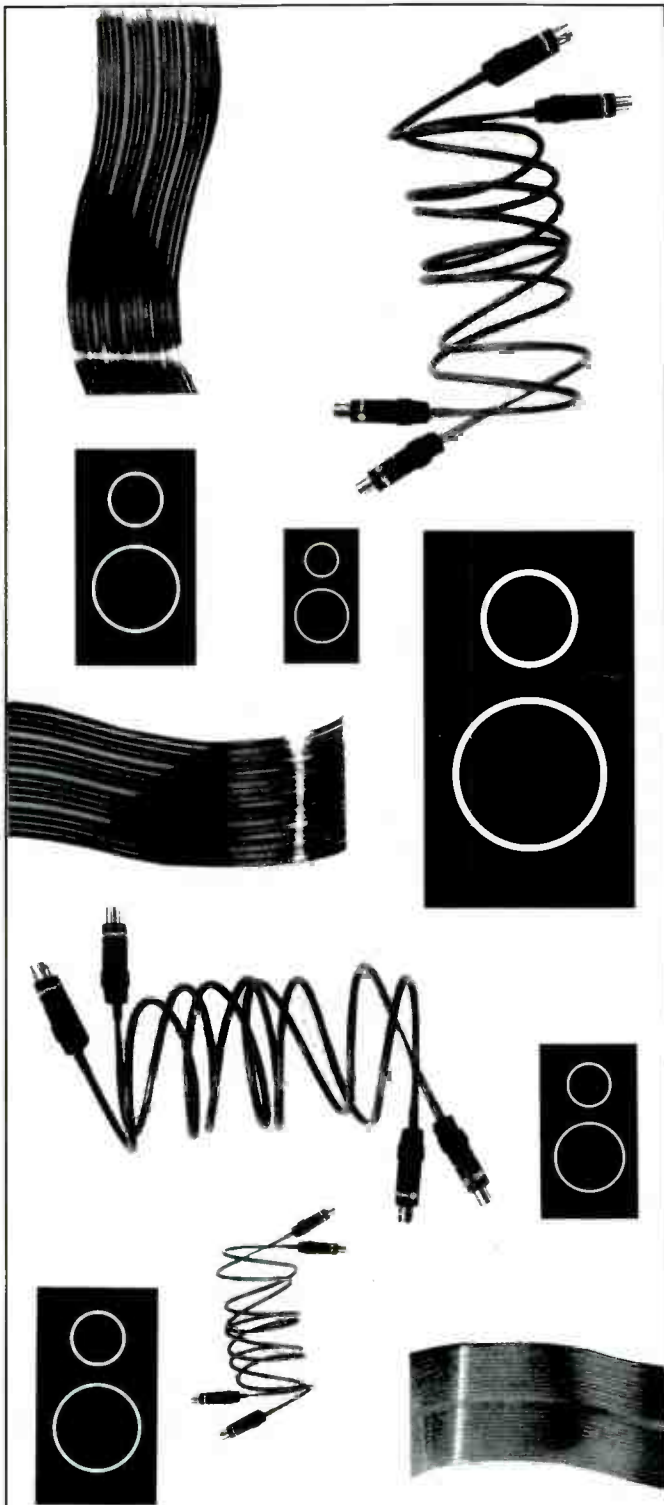
When I bought my A400 2 years ago I got hooked on hi-fi. Now I've got caught again - this time it's valves. So, much as I like the combination, I still want to replace the A400 with a dedicated valve power amp.

Okay, question time now. Maybe (for the sake of my marriage and bank balance) I shall have to wait a while, but which power amps would you recommend? I have thought of the matching A200 power amp but I wonder if my speakers are really sensitive enough (90dB) for their low output; and I am considering your own K5881 kit (an electronics engineer friend of mine will eagerly assist in its construction - I'll hold the tools). Although I listen to most types of music, I spend most time with classical and want a system that is good for opera and acoustic music in particular.

**Richard Browne  
Fleetwood,  
Lancashire.**

**One of our contributors, Dominic Todd, has arrived at a very similar amplification system to yourself. He too finds the A400 makes a superb power amplifier, but has added an external phono stage with excellent results.**

**The A200 power amplifier isn't that powerful and won't drive many loudspeakers as a result. The Mordaunt Short loudspeakers you are using should be next on the list for upgrading. This will give you the chance of picking a more efficient loudspeaker that will get the best out of your A400 and be more suitable for a valve amplifier in the future. **DB****



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**Built by Rega to NAD's specification, Dominic Todd finds  
the new NAD 533 turntable fit for a king.**

**D**on't be surprised if you're faced with a sense of déjà vu when eyeing up NAD's latest offering to the budget turntable market. To all intents and purposes it is essentially a rebadged Rega Planar 2. NAD aren't alone in offering a badge engineered Rega, though. At about the same time the NAD was announced, Akai launched a similar product. This has since been discontinued and was no doubt the cause of the delay in actually launching the NAD turntable.

Being related to the Planar 2 is no bad thing. In fact it's quite the opposite: it allows NAD to instantly inherit the excellent reputation that the Planar 2 has built up over the years. The classic elegance of the deck remains untouched, as well as its simplicity of operation. There's no doubt that the Rega hides its years well, still standing out as a fresh and clean cut design on the shelves of

hi-fi retailers. Yet differences do exist between the two brands. For one, the NAD's platter is turned from MDF, rather than the Planar's glass. NAD also choose to include a cartridge, Goldring's basic Elektra, in with the package price of £199.95.

Initially this may seem like a shrewd marketing move on NAD's part, especially when one considers the Rega equivalent costs a mere £15 less without cartridge. However, this apparent shrewdness on NAD's part turns out to back-fire somewhat when it comes to sound quality. Although, in essence, the NAD strikes the listener as being a fine sounding turntable, it doesn't take long to realise that there's something amiss, something holding back the deck from sounding as good as it could do.

Higher frequencies sounded uncharacteristically ragged for a Rega based machine and bass extension, whilst

being deep, was almost painfully ponderous. It didn't take me long to suspect that it was the cheap and cheerful Goldring badged cartridge that was at fault here. Changing this for a 1012GX from the same company proved an eye opener, and an instant upgrade I'd advise anyone to consider before buying the NAD.

Once up and running with the 1012, the NAD's heritage shone through, demonstrating the well rounded, yet capable qualities of its namesake. Richard Thompson's "Mimor Blue" album showed the deck to have an uncommon (at this price range) ability to unravel complex nuances from the music. Nothing seemed forced, yet by the same token the NAD couldn't be accused of being bland - it simply got on with the task of making music in a relaxed and informative manner.

Dissecting this general critique of the 533, it is the arm that must take the lion's share of the credit for the transparent and at times bewitching mid-range. The ragged treble had disappeared with the fitment of the more refined 1012, yet Grace Jones' "Bulletproof Heart" showed the bass could still occasionally sound a little too soft and lacking in attack. Not one of the

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arm's strong points, but possibly exaggerated by the switch to an MDF platter, since glass sounds punchier in the lower registers. This change of material could also account for the slight lack of sparkle at the top end, although this is greatly preferred to the shrill nature that was present with the standard cartridge.

Bear in mind that these criticisms are in relation to decks often costing much more than the NAD, such is the standard expected from the deck, and that in day to day use they hardly detract from the performance. Comparison with the similarly priced Pro-ject I did reveal that the Rega could sound slightly euphonic and not the most cleanly etched of performers. Yet at the same time it had a fuller presentation than the Pro-ject and a more expansive soundstage to boot.

Various Van Morrison tracks also showed the NAD to lack the dynamic impact of certain rivals, with a slight softening of transients present. Yet, despite this quibble, the 533 was always involving, such was its articulation and, above all, coherence with whatever type of music was being played.

In the final analysis, the NAD's sound can be described as transparent and informative, smooth yet still able to unravel complex signals. Its dynamics are softened somewhat and slightly ponderous bass doesn't make it the best choice for large scale orchestras. Yet - to use an industry cliché - at heart the 533 is "musical".

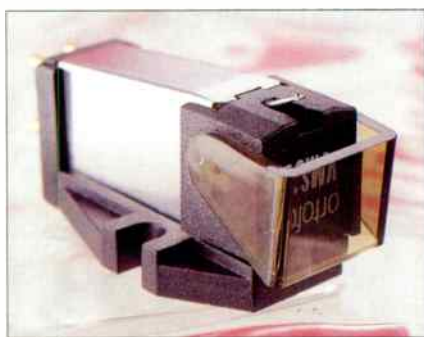
The 533 marks a useful step forward for NAD in terms of turntables. Put next to the still fine sounding, yet poorly built 5120, the 533 is nothing short of a

revelation. With a change of cartridge the 533 is a deck that is both pleasant to use and look at, unfailingly reliable, well built and offers mature sound quality. What more could you possibly ask for from a turntable costing around £200? The NAD merits recommendation, and with it continues Rega's reputation for providing a taste of the high end at a bargain price ●

**NAD 533** £199.95  
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# GOOD VIBRATIONS

**Ortofon keeps the price down and the quality high for its new budget priced cartridge, finds Dominic Todd.**



There's not much you can get for a tenner these days, not even a half decent CD. So it came as a surprise to find that was all Ortofon were asking for their latest VMS 2E. Have Ortofon gone mad? Or are they simply trying to win the award for the greatest price differential between cartridges (£10 - £2,000)? The answer is that it's a shrewd move on Ortofon's behalf to produce a cartridge retailers can sell at a replacement stylus price and it can be fitted as standard on budget turntables, to keep the price down.

Fitted to the NAD 533, it produced a smoother treble than the Goldring Elektra with cleaner transients too. With Eric Clapton it sounded punchy and fast, drilling the rhythm into the listener. Fitting the cartridge to a reference source, a Michell Gyrodec QC with SME IV, revealed the Ortofon does have limitations. Vocals sounded nasal, bass somewhat plummy and it became confused with more complex sections. The basic character, however, was of an honest product that could still sound good.

The bass on Brian Ferry's Taxi was deep enough but, even on the NAD, rather loose. In the best tradition of Moving Magnets, the Ortofon produced a broad expanse of sound and good projection that made the Goldring sound compressed in comparison. On some systems, this could become wearing, but generally this quality is ideal, adding a little sparkle. Ferry's vocals were distinctive and clearly separated from the rest of the mix, and the atmosphere of the album was captured on both the NAD and the reference deck.

Anita Baker's Giving You The Best I Got revealed no problems with female vocalists (namely sibilance), although the bass could occasionally "plod". Vocals were clean-cut and, again, well projected from the 'speakers.

Considering the Ortofon's ludicrously low price, it tracked exceptionally well, even with dusty old demo. records. The highish tracking weight of 2gms no doubt helps here.

The VMS 2E is no giant slayer, in the mould of an Audio Technica AT110E, and anyone considering a decent budget cartridge would be better off with an AT95E at the very least. Yet, if you are really strapped for cash, or plan to upgrade quickly (the VMS 2E is compatible with all of Ortofon's VMS styluses) then it's difficult to go wrong with the new Ortofon. If you're considering a new NAD 533 you might even be able to twist a dealer's arm to swap the VMS for the Elektra. But don't tell them I said that!

## MEASURED PERFORMANCE

The new VMS 2E has superb tracking ability at all frequencies, very high output and low distortion, plus good separation - especially for an Ortofon. Only frequency response was a little wonky, exhibiting a large midband suckout of -3dB, as our analysis shows. This got worse towards the centre of the disc and heavy capacitive loading improved matters little. The VMS 2E will sound very warm and full bodied as a result of this response. **NK**

## TEST RESULTS

Tracking force	2gms
Weight	5.5gms
Vertical tracking angle	22degrees
Frequency response (+/-3dB)	20-20k
Channel separation	30dB
Tracking ability (300Hz)	
lateral	90µm
vertical	45µm
lateral (1kHz)	25cms/sec.
Distortion (45µm)	
lateral	1.4%
vertical	2%
Output (5cms/sec rms)	7.7mV
Channel imbalance	0dB

## Frequency Response



# IN THE DECEMBER ISSUE

You'd be mad to miss the December issue of Hi-Fi World, there'll be so much to read and keep you entertained. Once again we'll be giving away a FREE DIY hi-fi Supplement. There's a fabulous competition to enter, and reviews and features on all of the latest equipment and developments in the world of hi-fi. Here's just some of what we hope to bring you in December -

## AUDIOPHILE CD PLAYERS

We test a group of CD players around £350, including Arcam's new Alpha One, the cheapest British built CD player available.

## MISSION 73 I

Mission have launched a new 'affordable' loudspeaker to stand alongside the regarded 760is. We audition these high tech miniatures.



## SD ACOUSTICS SD-3R

SD Acoustics have been hard at work on this new loudspeaker, featuring a custom built ribbon tweeter. For £399 these stand mounting loudspeakers look set to be a winner.

## DPA INTEGRATED AMPLIFIER

At last, DPA bring their magic down into the crowded, competitive but popular integrated market. Will surface mount technology let them prevail here too? Find out next month.



## LINN KAIRN/KLOUT

We were so impressed with this top end pre/power from Linn when we used it to drive the massive TDL References in the October issue, we decided it was worth a more in-depth review.

Hi-Fi World is still only £2, but with more editorial than most rivals. With the most enthusiastic and expert editorial team in hi-fi journalism, can you afford to miss it? Make sure you don't by filling in this order form and handing it to your newsagent.

## DIY SUPPLEMENT No. 12

It appears that you just can't get enough of DIY hi-fi projects, but neither can we, so once again there'll be another FREE Supplement with the December issue of Hi-Fi World. We'll be testing new high tech Audax High Definition Aerogel drive units and giving suggestions for using them. They're the best you could possibly buy for DIY loudspeakers, yet not madly expensive. As well, there are other projects, letters, news from the DIY scene, book reviews etc. Miss it at your peril.

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**COMAG**  
MAGAZINE MARKETING

Loudspeakers drive me nuts - but they're great fun. Everyone finds great satisfaction in engineering a loudspeaker that they think is right, including me, but there's also a great sense of frustration in knowing that any and every loudspeaker offers only an interpretation of the sound. Whether others will like it depends upon a bewilderingly large number of factors, many of which interact. How I have been reminded of all these things when listening and tweaking KLS4, as well as necessarily canvassing the opinion of others about its sound.

In the past, engineers have tried to invoke so-called technical perfection as a defence for their loudspeakers, KEF in particular championing this approach. I got into a great argument the other night at a KEF dinner defending KEF founders Fincham and Cooke as great engineers, if unable to fool all of the people all of the time - including me. In the end, you have to submit to the opinion of others. If the man from Del Monte says "no", then NO it is. That, especially, neither Fincham nor Cooke - both great autocrats - could take on board.

After twenty years of reviewing loudspeakers, giving me the benefit of hearing more commercial models than probably any speaker engineer, I am a firm believer that the drive unit overwhelmingly dominates the sound of a loudspeaker above 200Hz - all other things being equal. To make a better loudspeaker, we need a better driver and, believe it or not, there are plenty around, though not in common use.

The reason for this is partly economic. Better drivers cost more and, in the competitive speaker business, drive unit cost is commonly kept to a minimum. The DIYer can happily spend a relative fortune on the drive units, since besides this there's little more to shell out for. This is a great advantage,

putting anyone with the time and ability to make a couple of MDF cabinets well ahead in the quality stakes.

Having heard Audax carbon-fibre drivers doing a wonderful job in KLS3, demonstrating vivid clarity, I couldn't but help decide to use them in a smaller, less expensive and domestically less intrusive loudspeaker. Keeping the same tweeter and using the midrange unit from KLS3 as a bass/mid, KLS4 was born. Getting deep bass from a small driver and cabinet is always difficult. I



manufacturers have found with CD players, treble needs to be gently rolled off for 'natural' treble from CD. I decided to let KLS4 run flat to 20kHz all the same. It's less amenable as a result, but it is very analytical.

Another conscious choice made in the design process was in a similar vein. The bass/midrange unit has a response that starts to fall gently above 500Hz, becoming about -2dB down at high frequencies. Most designers would, I suspect, leave well alone, knowing

## Reflections from Noel Keywood kaleidoscope

fitted a long port as well as a short one and found after experiment that strong, deep bass could be obtained from this stagger tuned system. Listeners have remarked upon how low KLS4 goes, but they also commonly feel it has light bass too.

That to quite some extent is true, being part of a conscious trade off I made in the design. Most small speakers these days have rising bass output, whilst KLS4 has a flat bass response. As a result it typically sounds less bassy than usual. However, it is meant to be used close to a rear wall, which raises bass output, and it gives a great result with the right partnering equipment, having good bass definition and little boom. But being on the forward and lean side in its presentation, it does favour partnering equipment capable of delivering a good, strong bass signal. I was forcefully reminded of this by swapping from the Arcam Black Box 500 convertor to an EMF Crystal convertor.

The system sounded a little shrill and acidic in its treble with the Arcam; it sounded sweet in the treble and fulsome in the bass with the Crystal.

The differences between the two convertors were made very obvious by the revealing nature of the KLS4 carbon fibre drive units, but just as importantly the Arcam Black Box 500 did not suit the very up-front presentation I have deliberately engineered into KLS4. This convertor may breathe life into polypropylene cone speakers in the way Black Box 50 does, but neither are happily paired with a speaker like KLS4 and I'm reminded that any bright CD player/amplifier may be unsuitable.

There are some good reasons, ones that could be engineered out of the speaker. Firstly, KLS4 has a truly flat frequency response. This gives a bright sound with many or most CDs, even though it'll sound properly balanced with LP. As British

this makes for the warm, fulsome sound most people like. I decided to raise mid-band/treble output in order to lower the impedance curve, increase sensitivity and, most of all, ensure superb vocal projection.

Sure enough, KLS4 produces a vivid sound stage, right out of the box, with superb projection forward of vocalists. But whilst this is a function both of the drive units and the way I've engineered the crossover for them, it isn't necessarily to everyone's taste. KLS4 is a dry, revealing speaker and dramatic in this sense. It's also very fast, which is great for rock, but it isn't especially warm, laid back or relaxing. Somebody commented that it had been designed by an electrostatic man - too true!

So there you are. The perfect speaker is a long way off, which is just as well. We can all have fun trying to make the perfect speaker - that's what DIY is all about - but believe me, no such thing exists, which drives me nuts!



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valve amplifiers like this are  
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*Hi-Fi World, June 1994*



*A Sense of Rhythm*



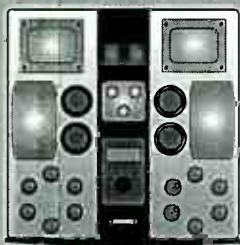
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*Pictured:- The Genesis 100 watt All Tube Monoblocs.*

# Recital

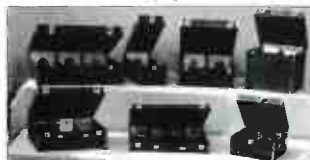
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A couple of months ago in this column, I described some of the ways in which valves are finding their way back into professional recording equipment. About five to ten years ago, professional audio engineers, producers and musicians started hunting out old valve microphones and valve outboard gear to take some of the 'edge' off the new digital sound. Now, new equipment is being designed and built to satiate the ever increasing demand for the 'valve' sound. AKG and Sony have started producing valve microphones and TLA now produce valve equalizers and a valve mixing desk.

My own company, originally commissioned to produce a valve model of our Francinstien Stereo Enhancement System as a special, now sell more of the valve model than the original solid state version! I have recently also completed the development of a hybrid power amplifier which handles the audio signal in the power output stage by sharing the job between a high-power MOSFET stage and a single-ended triode

Another area in which valve circuitry is making a burgeoning return is in the field known as 'dynamics processing'. The most common processor of this type is known as a compressor, and it is an absolutely indispensable part of a recording engineer's electronic armoury. In effect, a compressor does just what it says: it compresses the volume range of an audio signal.

There are a number of occasions when a signal must be dynamically 'squashed' in this way. The most common is on a vocal track where, in order for the singer to express the emotion necessary to deliver a convincing performance, they may modulate their voice from a bare whisper to a near shout. Unfortunately, such a performance - with its attendant vast dynamic range - is either unrecordable, unmixable or both. So, something must be done to shrink the size of the

vocal into a smaller dynamic package without bullying the singer into reducing their emotional gamut of vocal possibilities.

Listen to any well produced record and you will notice that the vocal remains at an unrealistically constant intensity despite very considerable changes in vocal modulation. Listen, for instance, to Sinnead O'Connor who has made this effect a part of her vocal style. Interestingly, this need to compress the volume, but not the emotion of a vocal is not limited to the sung



P3. The compression action is obtained because as signal peaks depress the bias volts on V1, the stage 'slides' further down the valve's curved Vg-k/la characteristic. The required voltage change for a given change in anode current is reduced and the stage-gain is lowered. The compression signal remains inaudible because it is applied equally to both input valves, whereas the audio signal is applied differentially - in other words the common-mode control signal is cancelled out in the differential

# recorded message

## Left by Richard Brice

voice. Speech, especially the modulated tones of a BBC announcer, needs compressing too. This is the reason why it's so often so difficult to set recording levels when doing something apparently as simple as recording speech directly into a microphone onto a domestic cassette recorder.

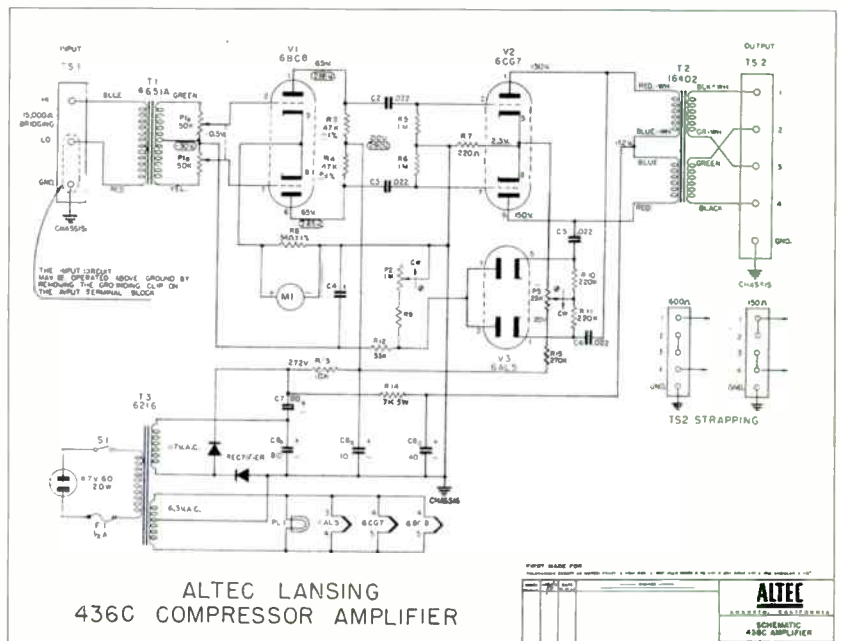
An example of one of the great valve compressors of yesteryear currently being sought out and copied today is the Altec Lansing 436C. The design dates from 1963, yet Jim Dowler of ADT tells me an original 436C was still in use at Olympic Studios when he was involved in recording many of the early punk classics. The reason why this compressor is especially interesting is its consummate valve-ness. The 436C is no modern compressor built with valves, instead, it relies on the inherent distortion characteristic of a triode valve to compress the sound.

The circuit operates like this: large negative signal peaks on the anodes of the

V2 cause double-diode V3 to conduct and thus drag down the bias volts to the input stage valve V1. This action is damped by the time constant formed by R9, P2 and C4 which allows for some adjustment of the compressor's release time. The level threshold at which the compression action is required to commence is adjustable too by means of the simple expedient of biasing the cathodes of the double-diode V3 with a constant positive bias derived from the slider of

amplifier.

The Altec Lansing 436C is one of the best examples I know of for a case for the indispensability of valves in pro audio. This compressor has a wonderful sound all of its own, borne of its internal technology. If a triode valve was a linear device (which it certainly isn't) this compressor would not work at all. The Altec Lansing 436C is living proof that the phrase 'valve compressor' does not mean the same thing as a compressor with valves in it ●



Aiwa have long held a good reputation for making a more than decent cassette deck. The AD-F450 is no exception to the general rule. Even better, Aiwa, having pretty well pioneered user-friendliness in down-market decks, have put in a couple of very handy facilities that are still usually the province of another rung up the price ladder.

For £130 there is Dolby HX-Pro and both B and C noise reduction; a mechanism that is well up to Aiwa's already high and reliable standard, 'Music Search' and a very effective variable bias.

Even when the ability to 'tune in' different tapes is included in much more expensive decks than this, not many owners use it. That is a great shame, for it makes the difference between having a sparkling spanking-new sounding home recording and the

second-rate one that gives cassette a good name. As always, Aiwa cover a sensible range of tapes, even with the control centred (where too many leave it) and the instruction manual gives pleasingly accurate rule of thumb

Matrow Bias Bug and a tone generator, Aiwa's own suggested settings were pretty near spot-on.

It is on home recordings that this matters, for on good-quality ferric, chrome and metal tapes the Aiwa produced a sparkingly clear and clean treble and a very healthy midrange. A tiny twist to the bias setting and chrome particularly could be brightened up just that side of true to convince even the most ardent Dolby-hater that noise reduction really does not dull a recording. And, by the way, tracking on Dolby B and C was excellent.

The days when a deck had to be expensive to achieve that are long gone and Aiwa deserve congratulations.

Now, although this is a good deck, it's

# AIWA'S MODEST MARVEL

**Eric Braithwaite listens to Aiwa's budget priced**

**AD-F450 cassette deck.**

positions for the usual breeds for those who either do not trust their ears or find comparison between a few seconds' recording and playback tedious. Using a

## MEASURED PERFORMANCE

For a budget deck this one has a good tape transport mechanism. As our speed stability analysis shows by its thin test-tone peak (at right) with few unwanted side peaks or shoulders, basic speed was tightly held, with little degradation from drift. I'd expect this deck to maintain a firm grip upon tempo and not meander or wow in pitch. It should sound reasonably clean and free from the papery colouration characteristic of cassette flutter.

The replay amplifiers were quiet and replay equalisation fairly good too, although high frequency gain rolls off a little early, limiting replay frequency response, which affects pre-recorded tapes, to 16kHz (-2dB). Unfortunately, Dolby amplifies response errors so some small amount of dullness will be introduced by this.

Recordings made on the deck had a flat frequency response, at least when bias was correctly adjusted. As it stands, at normal bias the deck gives mildly falling treble with TDK MA but not enough to sound dull. Since the deck under-biases metals in any case, as the overload figures (MOLs & SATs) show, this isn't the best balance. However, providing record level isn't pushed much above +3 on peaks the '450 should give a clean sound.

The head suffered low frequency overload and had a wavy bass response,

like most other budget heads. I'd expect wooly bass.

Standard chromes matched in well, but bias has been set to suit high performance ferrics like TDK AD and Maxell XL-IS, rather than TDK AR, which needed lower bias to give balanced results. Treble overload levels were high due to low bias and Dolby HX Pro.

The AD-F450 gives balanced results, due to good all-round adjustment and competent basic design. Recording levels cannot be pushed too high but otherwise recording and replay quality with all tapes should be good. **NK**

## TEST RESULTS

### REPLAY (pre-recorded tapes)

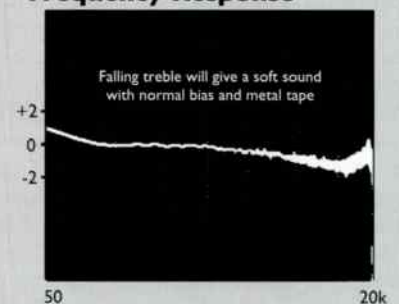
Frequency response (-2dB) 30Hz-16kHz  
Speed accuracy +0.7%  
Hiss (70uS, Dolby out) - 60dB

### RECORDING (blank tapes)

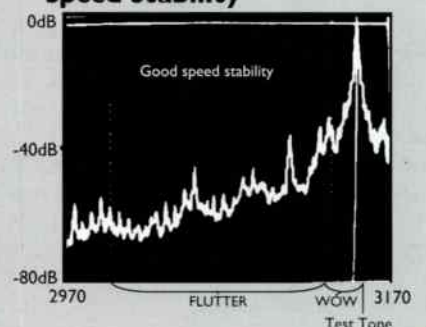
Frequency response (IEC Primary Refs.)  
ferric (IECI) 10Hz-16kHz  
chrome (IECII) 10Hz-17kHz  
metal (IECIV) 10Hz-19kHz  
Separation (1kHz) -49dB  
Distortion (315Hz) 1.6%  
Hiss (70uS, Dolby out) -57dB  
Speed variations (DIN total) 0.08%

Flutter energy (3-3.13kHz)	-23dB
MOL/SAT (IEC Refs)	315/10k
IEC I (ferric)	+2dB/-3dB
IECII (chrome)	+1.5dB/-3.5dB
IECIV (metal)	+2dB/+0.5dB

## Frequency Response



## Speed Stability







still a budget one. For all that, there was a remarkable amount of air coming out of a wonderful big rasping sax on a jazz recording, along with space around the drummer's kit that gave a very decent representation of studio space. Inevitably, on orchestral music there was some confusion in the tutti passages, but the overall clarity inherent in the deck produced a very good impression of the size and scope of an orchestra. Tonal colour was pretty fair, too, with upper strings sounding a spot shrill and lacking some body, but with enough clarity to be acceptable.

Rock music fared equally well, with a forward drive and tight positioning between the speakers while delivering enough studio ambience to reproduce a picture much less flat than the majority of budget decks. Vocals could come nicely forward without landing in anyone's lap, although double-tracked vocals, while being discernible as double-tracked, didn't quite separate as much as perhaps a deck a little more expensive might manage.

Bass performance was, however, more of a give-away. There's nothing wrong with its timing, but plucked double-basses, timpani or bass guitars had a softness and subdued definition. Admittedly, this is the curse of the majority, not restricted only to this deck, but against the clarity of the rest of the frequency range the 'elastic band' sound of bass strings and slightly soggy kick

drums was mildly disappointing. Not to grumble too much, however, bearing in mind that would-be owners are not likely to be counting on the definition from the rest of their equipment.

The Aiwa's strengths are in an all-round believable quality of sound and presentation that makes it ideal for taping both for home use and abroad in the car or on the hoof. The slight degree of sharpness would be a positive benefit in the average in-car player or personal, while avoiding that edginess or coarseness that tends to knock budget - and some mid-price - cassette decks down to the bottom of the system hierarchy. As a recording machine, Aiwa's little marvel wouldn't disgrace systems with components that cost double or treble.

Turning to pre-recorded tapes, however, the picture alters somewhat. On the benefit side is a transport which is stable enough to replay piano recordings with a timing ability which is well beyond the usual ability at this price. The same goes for rock rhythm. All the best aspects of home-recorded tapes also came across. Chiefly, the amount of recorded detail, the placing of vocalists and guitarists on rock tapes was quite an eye-opener. If it hadn't been for one snag, pre-recordeds would have sounded by no means a second-rate source.

The main drawback, where the Teac V-600 reviewed recently was rather better, was the notably restrained treble,

which on average rock band tapes just took a slice off the top end and left a lingering impression of their being recordings made with an FM bandwidth. It also meant, of course, that orchestral strings failed to soar and cymbals lost their shimmer. Against the apparent immediacy of many personals, in a home system many commercial tapes played back on the Aiwa might well sound disappointingly dulled.

Lest anyone think they hear only the sound of faint damns or fainter praise, Aiwa has produced a deck which in relative performance and facilities would have cost twice the price not much more than a year ago. It's a reminder that when the name is now often associated with A/V midis or personals, although the hi-fi separates range may be less wide than it once was, Aiwa takes it seriously. When being towed away because the parking meter ran out costs as much as this cassette deck, it occurs to me I'd better ask for the conclusion to be printed the size of a Sunday Sport headline. This is a very good bargain. Feed the meter, save the fine, buy it ●

**Aiwa AD-F450**

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The Aura CD-50 is a slimline, minimalist styled CD player with a bare minimum of buttons (play, stop, track skip and open/close) gracing its deep chrome plated fascia. A wider range of facilities can be found on the remote control. There's elegance to be found inside too, where a high quality Philips CDM-9 transport, SAA7321 bitstream

chip and Burr Brown op-amps can be found, amongst other audio grade components.

When we reviewed the Aura CD-50, we found it possessed "a degree of refined elegance which presents chamber music, soloists or a singer like Rory Block with a clear, polished air and even a fair degree of airiness to boot". In fact, the openness of the Aura was one of its strong points, having a "well-defined, broad soundstage that was nearly up to the quality of the references, which is a remarkable achievement for a four-hundred pound player".

From the CD-50 CD player the signal is fed to the new VA-80 amplifier, the replacement for the highly regarded VA-50. Reviewed only last month, the VA-80 was deemed a worthy successor to the VA-50, with its "tight flowing rhythm, driving pieces along". Also noted was its ability in the critical midband, where "vocalists were allowed to breathe, performing with space around them".

Completing the system, the SP-50 loudspeakers use high tech drive units - carbon fibre in fact. This gives them a smooth and detailed sound. When we reviewed them in the March '94 issue they were praised for their "good pace and timing" and "relaxed and informative" sound.

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| A. Brass | B. Chrome |
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2) What transport mechanism does the Aura CD-50 use?

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|------------------|---------------------|
| A. Philips CDM-4 | B. Philips CDM-12   |
| C. Philips CDM-9 | D. Philips CDM-9Pro |

3) The new Aura VA-80 replaces which previous model?

- |          |           |
|----------|-----------|
| A. VA-50 | B. VA-60  |
| C. VA-90 | D. VA-100 |

4) Which high tech cone material do the Aura SP-50s use?

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| A. Paper        | B. Polypropylene |
| C. Carbon fibre | D. Glass fibre   |

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In the event of more than one entrant submitting all the correct answers, the winners will be picked by the Editor from a hat. We will endeavour to publish the results in the January 1995 issue. Purchase of the magazine is not a precondition to entry.

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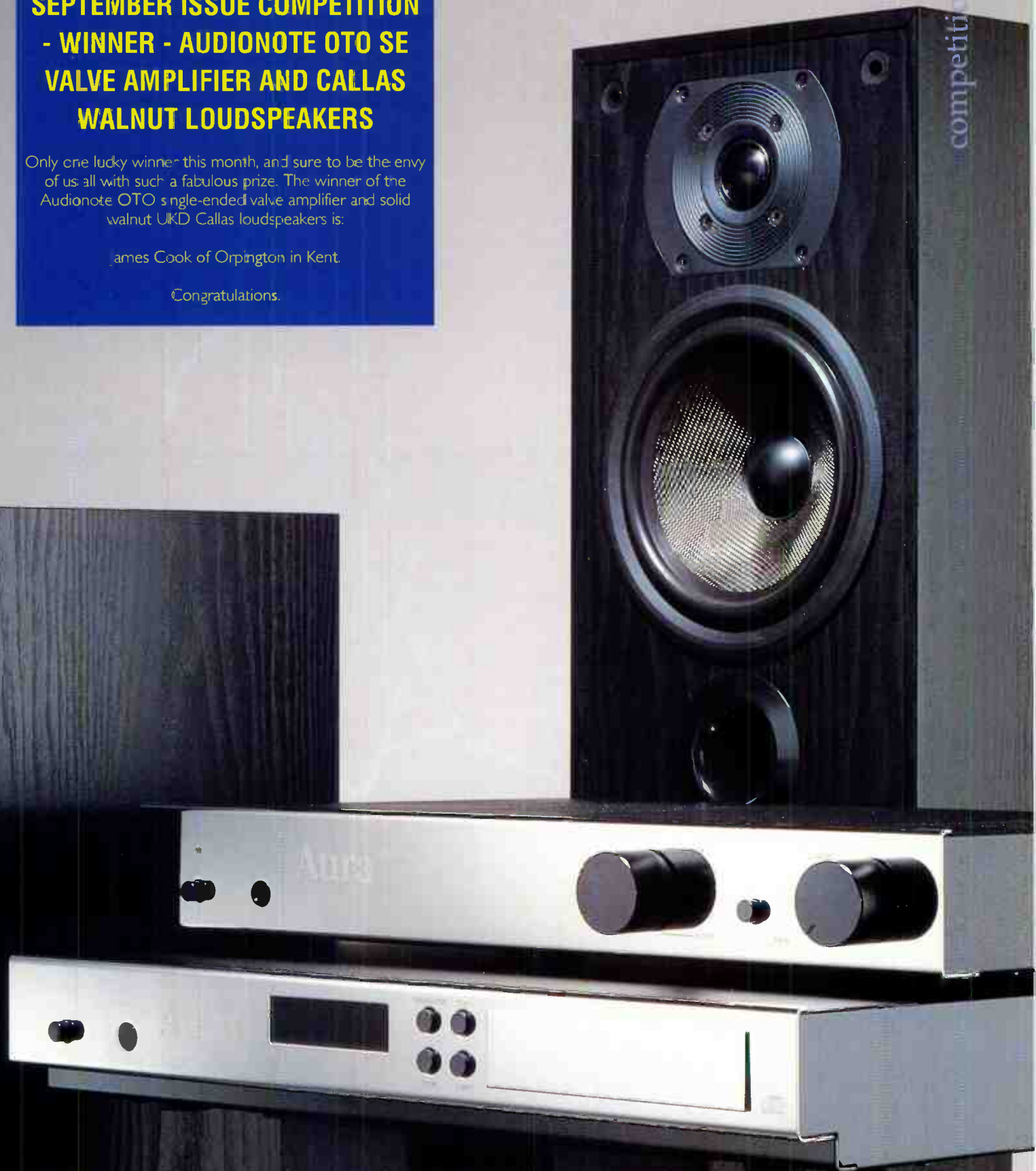
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**W**ith the Ramada show on whilst I'm writing this, and Live '94 - The Consumer Electronics show, just around the corner, are there too many shows too closely spaced to give either manufacturers the full benefit of displaying their new products or the public a chance of seeing all that is new?

Ramada looks set to quickly become the enthusiasts show, where small manufacturers can display esoteric equipment for a reasonable outlay. Live '94 is drawing in the big boys, Sony, Philips, Marantz etc. But is this division healthy or not for hi-fi and music in general?

Sadly I think not. And it's the smaller manufacturers that could stand to lose most. Before last year, as far as most manufacturers were concerned, there were two big shows that they had to attend - Bristol and Heathrow Penta (now Ramada). They were the big venues where new products were launched, and the whole hi-fi industry came together to discuss, speculate and argue about various hi-fi topics, like the meaning of life and the cost of beer at the bar.

The close proximity of the two shows to each other has caused us problems too. Deciding that the magazine really ought to be seen at the biggest show of the year, Live '94, meant that we couldn't afford the extra burden of Ramada; in fact it was difficult to even find time to visit to catch up on new products.

Now, with competition from Live '94, the general public will be drawn away from Ramada. When the masses visit Live '94 again this year they will see only products from manufacturers that can afford to attend, and come away with a very narrow view of what hi-fi has to offer. The smaller manufacturers at Ramada will basically be demonstrating to enthusiasts that in most

cases already know about their products. The new customers, ones that turn up to Live '94 to look at video games and such like, will never see the kind of equipment that is on offer from small specialist manufacturers.

I don't think that Live '94 was supposed to be a spoiler though, and in the end I think that it will be a good thing that there is once again a major show attracting hundreds of thousands of visitors. I hope that next year a greater effort will be made to make sense of things,



Dominic Baker

## dB on the level

perhaps the way forwards being a section of more affordable stands at Live for the smaller specialist manufacturers. This needs to be considered carefully by the organisers, since these specialist companies are responsible for some of the most innovative and colourful products around.

If the organisers of Live do make it easier for smaller specialist manufacturers to display their products, a whole new variety of equipment will be on show to the rather unaware public. I think it will enhance the appeal of the show; the wonder of a valve amplifier is every bit as good as the latest wide screen TV.

Another boost to the industry may well come from BADA's 'Real Hi-Fi' campaign. This, unlike Live '94, is specifically designed to make the man on the street aware that there is a difference between a mass produced midi system and separates hi-fi from specialist manufacturers. You can only display the 'Real Hi-

Fi' logo on a product if you conform to BADA's rules, some of which may be difficult for small manufacturers to meet. There are fears that esoteric high fidelity equipment such as valve amplifiers, turntables, special Class A transistor amplifiers, produced in limited numbers by small manufacturers, may well not be allowed the 'Real Hi-Fi' description. But this may be just speculation, and certainly a couple of the smaller manufacturers

I've spoken to have been granted a 'Real Hi-Fi' licence. The cost has been low enough to encourage membership: around £100 a product. This, I'm sure, will encourage many to get behind the campaign, and I suspect that those who do so will gain most in years to come.

The combination of a large and well publicised consumer electronics show and BADA's 'Real Hi-Fi' campaign should be used by manufacturers for their advantage. They have a chance to display their products to a massive

audience, many of whom probably don't even know what real hi-fi is all about and displaying the 'Real hi-fi' logo will help them to explain and promote hi-fi for what it is.

Hi-fi has turned around in the last few years. DIY and tweaking are back, there's a major show in central London and valve amplifiers are popular once again. It's slowly rebuilding as a serious hobby as it was in the past. Then we had Olympia; now we have Earls Court ●

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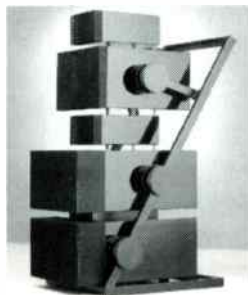
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"Perfect Sound - Forever" was the rather optimistic (to put it mildly) marketing spiel Philips used to launch Compact Disc. The 'perfect' part of the equation was rather dubious from day one. Recently we have also seen that the 'forever' aspect has been discredited with the discovery of 'rusting' CDs (see "Not Fade Away" HFW June).

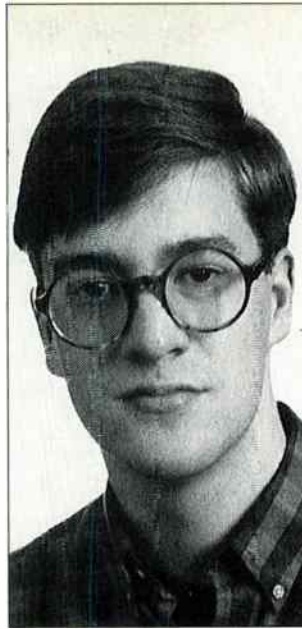
You may be thinking that here is yet another column lambasting Philips' marketing or even the deficiencies of CD. In fact it is neither. Instead, it's the phrase itself or, to be more precise the 'perfect sound' part that provoked the grey matter into action. Rather than simply limiting thought to the CD section of hi-fi, I applied the term to hi-fi in general, and invited friends', customers' and colleagues' opinions on what exactly constituted a 'perfect sound'.

The first part was easy. A 'perfect' sounding hi-fi is unobtainable, it exists simply as an ideal (unless you believe what the bloke in the pub tells you about his Technics midi system). A system would have to overcome the difficulties of reproducing the huge variety of music, not to mention appealing to differing tastes. Once it has been established that there is no such thing as 'the perfect system', I looked into what people wanted in the pursuit of 'perfect sound'.

One view I often hear is that a hi-fi system should sound just like being at a live concert. After having attended many live concerts (Suzanne Vega, Julia Fordham, Richard Thompson for example) and the odd acoustic performance, I'm not too sure. For a start "amplified" concerts are usually conducted at volumes totally unsuitable in most domestic settings, and are not the best things to unwind to after a hard day's slog. Most of the concerts I've been to have also been technically diabolical, with bass that

would flap Lycra cycling shorts - let alone trousers! Yet the bass also tends to drown any subtleties out and is usually ponderous and lacking any sort of articulation.

Much loved 'stereo imaging' is totally non-existent also, especially with large orchestras, and live vocals commonly sound harsh and nasal. On top of all that, the environment is often uncomfortable and, inevitably it seems, the person sitting next to me decides to hum along to the music or claps out of time.



many such products born from such an ideology are superb components (witness Audiolab, Pink Triangle and SME to name but three). Yet as ever, there can be a negative side. In pursuing technical excellence, manufacturers can find themselves ending up with products that are technically superb, but leave the listener cold rather than left with the feeling of wanting to go through their entire music collection (always the sign of a good system).

The outcome of the

## Fair Views

- from Dominic Todd, our man in Scarborough

Don't get me wrong, though, I love concerts and I don't sit there moaning about not being able to hear 'the shimmering decay of cymbals' either! There's nothing like a good live concert to really get the blood running and the rabble roused. My point is that such concerts are 'occasions' and as such, lose the whole point if repeated in the domestic environment.

Acoustic concerts are often the complete opposite. I'm often struck as to how 'overblown' hi-fi systems can sound when producing such music. One particular example that springs to mind is the way some systems produce a double bass with a rich, deep and full sound whilst others sound rather bass light and thin. The irony is that when I went to see a jazz musician live, the double bass didn't sound rich or deep, but was portrayed in a similar

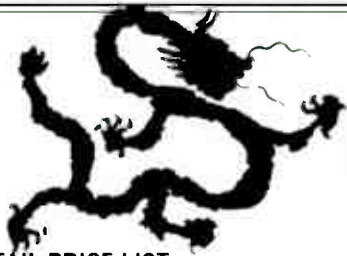
manner to the system I would have judged as light, thin and inferior.

Another term I heard a lot when asking people about their 'perfect' sounding system, was 'involvement'. I've always been a little uneasy with the term as it's somewhat vague and difficult to pin down to any particular aspect of sound reproduction. Having said that, there is a lot to be said for a system with 'character' that will entertain and even, dare I say it, involve the listener. Where such systems usually lose out is in the reproduction of a wide variety of music. On certain types of music their lack of technical ability can be frustrating.

The opposite approach is the pursuit of a system that can strip as much off the original master tape as possible. The emphasis here is firmly on technical excellence, and indeed

quest for a 'perfect sound' is as complex and varied as you'd expect from posing such a question. Obviously, don't expect a perfect sound in the first place (at any price), but do have an idea of the type of sound you are looking for. This may not be easy at first; when you haven't heard a variety of hi-fi systems it can be confusing. What a lot of people I spoke to found, though, is that if a particular piece of equipment doesn't fit sonically, then it is quickly replaced, or worse, the hi-fi remains dormant for a while. As you experience more hi-fi then you'll probably find your system fitting into one of the above (rather loose) categories, possibly unintentionally.

But, at the end of the day it's best not to get too hung up about your system's niggling faults, and get on with enjoying your record or CD collection ●



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**OASIS**  
**Definitely Maybe**  
 CREATION CRE CD 169

● If anyone remains in even the slightest doubt that Creation are the class record label of the decade then the debut from Manchester's Oasis dispels them once and for all. It is, quite simply, yet another Record of the Year in a twelve month period that's had more than its share of fab pop discs. From their sublime single debut with 'Supersonic', the quintet haven't missed a trick, and this is the proof of the pudding par excellence. It has all the catchy, crazy, distinctly loveable singles aboard - 'Shakemaker' and 'Live Forever' - plus who knows how many other hits lurk in them grooves.

This, like Pulp's Boys & Girls comes on like another ready-made Greatest Hits

collection, and so too the remaining cuts, with their languorously laid-back vocals, hooks by the busload, and playing just right. This is frequently Britpop at its very best, combining the screw-you arrogance and magic invention of everyone from early Who and Kinks through to Sex Pistols and co., and all the way to such more recent naughty boys as the Stone Roses or Shaun Rider (who's he?) and cronies. Those weirdo lyrics - the wackiness of 'I know a girl called Elsa / she's into Alka-Seltzer' recalls John Lennon and 'Isadora Duncan, worked a Telefunken' from Let It Be - and there are echoes aplenty of classic past glories in the driving rhythms of items like 'Up In The Sky', which has the audacity to rip off one of the Moptops most over the top psychedelic grooves with nary a hint of remorse and what's more, makes it work perfectly, backwards guitar fade and all. I'll leave you to work out what it is.

There's Beatley bits all over the place - 'Columbia? Tomorrow never knows what inspired that, hee hee, hee - but it's never done with the pain-in-the-fanny obviousness that poleaxed the late Flamin' Groovies and hosts of other would-be successors to the Fab Four. There are loads of other lifts too, but the only time Oasis come close to blowing it is with a T Rex re-write which is really too Bolan-ish for comfort. But that's a small flaw in a thoroughly enjoyable first outing.

Let's face it, these guys look great,

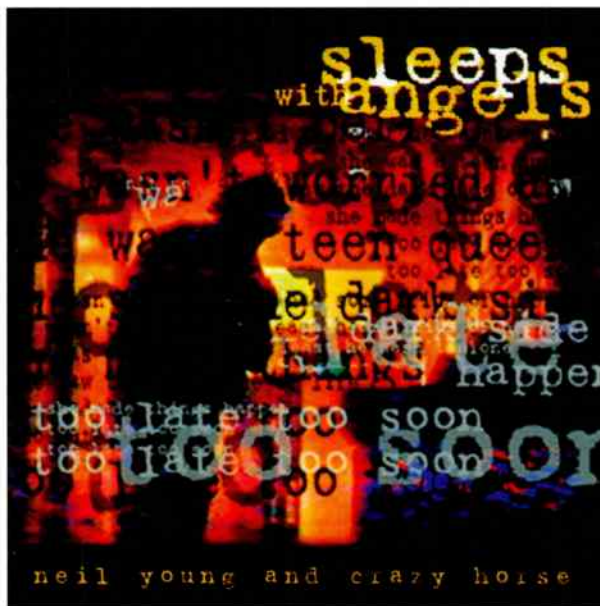
## RECORD OF THE MONTH

### **NEIL YOUNG & CRAZY HORSE**

**Sleeps With Angels**  
REPRISE 9362-45749-2

● It doesn't take a rock'n'roll Einstein to see that this is shaping up to be one of those golden years for pop music, and the British variety in particular, what with such spectacular LPs as recent offerings from Blur, Pulp and – qui vide – the debut long-player from Oasis. That said, it's salutary to find that one of the most exciting, vibrant and deeply moving of the latest releases should be the work of the coolest Canuck. Neil Young may be long in the tooth, but he's been on a spectacular roll since at least *Freedom* – how time flies – a good five years old and still hot stuff.

Ironically, it was the tragically premature exit of relative greenhorn Kurt Cobain that inspired the title track of what is probably Young's best album in a decade. Cobain, you no doubt recall, quoted Neil's line "it's better to burn out than fade away" in his suicide note. That's a hard burden for anyone to bear, but then Mr. Young is no stranger to premature, tragic death, from 'The Needle And The Damage Done', to the indisputably



classic 'Tonight's The Night', a record dedicated to Danny Whitten, Crazy Horse roadie-cum-guitarist and a victim of a drugs overdose.

Thus 'Sleeps With Angels', with Young's voice at its most haunting, his lyrics as touching as any he's written, and the two carried in the arms of a

intricately wrought, incessantly inspired. Even a relatively lightweight item like the grunge-ish 'Piece Of Crap' – one of the few light moments on the record – manages to knock most of the competition into the proverbial cocked hat.

'Change Your Mind' and 'Trans Am' are Young at his – by turns – most poignant and rockiest, the first with a melody to die for, the latter a riff blitz that could get Mother Theresa in front of the mirror with a tennis racket. And the self-explanatory 'Drive By' is proof positive that Young lives very much in the present, plus there's the added irony that the victim here happens to be a girl.

And so on; for once it's true that *Sleeps With Angels* has no dud tracks, no lingerers even in the lengthier instrumental sections, Young's guitar as inventive as it's ever been and Crazy Horse – Frank Sampedro, Billy Talbot, Ralph Molina – rising to the master's challenge throughout. A breathtaking record which

melody and instrumentation that combine to make this one of the most beautiful songs you'll hear this or any other year – it could make a statue weep, no exaggeration. But that's just the opener to a record that continuously astonishes: at times

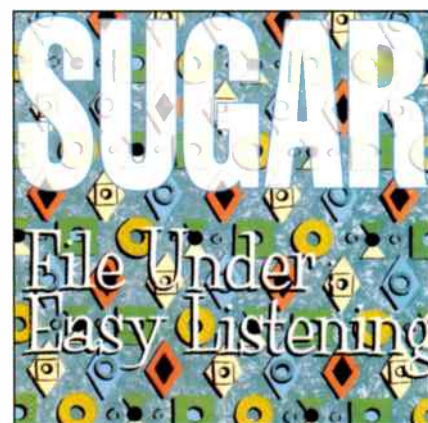
evokes the very best of Young's previous work, from *Harvest* and *Zuma* through to latterday gems like *Tonight's The Night* and *Eldorado* or the aforementioned *Freedom*. But even if you've never even heard those discs on no account miss this one. Brilliant.

singer Liam Gallagher has a lazy, coolly arrogant vocal style that's perfect for the excellent tunes delivered by his brother Noel's fevered lead guitar and helpmates Paul Arthurs (rhythm), Paul McGuigan (bass) and drummer Tony McCarroll. Hot lyrics too, and contemporary as they come, including references to "selling The Big Issue", the nightmare of going down the Social, and what I believe is the first time a pop song's included the jailbird slang of "when it comes on top". On the closing 'Married With Children' Liam spits a scowful "Your music's shite / it keeps me up all night". This music's anything but fecal – but it will run and run!

### **SUGAR**

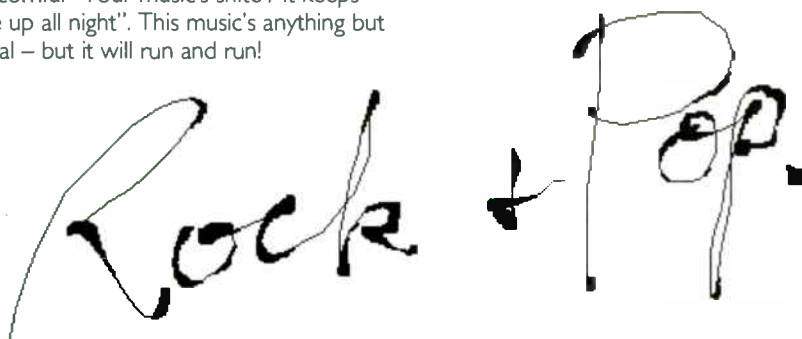
**File Under: Easy Listening**  
CREATION CRE CD 172

● Regular readers ought to know the ballad of Bob Mould already – how he fathered one of the great bands of the Eighties, Hüsker Du, gave up through a combination of alcohol and exhaustion, exorcised his demons on a pair of intermittently brilliant solo albums, and



thundered back to greatness with Sugar's *Copper Blue* debut last year. A mini-LP later and here he is again. The more studio-comfy richness of sound and arrangements of Sugar's debut have since been stripped down as the band's rocked its way around the planet, so this instalment's title is richly misleading.

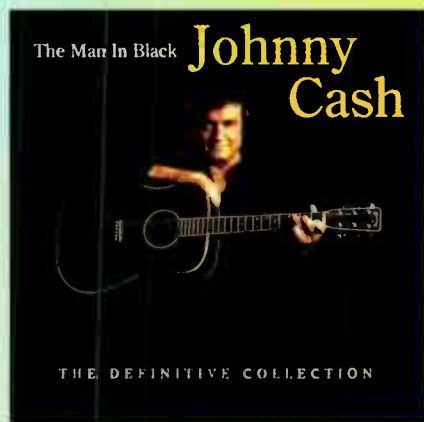
Mould (vox, lead), bassist Dave Barbe and drum maniac Malcolm Travis are



## SHORT CUTS

every bit as fearsomely fiery as the Hüskers at their best here. Simply put, F.U.E.L. is a roller-coaster ride through hell. Mould's gruff vocals and soaring guitars simply never let up on a set that'll make your hair stand on end. And, as I've said many times before, Mould's characteristic strong melody lines take all the instrumental fire and thunder and give it shape, cohesion and, most important, excellence and imaginativeness aplenty in the tune department.

Check 'Company Book' or 'Gee Angel' for textbook examples of contemporary guitar rock at it's very, very best. And there's what has to be my top song title of '94 – 'Explode And Make Up'. Love it to death.



**JOHNNY CASH**  
**The Man In Black**  
COLUMBIA MOOD CD35

● Every home should have its Johnny Cash record and this 24-cut selection of his best known songs is it. Cash has no match when it comes to evoking both John Wayne's America – 'Riders In The Sky', 'Ring Of Fire', 'Don't Take Your Guns To Town', etc – as well as the gritty blue collar world of the here and now, witness the way he takes some of the world's most hardened criminals on the live 'Folsom Prison Blues' and 'San Quentin' and holds them in the palm of his hand.

He also has a fine ear for a good tune, as on irresistibly catchy items such as 'A Thing Called Love' or 'Jackson'. He also has a cool sense of humour, as evinced on 'One Piece At A Time' – about a car worker who steals a motor bit by bit, year by year, with hilarious consequences. And, of course, there's 'A Boy Named Sue', while the darker side of life has few evocations as world-wearily convincing as cash is on 'Sunday Morning Coming Down'.

A handsome thorough accompanying booklet tells you everything you want to know about Cash and his up-and-down life and times. It also says that the version of 'Boy Named Sue' featured here is the first time the song's been released uncensored. Not on my version it ain't. Still essential for any thorough collection.



**PRINCE**  
**Come**  
WARNER BROTHERS 9362-45700-2

● Some say Prince's final recording prior to changing his name to some silly symbol is a contract filler cobbled together out of bits and pieces left over from the last few years of prolific writing and recording. Was a time I thought the litt'un could never make a bad record. Not any more – this is a bunch of the usual wet dream nonsense delivered over familiar – nay, over familiar – rhythms with barely a good tune in sight. 'Come'? It's a stiffy.



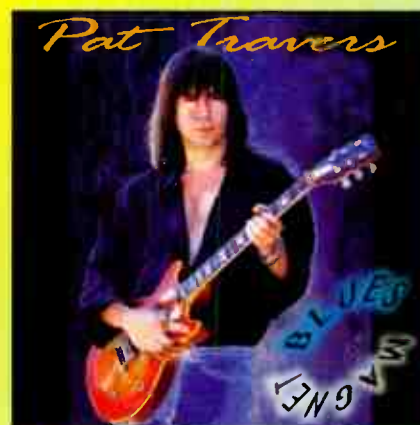
**LOVE AND ROCKETS**  
**Hot Trip To Heaven**

● Back together after five years of solo excursions, these former members of Bauhaus tread an uneasy line between contemporary dance rhythms and a tendency to sound like wizened electro popsters or worse – 'Body And Soul', the 14 minute opener sounds at times like an unused backing track from 'Dark Side Of The Moon'. Probably sounds better on drugs, a dance floor, or both. And then there's the one with the woman pretending to have an orgasm – where have we heard that before?



**RADIAL SPANGLE**  
**Syrup Macrame**  
BEGGARS BANQUET BBQ CD

Accompanied by a press release more ludicrously pretentious than anything this side of a 1965 Bob Dylan sleeve note – apparently the title refers to "the sticky effect one creates after lots of pleasurable sex after that magic sticky gets in your hair. You know, down there, it gets to be a syrup macrame" – this is the sad face of Indie all ultra weedy male/female vox over musical doodles that pastiche everyone from the Velvets to the Pixies but equal neither. The tunes? I counted at least two, maybe three re-writes of B.A.D.'s 'Medicine Show' in there. Pass it by unless you're (a) in the band, (b) the band's mums and dads, or (c) stark raving mad and stone deaf. No, I loved it really, kids. Not.

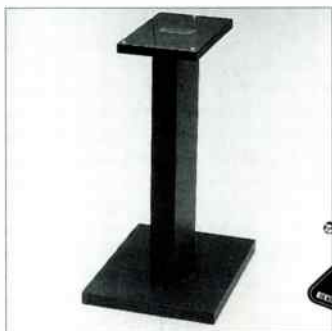


**PAT TRAVERS**  
**Blues Magnet**  
FRVVOGUE PRD 76682

● He may not be black or past retirement age, but Travers plays a mean axe. Helped out by old hand Aynsley Dunbar on drums and bassman Michael Amico, he follows his selection of classic cover versions – last year's 'Blues Tracks' – with this set of originals. He may not out-write Willy Dixon or Johnny Winter, but if you like your Blues hard, sturdy, and with a contemporary edge, he may well be the man you need.

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I noticed this lack of added colour particularly with female vocal music. Voices had openness and a tangibility that reinforced their communicative qualities. Singers appeared more expressive and technically more impressive. Last year, I remarked upon the stand's 'cleanliness and lack of clutter' and nowhere was this better demonstrated than on the Annie Golden and Frank Carillo CD, which can appear far less polished on a system whose set-up is below par. The Slate stand's ability to refine a speaker's presentation was evident even with the Mordaunt-Short MS10, for which it's not ideal. Golden's taxing voice and Carillo's acoustic guitar both sang out with striking verve yet never approached coarseness, nor did they fall short of refinement.

The stand's sonic transparency and musical fluency are partly a function of its excellent control at the frequency extremes. The Slate allows bass lines to thunder without wallowing, and treble to sing without zing. Having lived with, and appreciated, a pair for a year now I'm not going to do what I did last year and allow their cost to stop them obtaining a Recommended flag.

Verdict: (The Slate stand is unusual and expensive. But if you're after an exceedingly neutral stand it's the leading contender. This stand offers an exceptionally neutral platform for speakers: highly transparent sound leads to musical performances with real insight.)

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# WORLD DESIGNS

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### K5881 KIT

£395 ▼



A superb, Class A, 20watt stereo power amplifier that uses the Russian 5881 output valve, a military version of the American 6L6, designed for low distortion audio work. It has super-quality output transformers (4/8/16Ω selected internally) to minimise distortion and the input stage uses triode working. A rugged, sixteen-gauge, all-welded steel chassis is provided, together with protective bottom plate for safety.

Designed for long life, low running costs and excellent sound quality, K5881 is sensitive enough to be used with a simple passive pre-amp. or our own line-drive pre-amp, and it matches modern loudspeakers well. There is a choke-regulated power supply and the channels can be paralleled to turn it into a 40W monoblock if desired.

#### SPECIFICATION

Power	20watts/ch.	Separation	60dB
Frequency resp.	16Hz-40kHz	Noise (CCIR)	-103dB
Distortion	0.02%	Sensitivity	240mV
		Weight	16kgs(34lbs)

### 300B VALVE AMP KIT

£850 ▼



This is a specialised amplifier based on the highly linear 300B triode valve. Our 300B runs in Class A, giving one of the most sweet, open and neutral sounds possible today. Matched with good loudspeakers, it is unsurpassed.

The kit comprises a strong 16-gauge mild steel chassis, fully punched, welded and ground smooth. Finish is a durable 'powder coat' black. A protective bottom plate is provided for safety. Output terminals (one pair) take 4mm plugs axially and radially for

bi-wiring, or heavy gauge bare cable. Output options of 4/8/16Ω are selected internally at the transformer. A small circuit board carries most of the components. Can be monoblocked for 60watts.

All parts are included in the kit, except valves since different 300B makes are available.

#### SPECIFICATION

Power	28watts	Separation	54dB
Frequency resp.	5-18k-nfb	Noise (hiss/hum)	-100dB/-72dB
	50k-fb	Sensitivity	240mV
Distortion	0.2%	Weight	20kgs(44lbs)

### 4W SINGLE-ENDED VALVE AMP KIT

£385 ▼



The 4W Single-Ended amplifier kit is a line level integrated amplifier. It comes with three line level inputs and a tape output. High quality components are used throughout, including polypropylene signal capacitors, Alps volume control, custom C&K gold plated selector switch etc. Valves are included.

#### SPECIFICATION

Power	4watts	Noise (hiss)	-100dB
Freq. Response	9Hz-64kHz	(hum)	0.7mV
Distortion	1.3%	Sensitivity	180mV
Separation	74dB	Weight	10Kgs (22lbs)

#### DEMONSTRATIONS!!

Most of our products are on demonstration at Hi-Fi Confidential, 34 Buckingham Palace Road, Victoria, London. Phone the patient and understanding Luigi on 071-233-0774 to check availability. He's a valve afficianado, and stocks plenty of good products - including World Audio Design.

See page 83 for order form...

# WORLD DESIGNS

## by Mail Order

### VALVE LINE LEVEL PRE-AMPLIFIER £295

Constructed from heavy gauge steel with an aluminium anodised and polished front panel. This new chassis comes with the complete kit of parts necessary to build the valve line level pre-amp.

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**NEW**

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Picture of final production monoblocks will appear next month.

### HIGH DEFINITION LOUDSPEAKER

The High Definition loudspeaker is ideal for low power, high quality amplifiers, transistor or valve. It goes very loud with just 1-5watts, having an enormous sensitivity of 94dB - that's 8dB more than most other speakers. It is also a very easy load for valve amps (8ohms) and it gives a terrifically dynamic and fast sound. This speaker is also unusually suited to low powered vintage amplifiers, such as Quad IIs, Radfords, Pye Mozarts and such like.

The High Definition loudspeaker is available in two forms; as a drive unit pack containing two bass units and two tweeters modified and tested, or complete with all crossover components, gold plated bi-wire terminal dishes, silver plated copper wiring and long haired wool.

Drive Unit & Crossover kit etc £195  
Drive Unit Pack £145



transparency. The kit comes complete with a heavy-gauge steel chassis chrome plated for an attractive and hard wearing finish. All components necessary to complete these super monoblock amplifiers are provided in the kit and it comes with clear, easy to understand instructions.

The Class A monoblocks use special new super grade audio transistors. They are extremely fast and linear, giving a super measured performance without the need for high levels for feedback.

### SPECIFICATION

Power (8Ω)	36watts	Distortion (%)		
Frequency Resp.	1Hz-50kHz	1W	Full	O/P
Noise	-104dB	1kHz	0.003	0.005
d.c. offset	3mV max	10kHz	0.008	0.04

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### THREE WAY CARBON-FIBRE DRIVER LOUDSPEAKER

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KLS3 has been engineered to get the best from your amplifier, be it valve, solid state, single-ended or zero feedback. Its High 90dB sensitivity and near flat 8Ω impedance make it one of the easiest loudspeakers to drive.

KLS3 is available in three forms: Drive unit pack £230; Drive units + crossover etc (just about everything but the wood) £350; fully built, tested and finished in high quality, real wood veneer for £1500.



**NEW**

### HIGH TECH AUDAX DRIVE UNITS

The 1994 range of Audax drive units sees many modern high tech materials and technologies that would normally be unavailable to the home constructor. We offer a small range of the highest quality drivers, including High Definition Aerogel (HDA) units, carbon fibre and three superb soft dome tweeters. Sadly there isn't enough room to print the specs, but if you are interested in any of the following drivers, please ask us for a detailed spec sheet.

#### Audax Drive Units:

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	4 inch mid	6.5inch bass/mid	8inch bass
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CARBON FIBRE.....	HM130C0.....	HM170C0.....	HM210C0

##### FABRIC DOME TWEETERS

- TW025M0 (25mm 92dB suitable for 2-way systems)
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**ALEMA UK LTD.**, 25 Montifore Road, Hove, BN3 1RD. Tel. 0273 202637. Audion "Edison" Andersson "Trade enquiries welcome for our newly extended range).

**APPDLLO**, The UK based designers and manufacturers of high quality speaker stands and equipment racks have now added to their comprehensive range a modular system ideal for housing audio visual products and CD storage. Please send for our free brochure to Zenith Crown Ltd, Tipton Rd, Dudley, West Midlands, DY14 Tel. 021 520 5070. Fax. 021 522 2055. - All export trade enquiries welcome.

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and featured in Hi-Fi News Feb/Mar 92, is still available - only from DBS Audio. To find out what these comprise, cost and how to order plus any other information on DBS products please telephone, fax or write in to the above address and numbers.

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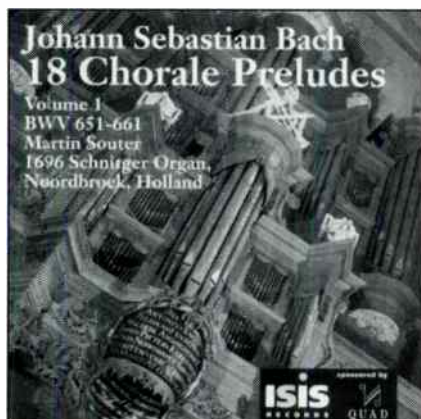
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# Classical

*Peter Herring*



**JOHANN SEBASTIAN BACH**  
**The 'Leipzig' Chorale Preludes;**  
**Volume One No. 1-11**  
**BWV 651-661**

Martin Souter, Organ  
ISIS RECORDS CD007 (DDD/73.25)

**An all-German programme this month, featuring J.S. Bach and his illustrious contemporary, Georg Philipp Telemann, Beethoven, Schumann and assorted composers from Bavaria. The performers come from far and wide; Russia, Britain, the United States, but the instruments are even more exotic; a 1695 Dutch organ and the ear-catching sound of a 1750 viola d'amore.**

● "Inside the church it is very dark and below freezing. It is also well after midnight. Despite being cold, I am enjoying a truly magical experience - hearing Bach played on fragile keys and pedals worn by 300 years of use. The original Schnitger organ with its tremendous baroque sound speaks, lives and breathes with such character, radiating a personality all its own".

The words of recording producer, Edward Hom, certainly convey the atmosphere of this latest release from the Oxford-based Isis label. It is the first of two CDs, again produced with sponsorship from the hi-fi manufacturers Quad, which will embrace all eighteen of Bach's so-called 'Leipzig' chorale preludes.

The church in question is in the village of Noordbroek, in the north-eastern corner of the Netherlands. What makes it special is that it possesses one of the last unrestored Baroque organs in the country. Noordbroek was never a wealthy community, yet in 1695 it was able to persuade arguably the finest of north German organ builders, Arp Schnitger, to supply an instrument for its parish church.

Unlike so many other organs from this period, which have been substantially

renewed and rebuilt over the ensuing centuries, the Noordbroek instrument has undergone little change. What work has been done has been accomplished sensitively and without disturbing the innate character of the sound.

Almost certainly Schnitger based the new organ on the style of the church's existing instrument and probably reused some of its pipes, some of which may date back to the sixteenth century. Modifications by the organ builder Hinsz, undertaken in 1768, generally enhanced the sound of the instrument, and the rebuilding in 1809 by Hermann Freytag was entirely sympathetic to the work of his predecessors. Since then, the instrument has remained virtually unchanged, its sound closer to that of the eighteenth century than probably any other organ extant in northern Europe.

Given its history, it is easy to imagine how Martin Souter must have relished the opportunity to record Bach on this instrument and it is one that he seizes



Mikhail Kazakevich is the latest in the long line of piano virtuosos to emerge from the musical academies of Russia. He was born in Nizhni Novgorod (Gorky) in 1959 and began learning the piano at six. He studied with the revered Isaac Katz and graduated in conducting and teaching as well as piano. Although Kazakevich toured extensively within the former Soviet Union, he did not make his first visit outside the country until 1991, when he appeared at the International Schubert Competition in Dortmund, Germany. Although he was not placed first in the competition - unjustly in the view of many who heard him play - he impressed the likes of the

conductor, Moshe Atzmon, who arranged for Kazakevich to appear with the Dortmund Philharmonic Orchestra, playing Mozart. His playing also made its mark with the Schubert Society who awarded him a scholarship which enabled him to come and play in London. While there, he so impressed Conifer Records' Richard Wenn that Wenn immediately recommended that the label sign the Russian pianist.

Kazakevich's concert debut in London came at the Wigmore Hall in May of last year and earlier this year I heard him give a memorable performance of Schubert's last piano sonata, the B flat D960. Although

Schubert is evidently close to his heart, Kazakevich's repertoire is broad-based and includes Bach, Rachmaninov, Brahms, Honegger and Alban Berg, whose piano sonata he has recorded. In another recent Conifer recording, Kazakevich plays Beethoven's Second and Fourth Piano Concertos, with the English Chamber Orchestra under Sir Charles Mackerras, in what are described as 'newly discovered final editions'. But for this debut recording on Conifer, Mikhail Kazakevich has chosen the music of Robert Schumann. However, buyers will be delighted to discover that the CD contains more than they bargained for...

**ROBERT SCHUMANN**  
**Piano Sonata No2 in G minor**  
**Op22/Intermezzi Op4/**  
**Symphonic Etudes**  
**Op13/Symphonic Etudes Op.**  
**posthumous/Toccata in C**  
**Major Op7.**

**GUSTAV MAHLER (arr.**  
**KAZAKEVICH)**  
**Symphony No1 in D Major -**  
**Scherzo**

**JOHANNES BRAHMS**  
**Intermezzo in E**  
**Major No4, in E**  
**minor No5**  
**JOHANN SEBASTIAN**  
**BACH**

**Prelude and fugue in**  
**E flat minor (from**  
**Das Wohltemperierte**  
**Klavier, Book One)**

Mikhail Kazakevich, piano  
**CONIFER CLASSICS CDCF227**  
**(101.02)**

● A disc with a difference: it's two discs in one. Open the box and there's Mikhail Kazakevich's Schumann recital. Lift the CD tray from the left hand edge and underneath you will find a twenty-four minute 'bonus CD' containing tracks from Kazakevich's forthcoming Conifer issues, some Brahms and Bach, and his own arrangement for piano of the scherzo from Mahler's First Symphony (which surprisingly takes to the treatment reasonably well, if rather leaden-footed compared to the original). This 'trailer' CD doesn't add to the price, or increase the width of the box, and Conifer must be congratulated on a fine piece of promotion.

But what of Kazakevich's Schumann? The programme is a generous one and,

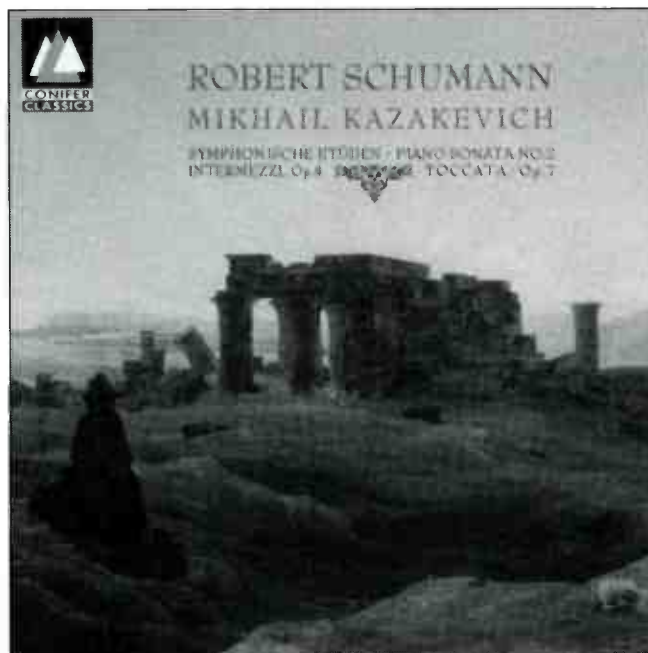
technically, a demanding one, too. He opens with the Second Sonata of 1838, a work criticised at the time for the looseness of its structure, which is surely to miss the point of this impassioned, intense music. Schumann's tempo markings for the first movement are intriguing. He first asks for it to be played "So rasch wie möglich" (as fast as possible) but then adds "schneller" (faster) and "nach schneller" (still faster), at which point the pianist is presumably

any pianist's qualities and Kazakevich passes with honours, not just for the technical prowess of his playing - which evinces open-mouthed admiration - but for the way he colours in what is essentially a set of variations, albeit on a lofty scale. Kazakevich displays both insight and imagination in his treatment of the Etudes, yet retains an air of thrilling spontaneity and unbridled energy. Moreover, he elects to play the full version of the work as published by

Schumann's friend, Brahms, in 1893, some forty years after the composer's death. Schumann omitted five variations from the first edition of the Etudes Symphoniques because he thought the work would be over-long if he retained them. Kazakevich inserts the extra variations between Variations Five and Six of the original score, playing them in the order 2,3,4,5,1.

Kazakevich concludes his recital with a dazzling performance of the Toccata Op7, a breezy, almost festive piece of pianistic gymnastics that suggests nothing of the darker side of the soul of Robert Schumann. It rounds off this fine debut recital in style. The piano

sound is first-rate, crisp, full, detailed and with convincing scale. Coincidentally, the recordings were made in All Saints Church, Petersham, near Richmond in Surrey, which was also the venue used by Decca for some of its earliest recordings of another young Russian virtuoso, Vladimir Ashkenazy. Will All Saints also prove a catalyst in the career of Mikhail Kazakevich?



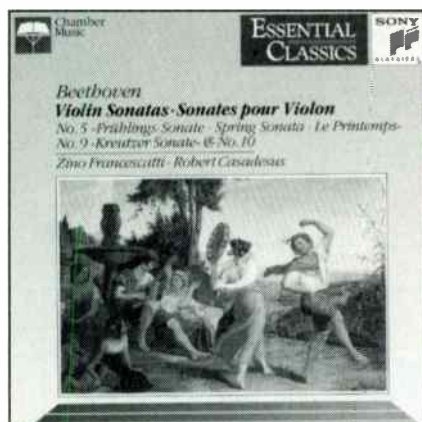
in orbit. Presumably there was a touch of humour in these instructions.

Kazakevich is certainly no slouch, but with what clarity and precision he plays and how well he shades the dynamics. He brings the same qualities to his playing of the Six Intermezzi of 1832, a delightful sequence of character pieces.

Schumann's Etudes Symphoniques of 1837 supply a testing examination of

with both hands - literally. I found myself rapidly immersed in this wonderfully atmospheric recording, and in Martin Souter's fine playing of the first eleven of the chorales which Bach collected together during the last year of his life. Altogether, there are eighteen 'Leipzig' chorale preludes, a puzzling number since it does not relate to any liturgical requirement. All the pieces are reworkings to a greater or lesser degree of versions composed during Bach's Weimar years and it could be that he was simply making one last, great compendium of his favourite organ compositions.

Robert Schumann believed the fourth chorale, *Schmücke dich, o liebe Seele* (Bedeck thyself, o soul) "as priceless, deep and full of soul as any piece of music that ever sprang from a true artist's imagination". It is a description that could readily apply to any of the pieces here and one which Martin Souter, given his intelligent, refined and lucid playing of them, evidently concurs with.



**LUDWIG VAN BEETHOVEN  
Violin Sonatas; No5 in F  
Major Op24 'Spring'; No9 in A  
Major Op47 'Kreutzer'; No10  
in G Major Op96.**

Zino Francescatti, violin; Robert Casadesus, piano

**SONY ESSENTIAL CLASSICS SBK46342  
(AAD/76.14)**

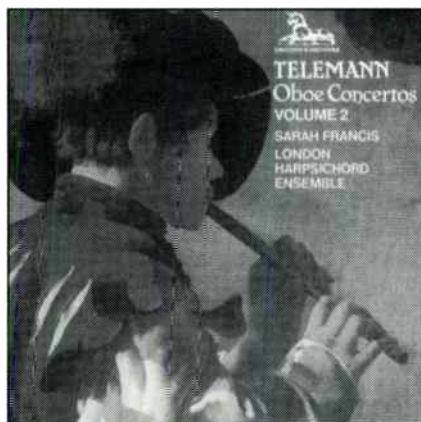
● Beethoven wrote ten sonatas for violin and piano between 1797 and 1812 each of which is a joy to both play and hear. But, in terms of popularity, two stand head-and-shoulders above the rest: No5 in F Major from 1801 and No9 in A Major, composed between 1802 and 1803. Both have acquired nicknames: that of the F Major, 'Spring', is purely a fanciful invention based on the gentle, bucolic charm and lyricism of the music; the appendage to the A Major, 'Kreutzer Sonata', has more substance. It could just as easily have become the 'Bridgetower Sonata' since the original dedicatee was one George Augustus Polgreen Bridgetower, son of a negro page at the court of Prince Nicholas I of Esterhazy

and what the history books term 'a Saxon woman'. Bridgetower was a phenomenal violinist and gave the first performance of the Op47 sonata in Vienna. He then had a disagreement with the composer - a not uncommon occurrence where Beethoven was concerned - and the work was instead dedicated to the gifted French virtuoso Rodolphe Kreutzer.

In contrast to the genial 'Spring Sonata', the 'Kreutzer' is a far more dramatic piece, almost symphonic in its style and use of bold gesture. The writing for both violin and piano is richly inventive and hugely effective. The often stormy aggression of the outer movements raises this work way above the level of genteel salon music; this is Beethoven at his most original and vital, and it is one of his finest chamber works.

Both the 'Spring' and 'Kreutzer' sonatas receive magical performances here from Francescatti and Casadesus, even if the recordings - from 1959 and 1962 - show their age a little; tape hiss is evident, but not distracting and the balance is very much 'left-right'. The sound lacks the fullness of more recent efforts, and the violin tune is bright, even shrill at times. Yet all is overridden by the enduring qualities of these classic interpretations; that of the 'Kreutzer' remains among the finest ever committed to tape.

The attractions of this Sony reissue are further enhanced by an eloquent performance of the Tenth Sonata, Beethoven's last and again dedicated to a French virtuoso, Pierre Rode. It is a more introspective work than the 'Kreutzer Sonata', but with its song-like melodies, tense scherzo and multi-faceted finale, no less captivating and rewarding, which is an apt description of this entire CD.



**GEORG PHILIPP TELEMANN  
Oboe Concertos**

Sarah Francis, oboe and oboe d'amore'; Graham Mayger, flute; Elizabeth Watson, viola d'amore; London Harpsichord Ensemble  
**UNICORN-KANCHANA DKP (CD) 9131  
(DDD/66.37)**

● Another welcome addition to the Telemann discography to join the BIS issue of chamber music reviewed a couple of months back. This is the second volume in a series of Telemann concerto recordings from Unicorn-Kanchana and offers six works, including the floriously unbuttoned E Major concerto for flute, oboe d'amore, viola d'amore and strings. The viola d'amore is a splendidly exotic instrument, with its bowed strings - six or seven of them - augmented by a similar number of sympathetic strings below. It may be of oriental origin and been introduced into Spain, and eventually the rest of Europe, by the Moors. Whatever, the Viennese instrument of c. 1750, superbly played here by Elizabeth Watson, almost steals the show.

Throughout, this collection of concertos shows the rich range of Telemann's influences, from the folk music of Poland and Moravia to the courtly classicism of France and the vibrant virtuosity of Italy. The concertos also demonstrate how well Telemann could distil these influences within his own abundant talent.

One work here, the concerto for oboe d'amore and strings in E minor, with its clear Italian influence, receives its first recording, in an edition prepared by the soloist, Sarah Francis. Throughout, she plays with a winning combination of assurance and exuberance and is ably supported by her fellow soloists and by the strings of the London Harpsichord Ensemble. Jane Dodd plays the harpsichord continuo.

An almost tangible spontaneity to the playing makes for some thoroughly enjoyable and undemanding music-making - which is not to diminish the quality of Telemann's writing; there is some ravishing music to be discovered here. A well-focused, vivid sound supplies the ideal setting for these fine performances.

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In the meantime we will be demonstrating our favourite amps from AVI, Heybrook, Chord, Electrocompaniet, Triangle, Cadence and Audio Innovations Valves, AMC Hybrid. New items are the 100 Watt Integrated (complete with R/C) from AVI plus it's matching CD Player, selling for £799 and £899 respectively, available mid-Oct. If anyone is interested in hearing the powerful American Boulder Amps that can be arranged, and the big Alon V is worth hearing if in the market for a big powerful sound and you have a large room. We have'nt yet got in any of the large 'TOCA' stone fronted Amps that you may have seen downstairs but we will have the 22 Watt Single-Ended Class 'A' Power Amp which is superb on the ESL 63's. One thing is certain - you'll hear better sound here than you did at the show!

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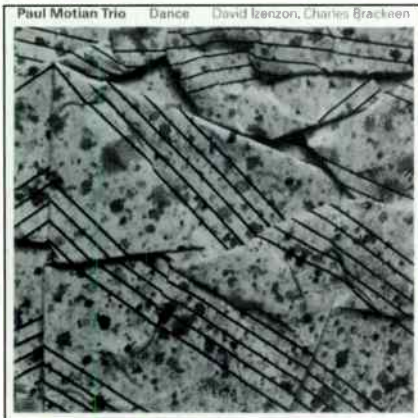
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## Simon Hopkins



**PAUL MOTIAN TRIO**  
**Dance**  
ECM 519 282-2

● The German ECM label continue their CD reissue series apace, alongside their ever expanding catalogue of new jazz and classical recordings. This quartet of reissues all roughly date from the late 70s, by which time the label had coalesced its identity musically and had established itself both as an extremely successful proposition commercially with a clutch of rising stars that included the Americans Keith Jarrett and Pat Metheny and the Norwegian saxophone player Jan Garbarek. By this stage the label had also

already established what would become both its prime selling point and its chief attraction of adverse criticism: a definitely recognizable sound and, even, style.

For my money the pick of the crop here is The Paul Motian Trio's *Dance*, but then that's an opinion helped along by the general belief that drummer Motian is at once one of the most creative and yet overlooked musicians to have worked in contemporary jazz over the last thirty years. Despite a background in both the military and traditional post-bop jazz, from the beginning of his professional career Motian always seemed drawn towards maverick music makers. Case in point: he first came to widespread public attention as one third of perhaps one of the finest groups to have ever graced modern jazz, the Bill Evans trio of pianist Evans, bassist Scott La Faro and Motian. Like Jimmy Giuffre, Evans contributed a lyrical approach to jazz improvisation which owed as much to the European impressionist music of the turn of the century as it did to the cry of the blues, and helped create an arena for romantically inclined jazz which a record label like ECM would mine so fruitfully.

Certainly Motian himself learned a great deal beyond drumming from his years with Evans. Over the nigh-on thirty years between then and now he has contributed some of the most arresting music imaginable to the jazz canon. He's done this as a sideman - most notably alongside Keith Jarrett (Jarrett has worked with many fine drummers, Jack De Johnette and Jon Christensen chief among them, but I reckon his music has never sounded finer than with Motian behind it), but it's his work as a leader that has been his most consistently probing yet satisfying.

For alongside his drumming - of which more later - Motian has two other stand-out musical traits: he's a fantastic composer - easily as fine a writer as has

ever graced modern jazz - a writer of music by turns elegaic, serene, urgent, lyrical, folkish, abstract, mesmeric; music which draws on Free Jazz and folk music and contemporary classical music and military marches and pop tunes without ever resorting to anything quite as modishly post-modern as collage or cut-and-paste; and he's got an unfailing ear for great musicians. Over the years his groups have practically launched the careers of musicians as diversely gifted as guitarist Bill Frisell, tenor saxophonist Joe Lovano (indeed, his current group with Frisell and Lovano truly ranks with the Evans-La Faro-Motian groups as one of the great trios of modern jazz), pianist Geri Allen, bassist Ed Schuller and tenor and alto saxophonist Billy Drewes. And then, of course, there's his drumming. As much a drumming melodist as a time keeper, Motian combines urgent hard-bop swinging with a painterly abstraction that verges on the gauche in a way which is seldomly less than awe inspiring. Put simply, he's very possibly the finest drummer to have been playing creative jazz for the last twenty years.

*Dance* dates from 1978 and features easily one of his very best trios: himself, bassist David Izenzon and tenor and soprano saxophonist Charles Brackeen. In many ways this was almost an inconceivable trio to have brought together. Izenzon had emerged in the sixties as a leading light of the New Thing, the blazing, black, urban Free Jazz which represented the polar opposite of the pastorally lyrical free improvisation coming from the likes of Evans and Giuffre. At the time of this recording, Izenzon had actually been retired from music making for some years (he'd actually been working as a psychoanalyst) which only goes to underline the unlikelihood of his presence in the trio. Brackeen by contrast, had been associated with Free Jazz through his working with the "Rhythm X" group of Ornette Coleman and friends; Ornette's impact on jazz had been, of course, as revolutionary as the arrival of Shepp, Ayler and co in the New Thing, but his approach was always more elliptical than incendiary, and that approach worked its way into Brackeen's sound, which was at once indisputably Ornette-inspired and unmistakably his own.

Yet together this group worked like a dream. Playing their way through six Motian originals, the trio bring a combination of rabid energy, mesmerisingly beautiful mysticism and unexpected, obtuse abstraction to compositions which range from the Caribbean pop song-meets-military march of 'Kalypso' to the folkish tone poem of 'Asia'. They do all this and yet remain resolutely accessible. This, I reckon, was as good as acoustic music-making got in the seventies, and the very pinnacle of the acoustic side of the classic late 70s "ECM sound". Highly recommended.



**GARY BURTON**  
**Times Square**  
 ECM 521 982-2

● Vibraphonist Gary Burton is another bandleader to have had a long-standing association with ECM, and another to have kick-started the careers of several recent jazz luminaries, guitarist-superstar Pat Metheny and pianist Makoto Ozone among them. But his music-making has been one both more self-consciously virtuosic yet less obviously visionary than that of Motian (relevantly, Burton's records don't feature his own compositions). Straddling post-bop and jazz-rock, Burton's music in many ways prefigured the "acoustic fusion" approach of eighties groups like Steps Ahead, and although I personally figure that the whole point of jazz-rock is to be able to make as much racket as possible while maintaining the improvisatory madness of jazz (like, the boring thing about being a rock musician was always having to play the same thing the same way night after night, week after week), nonetheless, this highly virtuosic, restrained version of fusion has proved highly popular.

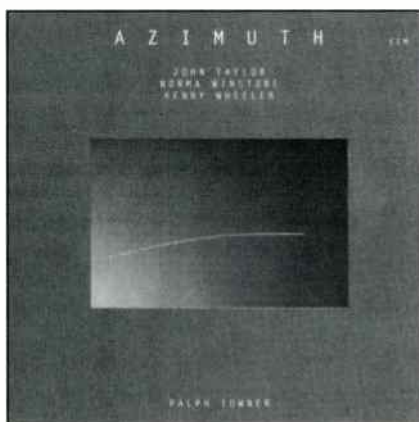
The group here is certainly a hard playing quartet: Burton on vibes, bassist (and - circles-within-circles - Jimmy Giuffrè alumnus) Steve Swallow, drummer Roy Haynes and trumpeter Tiger Okoshi, and from the rip-roaring hard bop opener, Keith Jarrett's 'Semblence' (sic) it's clear they mean business. Burning stuff.

**AZIMUTH**  
**Azimuth/Touchstone/Depart**  
 ECM 523 010-2

● If Paul Motian represents the truly visionary side of the ECM canon - alongside, say, the Keith Jarrett of The Koln Concert and the Jan Garbarek of Paths, Prints or It's OK to Listen to the Gray Voice - and Burton represents the label's solid, musicianly, determinedly jazzish side, then Azimuth represents what many listeners and critics have always seen as its most characteristic approach: a post-impressionistic, abstract, ethereal, pastoral music which borders on New Age tranquility, but retains enough jazz spirit to give it an edge which lifts it above

the anodyne. This description is, in truth, too broad to be fair to either Azimuth or their record label, but it's one which'll stick.

The group came together in 1977 as a recording outlet for the music of pianist John Taylor. Taylor isn't the world's most revolutionary musician, but he's certainly one of this country's finest post-bop pianists, indeed one of the finest in Europe, and always one to accompany visiting American superstars - like, say, John Abercrombie - on their European tours. In Azimuth he played organ and synthesizers in addition to piano, and was joined by the stunning improvising vocalist Norma Winstone and trumpeter-flugelhorn player Kenny Wheeler.

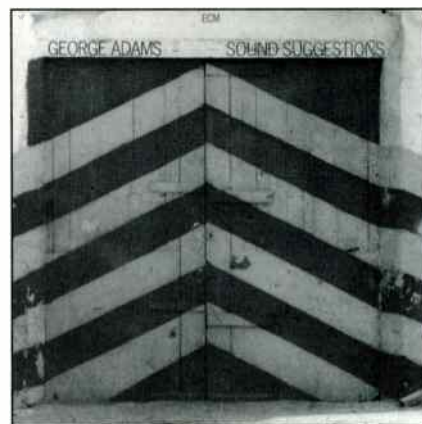


This three CD set brings together their first three recordings for ECM: 1977's eponymous debut, 1978's The Touchstone and 1979's Depart, on which they're joined by Ralph Towner on acoustic 12-string guitar, who's frankly a welcome addition after two CDs of some fairly stark arrangements - Taylor's compositions are often very beautiful, and his keyboard textures are extremely fine, but this is music whose emphasis is on lightness and space. Overall, this music is an acquired taste, and 3 CDs' worth is a lot to get through for the neophyte, but in the age of the three-second attention and MTV-happy-shiny-people aesthetic, art of this breadth and solemnity is welcome indeed. A vital reissue.

**GEORGE ADAMS**  
**Sound Suggestions**  
 ECM 517 755-2

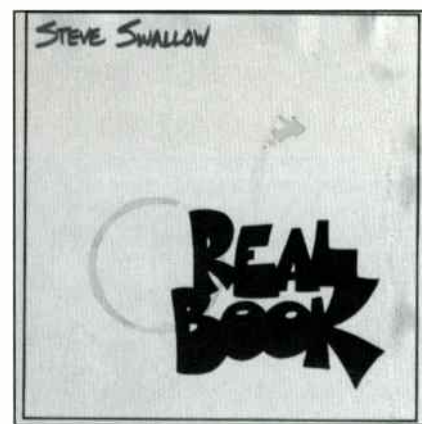
● And from definitive ECM stuff to a real one off. Georgia-born tenorist and sometime flautist George Adams first emerged in the sixties as a Coltrane-influenced player of considerable power, but an increasing romanticism and a deep, deep affinity with the blues pulled him towards a more traditional - if still highly invigorating - approach than the noisemaking-as-art favoured by his New Thing contemporaries, and the musician he chose to work with - Dannie Richmond and Don Pullen chief among them.

He recorded just one album for ECM,



1979's Sound Suggestion on which he was joined by a sterling "little big band" of Heinz Sauer on tenor saxophone, Kenny Wheeler on trumpet and flugelhorn, Richie Beirach on piano, Dave Holland on bass and Jack de Johnette on drums. They swagger their way triumphantly through pieces by Wheeler and Sauer and a blues penned by Adams to which he contributes his characteristic, gruff blues vocals. A rare marriage of contemporary jazz finesse and raw blues power. A corker.

## Simon Cooke



**STEVE SWALLOW**  
**Real Book**  
 521 637-2

● Steve Swallow wrote the ten tracks on this excellent release to honour an early sixties book of Jazz scores - the 'Real Book' - and arranged them for Joe Lovano and Tom Harrell's brass, Mulgrew Miller's ivories and the impressive Jack de Johnette on drums, with Swallow himself on bass. Playing as a perfectly-judged unit these musicians turn in excellent group and solo work. They really sound as though they enjoyed these sessions, and that's always infectious.

The first track storms from the 'speakers, balanced by an assured, strutting second track. Thereafter, mood and tempo are varied from track to track, in an eclectic palette of emotional hues mixed smoothly by the broad sweep of

group's easy bebop style.

Technically, the recording is unusual, giving the same intriguing, inveigling, by-the-seat-of-the-pants performance with a variety of systems, from a 'one box' hi-fi to an audiophile system. One last point; there are no sleeve notes, but instead a booklet of the working scores of each track; nothing more. It's a masterful ploy that completes the package.

This is already a benchmark CD for me, and I could eulogise ad infinitum given space, but there are not superlatives enough. If there's a better pure jazz release this year, I'll eat my DAC. More than a recording, it's the unadulterated Elixir of Jazz. Drink deep.



**TINA MAY**  
**It Ain't Necessarily So**  
33JAZZ017

● A far better work than her second album - *Fun* (which sold well anyway) - and well worth hearing. This album feels slower than *Fun*, giving Tina time to develop and hold notes to kill the breathless quality of that earlier work. She's been less closely miked here, enhancing the softness in her voice to balance her occasional tendency to 'squeak'. This produces a sense of space and atmosphere enhanced further by the fact that the band is softer and less forward, expanding this recording from the flat wash of sound which was *Fun*, into something resembling a live set.

Three tracks stand out; the Gershwin title track, a bass/vocal 'duet' which stands comparison with Carol Kidd's recent recording of the song. This may be less operatic and technically correct than Kidd's interpretation, but in my opinion



May scores for soulful ease and gut feeling. The two tracks recorded with the Britten String Quartet - 'Chelsea Bridge' and 'Solitude' - are excellent despite the Quartet's slightly leaden handling of the tunes which counterpoints May's voice particularly well; Tina's spine-tingling vocal on 'Chelsea Bridge' stands comparison with any version I know, while 'Solitude' is simply haunting.

So, this is an album which finally does justice to an outstanding live artist. Well performed, well recorded, well worth hearing.



**ZUBOP**  
**Freewheeling**  
33JAZZ015

● What can you say about Zubop? An instant Afro-Latin-Salsa-Reggae-Funk-'World Jazz' party; the kind of group that could cut a wax cylinder in a Citroen 2CV travelling between gigs and still turn out a release with enough energy and style to wipe most recording artists off the map. Maybe not a great recording, but great fun, and often challenging.

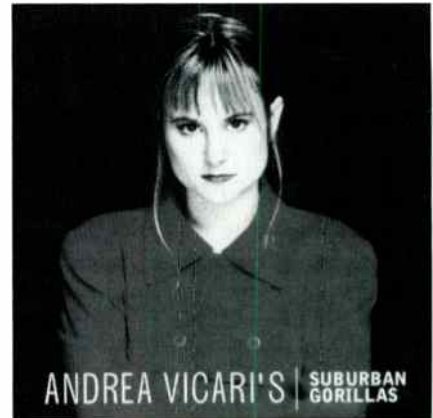


**SCOTT HAMILTON**  
**Scott Hamilton, 2**  
CONCORD JAZZ CCD-4061

Recorded in 1978, and now re-released on CD, '2' effectively bridges the intervening years by opening with 'East of the Sun', the title track from his most recent album. '2' is another meander - with Nat Pierce on piano, Monty Budwig on bass, Jake Hanna on drums and Cal

Collins on guitar - through Scott's home turf of mid-tempo standards. The only mould breaking track is 'I want to be happy', played fast, but unlikely to worry even the most slothful system.

I suspect that a few undesirable characteristics have crept in while this was being re-mastered; Pierce's piano is noticeably splashier than on vinyl, and Scott's tone is a little thinner, too. However, that's academic, really, and the result is a recording which only just falls short of Concorde's usual quality, but not enough to prevent it being worth hearing. If you want a decent collection of good jazz, '2' should be there simply for being Scott Hamilton, although absolute purists may prefer the vinyl.



**ANDREA VICARI'S**  
**SUBURBAN GORILLAS**  
**Andrea Vicari's Suburban Gorillas**  
33JAZZ016CD

● The debut album of Ms. Vicari's group is a mix of well performed contemporary jazz recorded with the workmanlike precision of most of "33" Records' releases. The line-up is one that includes many of Britain's finest young musicians such as Mornington and Dorian Lockett, and Leigh Etherington to name but three. Ms. Vicari herself is a keyboard player of talent enough to hold her own in this choice selection of young British talent sauntering through a 78 minute set.

The only track I didn't take to was the 'Pin Stripe Woman' boogie, but after the excellent 'In Africa Maibouye' - cod township jive like you've heard ten thousand times since 'Graceland' but set firmly in a contemporary jazz framework and descending into squealing midtown horns - I can forgive it. The three-piece 'French Suite' - an Arts Council commission - is also, in my opinion, worth whatever public money that body paid. The group looks like a promising line-up who are perhaps not yet at ease as a group (perhaps due to the vagaries of Arts Council funding?) but they should have a bright future ahead of them, and will be worth keeping an eye on, especially when backed by "33" Records high recording standards. A CD worth seeking out.

## An invitation from Bill Wilson

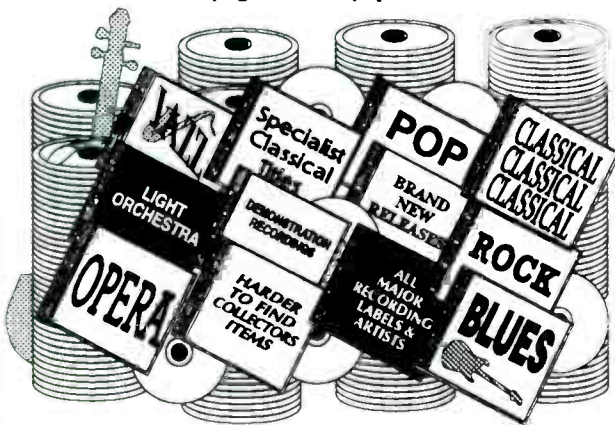
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HEW11/94

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LP together. Review in Hi-Fi World August 1994, these machines are a must for the dedicated Vinyl collector.

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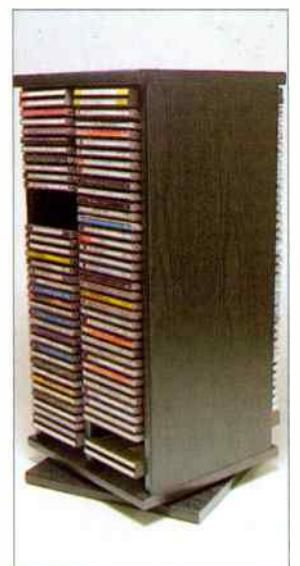
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**LP SLEEVES (50) PRICE £8.15**

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A rotating, upright, double-sided, storage cabinet with space for up to 160 Compact Discs, including 8 double jewel-cases. Mounted on an all-steel turntable, it swivels smoothly through 360 degrees giving easy access to the storage compartments either side. Manufactured in durable MDF with a Black Ash effect finish, the Sound swivel comes packed for self assembly with full instructions.

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# Hi-Fi World

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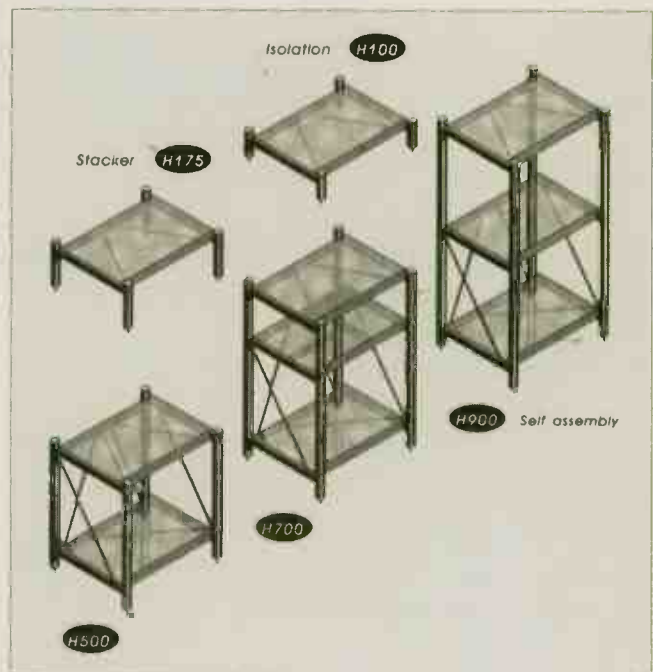
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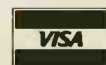
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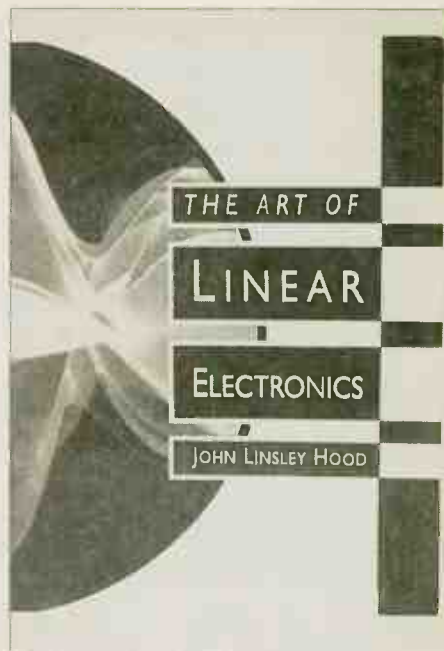
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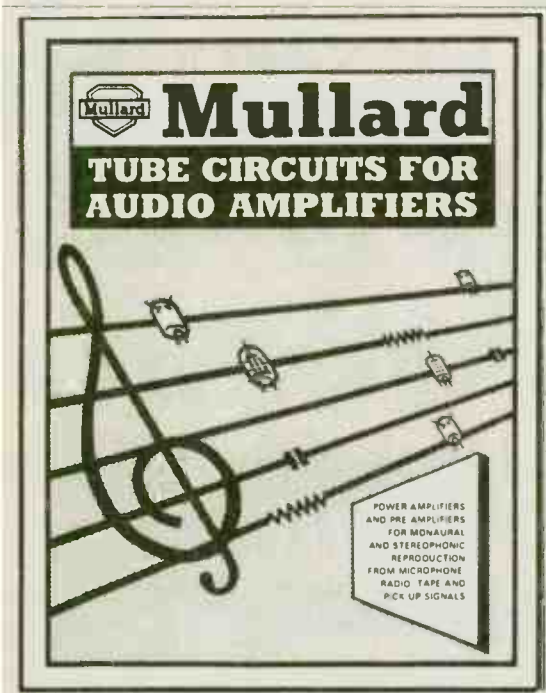
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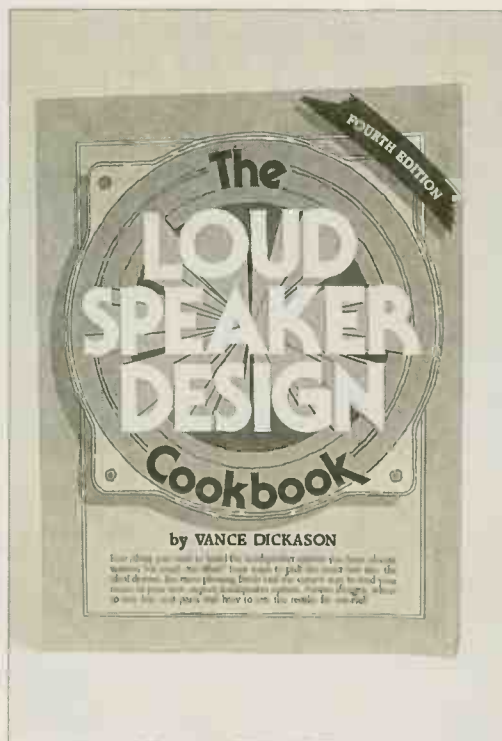
First published in 1959 by Mullard, this book includes full designs for eleven power and control amplifiers, including the 5-20, using valves. This book begins with a four-chapter tutorial on getting the best sound from valve amplifiers.

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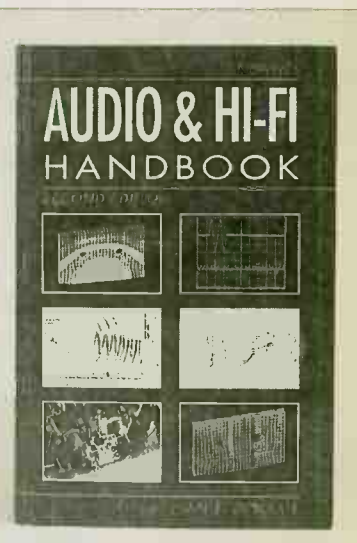
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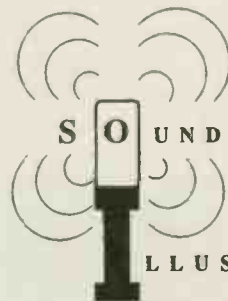
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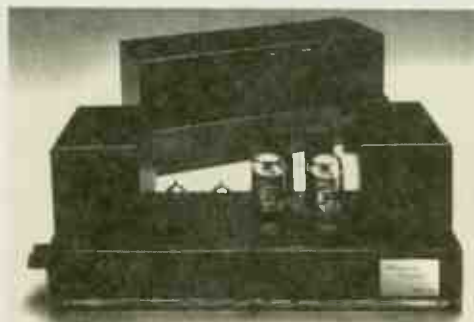
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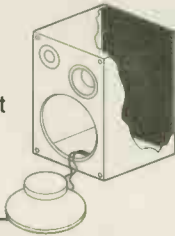
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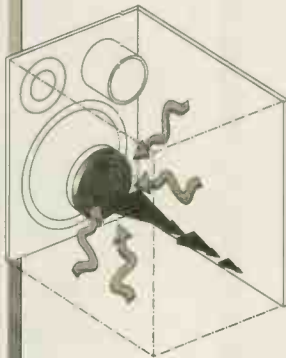


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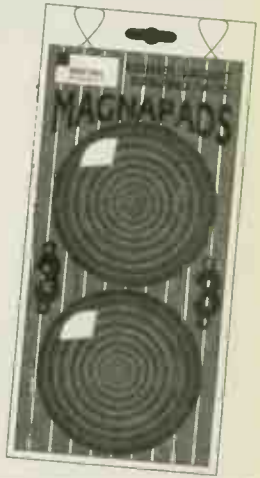
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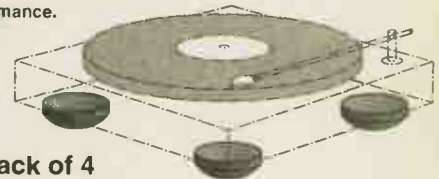
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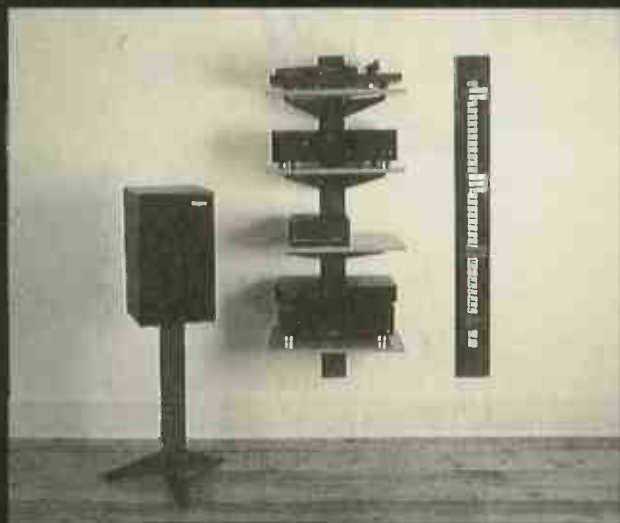
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# readers' queries

## TWEAKING THE THORENS TD150

I am at the moment contemplating up-grading my record player which is a Thorens TD 150 (approximately 15 years old) to which I added, two years ago, a Linn Akito arm and A&R C77mg cartridge.

I have considered the following combinations and would like your advice on them to get the best musical quality.

1. Thorens 166 MK6 motor unit only (putting Linn Akito on).
2. Systemdek IIX or IIXE (putting Linn Akito on) or getting hold of a Roksan Tabriz or Tabriz zi. Would this be an up-grade over an Akito arm?
3. Mantra. Again, as above, putting the Linn arm or Tabriz (zi) on to it.

The sound I would like to obtain is a deep bass, open and detailed midrange and detailed treble. Because these mid-priced turntables are not cost-no-object designs, I can only expect so much from them, so I would like you to advise me on which would be best overall.

I am also in need of a better cartridge than the C77. Would I be better off getting the P77 stylus or going for a different cartridge altogether? Again, I would appreciate your

**Write in with your problems to Hi-Fi World, 64 Castellain Road, Maida Vale, London W9 1EX. Our panel of experts will endeavour to solve them, or at least offer some practical advice.**

advice.

My system is as follows: Thorens TD 150/Linn Akito/C77mg/Rotel 820BX (I'm in the process of buying speakers after sorting the turntable out - listening through headphones at the moment).

I have written to various people and have had no replies from them, which I feel strange to understand. I am ready to buy a turntable/arm/cartridge combination soon and I would like it to be the right choice.

**Andrew Waller  
Rotherham,  
S. Yorkshire.**

You certainly need to improve both cartridge and amplifier. Rather than go for a new Thorens, why not stick

with the 150, spending the money on tweaking it up and on a new arm? The Linn Akito is a rather basic one. Way back, there were a whole series of tweaks published for a 150. First is to cut a piece of marine ply of the same thickness to the same size as the arm-board, with a suitable mounting hole cut into it for the arm and mount it in place of the original. (Painting it black is worthwhile). Next is replacing the suspension springs with those for a Thorens TD160 (if you can persuade Thorens in Germany to part with a set) and applying damping pads to the underneath of the sub-chassis, round the inside of the plinth and the hardboard base. Everyone used to suggest sound-deadening pads from Halfords for this purpose, but I've never found a Halfords that knew anything about them. A mastic-type roofing felt strip will do.

If you go this route, a fair bit of money can be spent on a new arm - Rega RB300 as a minimum. I can see no reason why a Tabriz-zi shouldn't work, but I've never seen the combination in action. A cartridge upgrade is essential. While the P77 would improve things, a Goldring 1022GX or 1042GX would suit much better. This now

allows improvement to the amplifier, which looks long overdue. Rotel have a new range about to appear, and given their success in 'Britishising' their CD players of late, they should be well worth a listen and should be a marked improvement on the 820.

Of the decks you suggest, I would be very tempted by the Systemdek IIXE 900, but would take their advice on the Tabriz-zi arm, since it was designed in conjunction with a rather different type of turntable. The Mantra, alas, I have no experience of, though it has a strong following. Since you're in Rotherham, it may be worth a trip to Doncaster Hi-Fi Studios to have a listen to their own turntable, which I saw at the Chesterfield Show, although I was unable to assess it. The Michell Mycro, with RB300, is also well worth considering in the same price bracket. (I don't like its green acrylic cover myself, but I believe Mr Michell can be persuaded to do one in clear acrylic).

At this point, a word of warning. Unless you are using very exceptional headphones, you are going to be misled as to what you are hearing. Very few reproduce much bass, or

Continued ...



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even any bass accurately, and only the electrostatic headphone's reproduction of treble frequencies can entirely be relied on. Consider your choice of amplifier and speakers first.  
**EB**

### IN SEARCH OF SENSITIVE SPEAKERS

What I am looking for are some speakers. I have a hotch-potch of a system consisting of Hitachi PS 17 turntable Ortofon FF15 cartridge, Teac Z500 CD player, Rotel RC850 pre-amp, a Leak Stereo 20 amplifier and Wharfedale 3XP loudspeakers.

Apart from the record deck and amplifier, which were given to me, all the other components were purchased second hand. The amplifier has been upgraded with new capacitors, resistors and regulated power supplies, the valves are from Golden Dragon, this work having been done by a dedicated valve man in Dorchester; it's certainly breathed new life into it.

I have no firm ideas on speakers, like makes, models etc., but having been through several copies of your magazine it seems to me that an efficient design would be more appropriate to partner the Leak amplifier. I am not keen on buying speakers second hand and my budget being about £350 I would be interested in your ideas of manufactured speakers and also kit speakers, some adverts for which appear in your magazine. My amplifier has a much more tuneful bass than it used to have and this is a quality I also like in speakers - something to bear in mind.

I shall, when I can afford to, change the record deck. This will probably be purchased second hand. I have a very helpful hi-fi dealer in Chesterfield and I keep scanning the window for second hand bargains. I can recommend this to anyone on a tight budget, especially where the equipment is demonstrated and guaranteed.

My musical tastes are wide, covering everything from Mozart to Miles Davis, Joni Mitchell and Led Zeppelin.

**John House Wingerworth, Derbyshire.**

You are right to consider an efficient loudspeaker, since the Leak Stereo 20 will sound at its best with a 'speaker of 87dB sensitivity or more and with a high overall impedance, which is usually the domain of British loudspeakers. The high sensitivity means that they will need little power to go loud, and a high overall impedance will draw less current from the valves, producing less

distortion.

Fortunately there are more and more loudspeakers becoming available with these qualities. At £279 there are Castle's Durham 900s. They are stand mounters, come as a handed pair for improved stereo imaging and, having a really firm and tuneful bass, should suit your tastes. If you want deeper, more powerful bass and have the room for a small floorstander, TDL's £250 RTL2s may be just the thing. If the bass is too heavy you can raise them off the ground a little on a low stand (a few inches is enough) which will also improve their ability to play a tune well.

TDL RTL3s are also worth considering if you've got the space, even if they're a touch over your budget at £399. All of these three 'speakers have soft dome tweeters which tend to give the smoothest treble.

On the kit side, IPL's S3s seem to be your best option. These floorstanding transmission line loaded 'speakers are sensitive, have a high overall impedance and possess very good bass quality. £290 buys you everything you need, including grilles and small stands. Or if you're a little more ambitious, have a go at our KLS3s. These use superb carbon fibre drive units, but you'll have to build your own boxes and wire the crossover. **DB**

### ROGERS RAVENSBORNE

My present system was established during the 1970s and comprises the following - Acoustic Research record deck and tone arm, Ortofon cartridge, Rogers Ravensbourne amplifier and Acoustic Research AR4 speakers on low (cheap) stands.

I'm seeking to re-new and or upgrade my equipment. A Marantz CD-72 now provides the primary source of music and, operating through a DNM Interconnect, has served to rekindle my passion for

listening to music. My tastes are fairly eclectic, spanning Blues, Soul, Jazz, Opera, and light Classical.

The listening room is 20ft x 12ft overall, L shaped with a low (7ft) ceiling and too much furniture. I am aware that the speakers are a little lacking in the treble, but of more concern is the rather lacklustre sound at low volumes which all too quickly becomes harsh and uncomfortable as the level is raised.

I do expect to replace the cartridge, but my main problem is that I am not sure what to do about amplification. Should I service and retain the Rogers? Probably the cheapest option, but is it out of date totally, not up to comparison with modern equipment, and also the source of some of my dissatisfaction with the sound?

Should I purchase a modern amp. like the John Sheame integrated, Audiolab 8000A, Technics SU-A900 or Cyrus III?

Should I buy second-hand, probably a Quad 33/303? Good value and I've always admired them, but would it be up to the task when compared with the above and will it give me the detail and solid imaging I prefer?

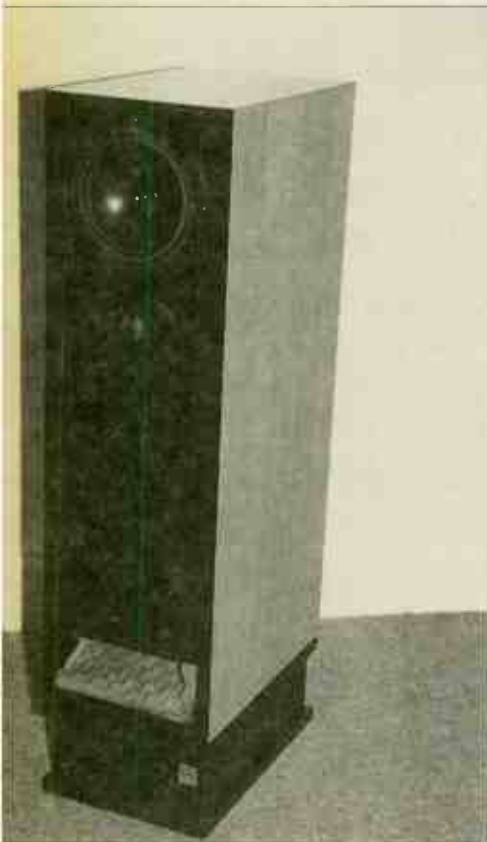
Loudspeakers I hope to narrow down when the core elements are in place, though I guess that I may find the CD, which got me started, may be lacking when I finally do get to the other end.

I would be grateful for your observations.

**R. W. Farrow Manningtree, Essex.**

You are living in the past. I went through that period too and can assure you that things have improved, even if not that much in some areas. The Ravensbourne really isn't very good by today's standards. Even in its day it was a budget amp. and no, a Quad 33/303 may be one of the best styled

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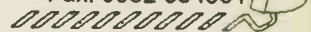
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and built amps of all time, but it doesn't sound so hot either. I ditched mine long ago, back in the seventies, even though it served me well and I loved it. I've thought of buying one again, as well as a Cambridge P50 which was a seriously radical amplifier in all respects (yet nobody writes to us about this one), but only for museum use.

The harder treble of modern amplifiers may shock you, so try auditioning an Aura VA-50 or an Arcam Alpha 5 in addition to the fine short list you've compiled, except for the Technics amplifier, which we wouldn't recommend.

You really should consider new loudspeakers, even if they are only a pair of small Missions like the 760iSEs (£150 or thereabouts). And watch out for reflections off that low ceiling. Try acoustically treating it to absorb and disperse sound. A few egg cartons wouldn't go amiss, perhaps with a muslin or light cloth covering to hide them.

**NK**

### BI-WIRE BLUES

After 20 years with my old system, I happened to pick up one of your magazines and start browsing. That was fatal, and I now get it regularly (the magazine, I mean!). As a result, I recently purchased a new hi-fi, comprising a Marantz PM44SE amplifier and CD-52 II SE CD, with Mission 760iSE speakers, Denon TU260 tuner and Aiwa 828 cassette. The speaker connection instructions given in the amplifier manual are not too clear - or I'm too thick - and I would very much welcome advice from an unbiased expert.

If I bi-wire the speakers, do I connect both pairs of leads to either the A or B output terminals on the amplifier, or do I connect the bass/mid-range wires to terminals A and

the treble wires to terminals B?

Is there any internal difference in the amplifier feeds to the A and B terminals?

In addition, I'm considering connecting an additional pair of speakers (not bi-wireable), for use in my workshop. Because I would have to use existing low grade wiring for this (it runs under concrete and can't be changed), I would wish to connect the speakers in parallel, so as not to degrade the feed to the 760is. I would like to be able to install a switch unit so that I could run either, or both, speakers.

Do you have any recommendations about connecting both bi-wireable and ordinary speakers, without degrading the feed to the good speakers? In addition, do you know where I can get a switch unit - the only ones I have seen connect the two sets of speakers in series, which I do not want. If I have to make my own switch unit, what electrical load characteristics would the switches need, again to avoid degrading performance? (Because of the location of the hi-fi, and a bad back, I do not wish to have to use banana plugs and disconnect them manually every time I have to switch speakers).

I must apologise for troubling you with questions which are simply a reflection of how uneducated I am. The advances since I bought my last system are quite amazing. However, I have retained my old Pioneer PL12D turntable.

If you are good enough to try and help me, then I would like to thank you in anticipation.

**Jim Taylor  
Charnock Richard,  
Chorley.**

In your system, I'd connect both pairs of bi-wire leads from the loudspeakers to the 'A' terminals, either by connecting them to the same banana plug, or by screwing both cables into the same set

of terminal posts. This will leave the 'B' terminals free for your second pair in the workshop. The amplifier you have will then enable you to select either 'A' speakers - the Missions, 'B' speakers - the ones in the workshop, or both pairs.

Both 'A' and 'B' outputs are normally the same inside the amplifier, and the signal shouldn't be degraded by running both pairs. By switching both pairs on, 'A+B', the impedance seen by the amplifier will reduce and more power will be drawn. But most of the Japanese amps are designed to be able to cope with this and it shouldn't affect sound quality. Make sure that the amplifier doesn't overheat though, as it may do if other equipment is stacked on top. **DB**

### FUTURE UPGRADE

I would like your advice on upgrading my system which currently comprises the following mixed bag: - Nakamichi CD4 CD Player (Original model), Deltec Slink interconnect, Rega Planar 3 turntable with RB300 tonearm and Bias cartridge, Marantz PM40SE amplifier and KEF Coda 3 speakers with Linn K20 cable on Sound Organisation stands. I also use a Creek 3040 tuner, Aiwa AD-F350 cassette deck and Sony CD750 headphones.

The CD player was purchased 18 months ago as a secondary source to the turntable. Since then, due to the lack of available vinyl, CD has become my primary source and I would like to concentrate my efforts here. My musical tastes are varied, but include Folk/Rock (Van Morrison, Hothouse Flowers, Mary Black, etc.) and Classical (Chamber and Opera) played at moderate levels only. Sound quality is reasonable on simple recordings, but seems to struggle with more complex material. I am seeking a more detailed sound without introducing brightness. I will

soon be in the position of having approximately £1500 - £2000 available for upgrading.

I wish to replace the speakers (as they are getting long in the tooth) and upgrade the CD player as a priority, followed by the amplifier if funds allow. Can you please advise on the best way to upgrade within my budget?

I like the idea of CD player and amplifier from the same manufacturer in order to take advantage of a system remote control (Arcam, Linn, Meridian, Quad etc.). Any replacement amplifier must have a MM phono input and a headphone socket which cuts out the sound from the speakers when in use.

Would I get more improvement by adding an off-board DAC rather than replacing the whole CD player?

I also favour compact floor standing speakers, both to eliminate the need for stands and for cosmetic reasons. They need to be suitable for placement within a couple of feet of the room corners (room size 18 by 12ft). For the same cosmetic reasons, my present system is housed in a wooden cabinet (my wife is not keen on the looks of specialised hi-fi stands!). Can you advise on the best means of improving the isolation of the electronics within this? Any recommendations will be carefully auditioned so I am basically looking for a short list to work with.

**Steve Callan  
Warrington,  
Cheshire.**

To start with, the best way to plan an upgrade like this is to audition a complete system. You need to find a CD player, amplifier and loudspeakers that work well together as a system. Of the manufacturers you mention, Quad make the most suitable CD player to start with, the 67. It is a super player to upgrade to, having high

Continued ....





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.... Continued

quality sound, Quad's excellent back-up service and a good transport should you wish to upgrade to even further heights in the future. But if you want to have a system remote control, the matching 66 pre-amp will add £840 to the £790 67 CD player. This only leaves £370 of your budget for an amplifier and 'speakers, and so far no headphone socket in sight.

To stay within your budget I'd stick with the Quad 67 CD player and source an amplifier from a different manufacturer. To start with, try the £460 Audiolab 8000A. This has everything you need; headphone socket, high quality MM and MC stage as well as being reliable and capable of producing a superb sound. It is very clean, some describe it as sterile, but this should balance the characterful and full sounding Quad 67 very nicely.

The Audiolab 8000A has plenty of power, so almost any loudspeaker will work well on the end of it. But I'd try Rogers' £449 LS8a2s first for their ability to play music in an enjoyable and entertaining manner. I also think that they'll be a particularly good match for the system and room. This brings the total up to £1700. Any remaining funds should be spent on music to enjoy on your new system; your interconnects and 'speaker cables are already of good quality. **DB**

### VINYL SURPRISE

Here's an easy question (or maybe not). Last year, starting from scratch, I auditioned and assembled a system, expecting to use CD (Arcam Alpha 5 and DITB) or tuner (Audiolab 8000T) as the principal sources. I bought a Pro-ject 6 turntable as well, thinking that I might be able to pick up a few second-hand records to listen to now and then. To my

surprise, I discovered that I liked vinyl most of all, for two reasons - I can collect more music for my money, and the quality of sound reproduction, even with the modest Pro-ject 6, is far better than I could ever have imagined.

Amplification is handled by an EAR 834P and John Sheame Phase II integrated with Heybrook Quartets, and they work together to produce a marvellous sound, with a lot of weight to the bottom end. Of the few albums which I have on both CD and vinyl, I prefer listening to the latter.

Here's the question.

Assuming that I have taken great care with mechanical isolation, cabling, interconnects and the occasional tweaky accessory (a Ringmat), how can I reasonably improve the performance of the deck?

I thought of a better cartridge (the new Ortofon MC20/30 Supreme), or a better arm (what would fit?), but how much does the basic construction and quality of the deck limit the potential of such attempts at improvement?

Would I be better off saving for another turntable? How much could I modify the Pro-ject 6 before it all became a waste of money? Rumour has it that the importers are planning updates for the deck, but I can't confirm this.

Please can you help me?

**David Howes  
Woodchurch,  
Kent.**

P.S. For your information, the full set-up includes Roksan blue bi-wired speaker cable, Isoda hybrid interconnects (HC-05-PSR) and the turntable is supported by a very sturdy wall shelf. No amount of jumping (literally) up and down on the floorboards seems to disturb the stylus, so the deck must be well-isolated from vibration. I have a Seismic Sink under the CD, but for the reason given above, I have not considered using it under the turntable. Should I? The Pro-ject 6 has been customised by adding a

heavy hardwood plinth (like an LP12) to enclose and support the lightweight baseboard.

Since, in my view, the Pro-ject arm is the weakest element, you are close to the maximum of what can be achieved, since there's not much more mileage left. The deck is certainly well-isolated as it stands, but since you already have a Seismic Sink, swap it from under the CD player (where it is certainly beneficial) to the turntable just to see.

While reviewing a Pro-ject 6, it did occur to me to wonder about arm-replacement, but the job would require dis-assembling the base and sub-chassis and then finding an arm with the same column diameter.

Ortofon tell me it's near-impossible to re-drill the arm-board, but they will be bringing in a Sumiko arm for the Pro-ject in the next few months. Hang on to your wallet, and be first in the queue for it.

In the meantime, however, an upgrade to an Ortofon MC20 Supreme would be worthwhile: the Pro-ject arm will (just!) support a cartridge of this quality. **EB**

### ARMSTRONG SERVICE

Inspired no doubt in part by the coverage in your magazine devoted to elderly, ahem, vintage hi-fi, I recently bought an Armstrong integrated valve amplifier. I've no idea how old this particular specimen is, but it had a label which bears the legend "as selected for the Design Centre London" attached - rather carelessly I thought - to some wires inside. In addition, another label, this time stuck on the back of the amplifier, bears the legend "MODEL 222". Perhaps these offer some clue as to the age and/or worth (if any) of the item in question?

Anyway the latter is of less concern to me than finding an honest enthusiast who would

be willing to check over the amplifier and carry out any repairs at a reasonable cost even.

To my, admittedly untutored, ear the amplifier sounds fine on all inputs - except phono - and then only when the source is the turntable (Rega Planar 3/RB300). With this set-up there is simply no volume. On the other hand, inputting a CD or Tuner through phono (or "pickup" as it is referred to on the amplifier) works just fine.

On a visual audit the only thing which seems amiss is that a small green cylinder, clipped to the base of the amplifier and located beneath the internal Off/On/Input Selector switch appears to have blown its top and leaked (some of?) its contents. Could this be the cause of the lack of volume with the turntable-source?

I welcome whatever speculations/advice you may be able to offer on any of the above.

Many thanks in advance.

**G. R. Thomson  
London.**

It surprised us to find out recently that Armstrong are still running as a service centre for a wide range of products, including vintage valve equipment and, of course, all Armstrong products. Your 222 can be repaired they told us. Contact: Armstrong Hi-Fi Video Services Ltd. 32A Blackhorse Lane, Walthamstow, London E17 6HJ or telephone 081-523-0051/0023/fax 081-523-4395. It sounds like the input labelled phono is in fact line level and is probably intended for connection to an external phono head amp. which will amplify the signal from your cartridge up to suit. Amps like this have little open market value and are best seen as valuable for the entertainment they can provide rather than the hard cash they can raise. Only a few sought after rarities can justify large prices. **NK**



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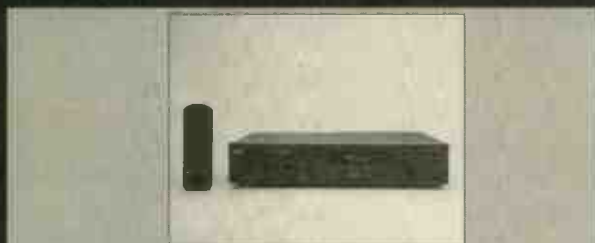
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QUAD ESL users should be aware of E.A.R. new 'direct coupled' electrostatic tube amp.

Tim has also designed a cunning sub woofer system free of the usual bass bloom you would associate with other inferior designs. This will be on demo around mid December.

I am sorry, I do not sell individual components or circuit diagrams for vintage amplifiers or equipment.

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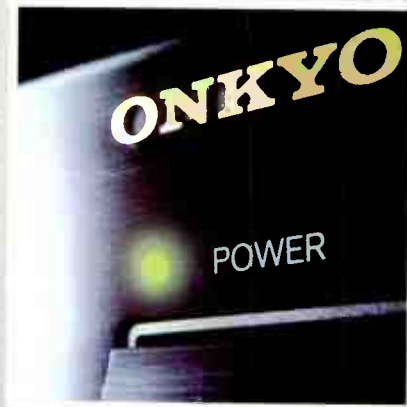
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