

HI-FI CHOICE

THE WORLD'S NUMBER ONE GUIDE TO BUYING HI-FI

MARCH 1992 £2.95

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do they really work?**

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**Free
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**DCC launch plans
announced**

**Big noises from little
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Amplifiers
on test**



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HI-FI CHOICE

ISSUE NUMBER 104 MARCH 1992

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PUBLICATION

PRODUCTS AND EDITORIAL SUBMISSIONS

Hi-Fi Choice welcomes all information on new and upgraded products and services, for possible coverage within the news and reviews pages. However, the publisher respectfully points out that the magazine is not obliged to either review or return unsolicited products. The editor is always pleased to receive ideas for articles, preferably sent first in outline form, with details of the author's background, and – where available – samples of previously published work. He cannot, however, accept responsibility for unsolicited copy and would like to point out that it may take time for a reply to be sent.

READER DIFFICULTIES

Hi-Fi Choice welcomes any technical questions, although these can only be discussed within the pages of the magazine. Regrettably, *Choice* is not in any way able to offer telephone assistance.

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THE GET OUT CLAUSE

While every care has been taken in the preparation of this journal, the publishers cannot be held responsible for the accuracy of the information herein, or any consequence arising from it. Readers should note that all judgements have been made in the context of equipment available to *Hi-Fi Choice* at the time of review, and that 'value for money' comments are based on UK prices at the time of review, which are subject to fluctuation and are only applicable to the UK market.

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Menu

Once upon a time hi-fi was a separate subject. If you wanted to listen to music you bought a hi-fi. If you wanted to watch pictures, then you needed a TV set or a slide projector. Of course, if you wanted to play computer games, you needed a computer and a floppy disc.

However, the times, as some bearded pillock once said, they are a changin'. The 'AV revolution' has been a long time coming, but the Luddite attitude that connecting your Nicam video recorder to a decent hi-fi system is something akin to sacrilege is changing, albeit slowly.

Although wiring up your TV and hi-fi is the most obvious manifestation of the convergence of previously separate fields of home entertainment, it is by no means the only one.

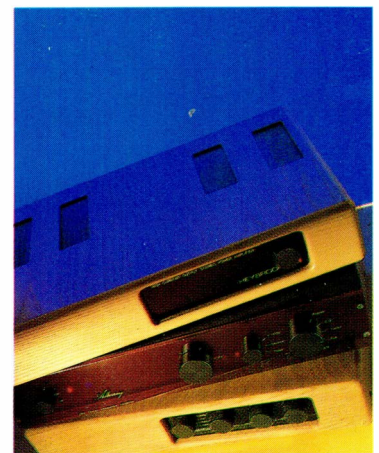
Look in the *Update* section of this issue and you will see that the computer games giant Nintendo has decided to get in on the act and launch a CD player, albeit one whose primary purpose is playing computer games rather than audio CDs. The point is that the CD-ROM-XA drive produced by Nintendo will play conventional audio CDs, and the sort of people likely to buy one will certainly be aware of the fact. Consider also Kodak's Photo CD system that enables you to use a CD player to 'play' your favourite slides.

The fact that the purist audio market is increasingly under siege was brought home at the recent Las Vegas Consumer Electronics show. Traditionally the show starts off with a keynote speech by some industry luminary. So who did they choose to open the show this year? The president of Philips? Someone from Sony? A manufacturer of esoteric valve amplifiers? Actually, it was John Sculley, who, as just about any streetwise teenager will know, is the chief executive officer of Apple Computers.

The fact that a computer hardware manufacturer should be chosen to give the opening address at what is often viewed as a hi-fi show is immensely significant. Whether we like it or not the advent of the digital age has changed the face of hi-fi for ever. Sculley summed it up when he declared that the main difference between analogue and digital media is that digital media allow the end user to talk back. With analogue you are basically presented with fixed information. In the digital domain you have far more freedom to tell the machine how you want the information, all the way from computer games, through digital signal processing, to simply programming in your favourite tracks on a particular CD.

The market is going to change, and sooner than most people think. I just hope that the hi-fi industry has the sense to think the whole thing through and ensure that sound quality is at the front of, indeed leading, the new revolution, and not something that is added as an afterthought.

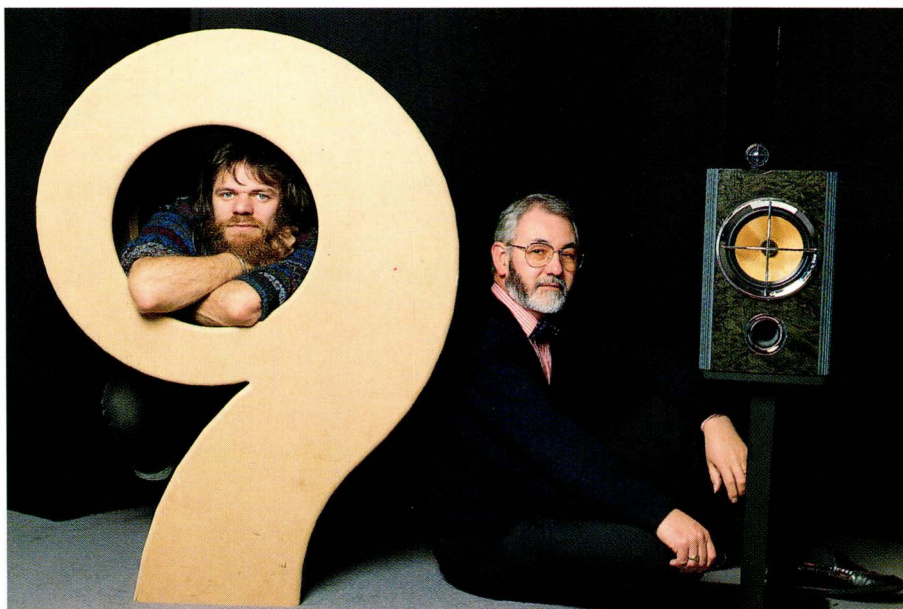
Andy Benham



Cover photograph by
Chris Richardson.

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Bottom: A stack system with a difference. Just some of the 20 amplifiers evaluated in our review section. The fun begins on page 47.

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CONCLUSIONS, BEST BUYS AND RECOMMENDATIONS

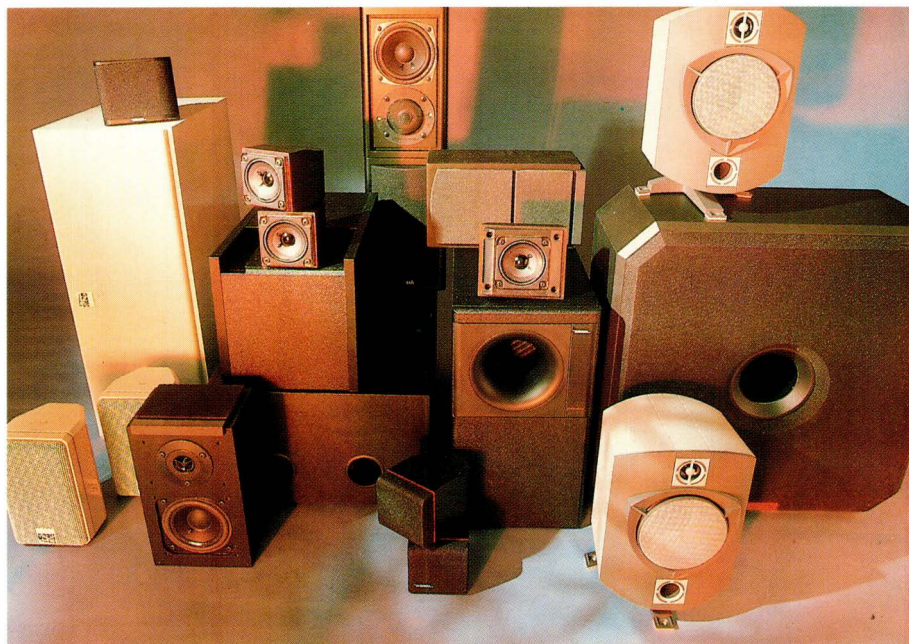
Essential results from the reviews.

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THE CHOICE DIRECTORY

Shopping for that special component or looking to build a system? Look no further. Our directory summarises the huge



inventory of *Hi-Fi Choice* reviews and offers at-a-glance information on all the current products tested in our pages. The ultimate reference featuring nearly a thousand entries: beware of cheap imitations, this is the real thing.

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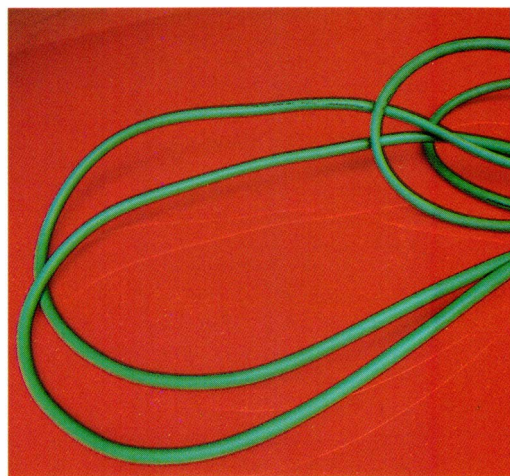
READERS' OFFERS

Get your audiophile goodies here.

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PERSONAL MESSAGES

Paul Messenger listens to the Stentorian tones of an interesting new subwoofer.



Top: Round up the usual suspects. This month we review seven satellite and subwoofer systems, starting on page 87.

Middle: Loop the loop with high-end Furukawa cables in this month's competition.

Bottom: Green paper. We survey assorted CD tweaks in Sessions.



Philips delays launch of DCC

In what is rather optimistically described as 'revealing DCC launch plans' Philips has decided that the public will not be able to get its hands on DCC (Digital Compact Cassette) until September, rather than the April launch date much quoted in previous issues of *Hi-Fi Choice* and elsewhere.

April 1992 will now mark what is described as 'the start of the campaign' with DCC hardware being 'made available for demonstration and sampling purposes' with a view to 'building industry, dealer and consumer awareness for the new system.'

Mass introduction of the DCC system will start in September 1992 in Europe, Japan and the USA. Philips anticipates that at this time



DCC: mean and moody — but not on the market yet.

there will be approximately 500 pre-recorded titles available from the software industry. High-end table top DCC machines will go on sale from

September and every few months new models will be introduced. Philips also promises midi, personal and in-car units within a year.

Arcam's S type hits the shops

First previewed by *Choice* nearly a year ago (see the May 1991 Show Report), Arcam's £850 *Delta 100* Dolby S equipped cassette deck is now available from your friendly local hi-fi dealer.

The brainchild of A&R Cambridge Limited, the *Delta 100* is reportedly the first UK made domestic cassette deck since the Neal 302 bowed out over ten years ago. The *100* is based around a three head, three motor dual capstan mechanism. As previously reported the deck incorporates Dolby S type noise reduction and is reportedly the first European made tape deck to do so. The *Delta 100* is built on a non-magnetic aluminium chassis and features a music search facility, real time tape counter and automatic tape type selection. An optional remote control unit is also available.

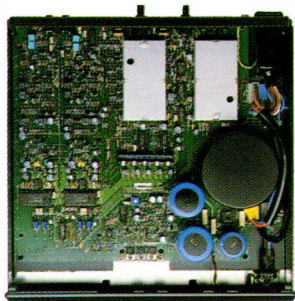
Linn bites the digital bullet

Linn has finally provided details of its long awaited domestic CD player, which turns out to be a two box transport and DAC combo costing £2,590. The two components, karakteristikkally named *Karik* and *Numerik*, have been under development for seven years, and are said to have benefited from Linn's experience with the *Numerik* professional A/D, D/A convertor.

The *Karik* transport features a Linn built four motor mechanism and uses a Japanese style three beam laser assembly. Outputs include BNC electrical and high speed optical, in and outputs for round the house systems and a

diagnostic port. The latter has been provided so that dealers can 'monitor the performance of the laser' (and you thought that setting up was a thing of the past.)

The *Numerik* D to A convertor



uses a pair of 20-bit, eight times oversampling chips specially selected by Linn for low level linearity. Linn claims to have paid special attention to protecting the signal from noise, the low noise crystal oscillator and even critical PC tracks are shielded. It has two BNC electrical inputs, but no optical input, and two sets of RCA phono outputs.

When used in tandem the *Karik* and *Numerik* can be linked with a sync cable that connects up the clocking systems in both units and is said to reduce jitter. Initially this will be the only way you can buy these components as Linn won't be selling them individually until supplies are up to full strength.

Linn has also introduced a substantial new loudspeaker. Called the *Keltik* it looks like an overgrown *Kaber* and utilises three drive units including an unusual almost oblong bass driver. Details are still scant but the price has been set at £4,400.

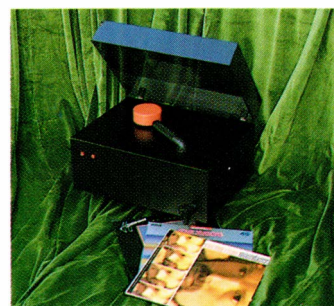
And finally, if you want to find out more about the Linn product range and philosophy check out their glossy new catalogue.



Black boxes with a silver Linning: the Karik and Numerik.

A vinyl solution

Keep your precious vinyl in pristine condition with a Moth Marketing record cleaning machine. The Moth RCM costs £299, which though it seems a lot, is around half the price of the American built alternatives and is nothing compared to the value of your virtually irreplaceable record collection.



A real Mothful: the RCM.

The Moth RCM is a wet cleaning/vacuum removal device with a powered turntable. You apply fluid with a hand held brush and a vacuum system removes the dirt.

Nintendo becomes major player in CD market

Computer games giant Nintendo has announced plans to enter the CD market. Its first product, the snappily titled *Compact Disc Accessory*, will play both standard audio CDs and computer games, the latter being CD ROM XA versions of its market leading games titles.

Nintendo plans an initial production run of a staggering 300,000 units a month, with the player being introduced into Japan, the USA and Canada in January 1993.

Announcing the new player, Minoru Arakawa, president of Nintendo of America Inc, commented: 'At a suggested retail price of \$200, Nintendo's new *Compact Disc Accessory* will launch the next generation of video games. Together with our



If Mario is so super why has he only got three fingers?

worldwide network of Super NES game developers and third party licensees, Nintendo will introduce a full range of outstanding and unique Compact Disc software.'

The player will use the CD ROM XA format, licensed from Philips, and at the time of launch Super NES CDs will only play on the Super Nintendo Entertainment System (Super NES). However Nintendo is also working with Philips to develop the CD-ROM XA 'bridge format' which will allow Super NES games to play on both the Super NES and Philips' new Compact Disc Interactive (CD-I) hardware. Nintendo is also having discussions with Sony regarding the compatibility of Sony's Play Station CD-ROM system.

American bitstream

MPI, distributor of the McIntosh and Counterpoint brands amongst others, has a new relatively affordable American DAC. Designed and built by Digital System/Design the £595 *Decode 1* is essentially a 1-bit 192 times oversampling device but it uses a 20-bit 18 times oversampling digital filter before the DAC. It has three electrical inputs with BNC sockets and a single optical TosLink input.

The analogue output stage has a gradual slope filter and the level of output can be selected between two and seven volts rms. Attention has also been applied to the power supplies which are said to be 'extremely elaborate', with independent supplies being provided for the analogue and digital halves of the unit. Contact MPI on (061) 777 8522.

Breaking the accessories barrier

Maxell has branched out into the wacky world of accessories. The new range includes audio, video and CD care kits including cleaning systems, demagnetisers and adaptors for playing portable CD players through in-car cassette decks. Prices range from £2.99 to £14.99.

Maxell has also made its first steps into the steamy world of wire with a selection of LC-OFC interconnect and speaker cables, the latter come in 6m lengths and cost £7 or £19 depending on whether you go for standard or premium grade. The interconnects are made up in 1.5m lengths and cost between £17 and £39.

And finally the company has jumped into the personal headphone market with a 'flagship group' of nine models, prices range from £4 to £25 depending on whether you want 'Light-weight', 'Deluxe' or 'Premium digital ready' cans.



Maxell on the rocks with its new range of accessories.

Hi-fi Brinkmanship

Brinkman, a new Welsh company, has introduced its first product, the £395 Endymion ceramic loudspeaker. Ceramic was chosen for its high rigidity at audio frequencies and its inert nature. The classical design was chosen to make the speaker domestically acceptable.

The Endymion (the name comes from a poem by Keats) utilises drivers mounted above and below a conical reflector to create an omnidirectional sound source. The lower mid/bass driver is a 165mm polypropylene unit and the tweeter is a 25mm dome device. It is a fairly small infinite baffle design measuring 550mm high and 290mm in diameter which offers the amplifier a below average sensitivity of 86dB.



Brinkman's nice little urner.

Further inquiries should be directed to Brinkman Ltd on (0443) 841 708.

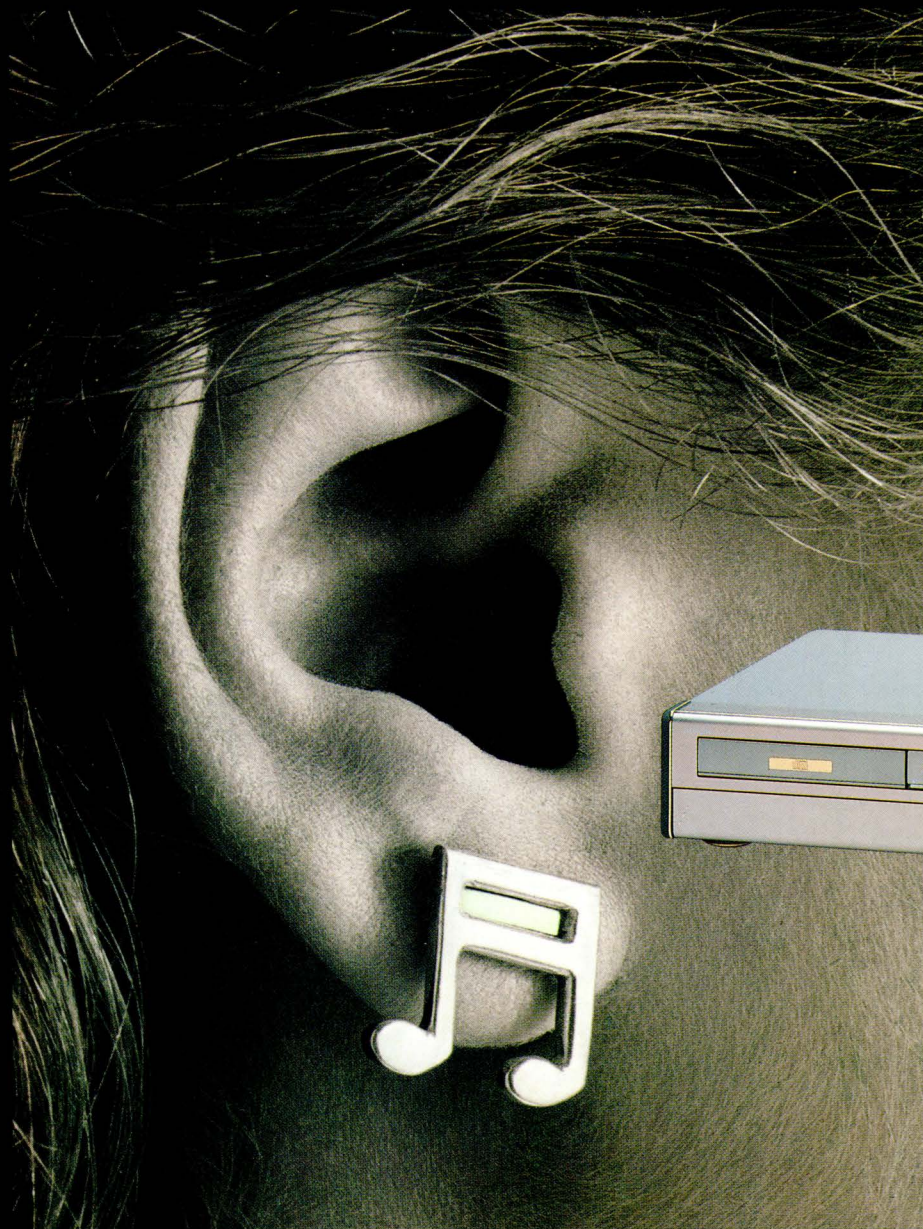
There's only one T in Typhoon

Musical Fidelity has brought down the entry level price for its pre/power amplifier combos with the introduction of *The Preamp* (£199) and *Typhoon* power amp (£299). *The Preamp*, which comes in B1 style casework, is a line only device with six inputs and tape out alongside the XLR main outputs. It comes complete

with two metres of balanced interconnect, terminated as you would expect, with XLR plugs.

The Typhoon is a 45watt stereo power amp that can be bridged and used as a monoblok to deliver 150 watts. It is said to 'deliver colossal peak current and will drive any speaker', Musical Fidelity isn't renowned for its modesty!

THE D-70 HI-FI WITH A NOTABLE DIFFERENCE



Everyone's different. It would take a thousand words to describe your lifestyle. Yet only one sound to capture it. The sound of quality, embodied in the new range of lifestyle, mini-sized hi-fi from Denon.

Take note of our D-70 mini system. Not for us the boring plastic of ordinary mini hi-fi systems. Instead, Denon reflects your taste for the extraordinary in the beauty, strength and quality of aluminium.

Three integrated components that stack up to your highest expectations of quality and which can be operated by remote control.

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Experience the sounds of the Denon Lifestyle range of hi-fi at branches of House of Fraser and John Lewis or one of the many independent hi-fi specialists around the country who stock Denon. Lifestyle system prices start from as low as £479.99.

DENON

Presence Audio has introduced a mail order service for its accessories, these include the ZYP CD enhancer, CD Interface mats and Decca London tonearms. Most items are available on a seven day money back guarantee basis. For a full catalogue telephone (044) 485611.

Alphason has produced a variation on its equipment racks specifically designed for audio/visual systems. The TV45 (£110) and TV45S (£140) are suitable for supporting up to 28inch TVs and have two sub shelves for VCRs, surround sound decoders etc. The S in TV45S stands for swivel as that model has been designed with a rotating top for extra flexibility.

Goldring has added two open frame speaker stands to its established Black Satin range. The MBS180, 460mm high (£48) and MBS240, 610mm high (£50) are three leg designs with the option of spikes at both ends.

This year's ever unpredictable Hi-Fi 92 show, previously scheduled for Bristol in late March, will now in fact be held in Cardiff, at the Holiday Inn, over the Easter weekend. Renovations at the original Bristol venue are cited as the reason for the change.

The Recommended Teac D500 D to A convertor has been reduced in price from £399 to £329.

Goodmans has introduced a new active speaker aimed at users of its CD personal range. The Active 60s have a total output of 25watts and retail for around £30.

Remaining stocks of Radford speakers (the T90, S90 and M90) and all spare parts are now available from Keysound of Bristol. Ring (0272) 733 154 for details.

Akai shuffles the stack with a DAC

Akai has taken a rather unusual step with its latest midi systems by removing the DACs from the CD players and building them into the amplifiers instead.

Three systems are available, starting at £450 for the FX-430CD, as with the other systems in the range connection to the CD player, which is effectively a CD transport, is by means of an optical input provided on the back panel of the amp. Other interesting features include the provision

of Goodmans speakers with the units and an option to upgrade the CD player to a seven disc multi-play unit for an extra £50. Talking of upgrades, an extra £50 provides a pair of rear channel effect speakers to enable you surround sound fans to get the best from your system.

Further up the range are the FX630CD and the FX830CD which introduce a choice of sampling rates in the DAC section (to connect DAT for example). Upgrades available

for the more expensive systems include the same multi-play CD option and a device known as the EA M830 digital sound processor which, for an extra £150, will let you recreate various acoustic environments in your own front room.

A refreshing feature of these ever so digital systems is the inclusion of turntables as one of the available components alongside the more standard double cassette deck and three band tuner.

CD heading up the Creek

Creek Audio Systems, perhaps best known for its amplifiers (such as the CAS4040), is now testing the waters with its first CD player. The player is called the CD60 and is a multibit design based around the tried and tested

Philips TDA 1541 16-bit DAC. Selected, or 'Crown' versions of this DAC are employed along with four times oversampling and a third order GIC filter.

Other features include an electrical output relay, custom

built circuit boards and a display panel which can be switched off to reduce RF emissions. Absolute phase switching, a switchable digital output and the inescapable remote control complete the £500 package.



Creek Audio is hoping to make a splash with the CD60 — the company's first ever CD player.

HK joins the carousel

Harman Kardon has joined the multi-play CD market with the introduction of two top loading carousel machines.

Both the TL8500 and the TL8600 are based around a five disc mechanism and use PWM digital to analogue converters.

Priced at £450 the TL8500 comes complete with a 35 key remote control unit and all the usual facilities while for an extra £100 the unit's big brother also offers motorised output level control.



Aiwa breaks the budget audiophile

Aiwa has produced a 'budget audiophile' amplifier called the XA-003. It retails for £120 and incorporates such 'phile features as single point earthing and source direct switching. However, as the latter indicates, it does have such mass market incentives as tone controls and two pairs of speaker outputs.

But you never know, the XA-003 with its 40W output, five line inputs (no phono stage) and short circuit paths could be a killer with a cause. Watch out for a review in the August issue.

A new multi-player from HK.



The Pioneer A400 amplifier.

As recommended
by these
speakers.

WHAT HI-FI?
MAGAZINE AWARDS 1990

Best Amplifier.

Best Buy Overall.

HI-FI CHOICE MAGAZINE

Best Buy Amplifier.



 **PIONEER**
The Art of Entertainment

WHAT HI-FI? OCT 1990. "THERE IS SOMETHING INEFFABLY RIGHT ABOUT THE A400." ALVIN GOLD.

HIGH-FIDELITY. SEPT 1990. "IT LOVES MUSIC, THE A400. IT LOVES IT WITH A VENGEANCE." MARK PAYTON.

AUDIOPHILE. SEPT 1990. "EVEN IF YOUR BUDGET EXTENDS TO £1,000, IT COULD BE EXACTLY WHAT YOU'RE AFTER." JIMMY HUGHES.

Don't miss next
month's issue of

HI-FI CHOICE

Packed with
in-depth reviews!



Cassette Decks on test

We test over 20 of the latest cassette decks and DAT players including models from Aiwa, JVC, Pioneer, Sony and Technics.

Plus . . . Full in-depth reviews on receivers — from Harman Kardon, Kenwood, Marantz, Proton and many more.

AND, OF COURSE . . . News, views, and much, much more!

HI-FI CHOICE

APRIL ISSUE ON SALE
13th MARCH 1992



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issue of

HI-FI CHOICE

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cassette tape!

Attached to the cover of your magazine you should have found a That's RX C90 cassette tape (if it is missing kindly contact your newsagent).

This Type 1 (Ferric) high performance tape is just the latest in a series of excellent gifts brought to you by the makers of the world's number one guide to buying hi-fi.

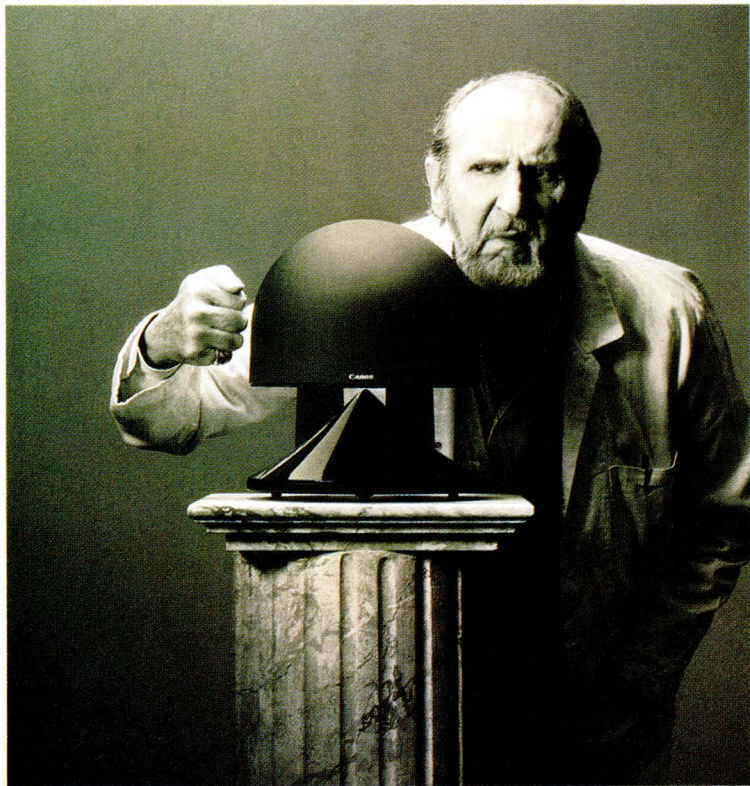


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CAMBRIDGESHIRE		Southampton Hi-Fi Centre, Southampton	0703 228434	Nottingham Hi-Fi Centre, Nottingham	0602766919	YORKSHIRE WEST	
The Hi-Fi Company, Peterborough	0733 341755	HERTFORDSHIRE		Parker High Fidelity, Nottingham	0602476377	Amrik Electronics, Bradford	0274 722530
University Audio, Cambridge	0223354237	Chew & Osborne, Bishop's Stortford	0279656401	Superfi, Nottingham	0602412137	Amrik Electronics, Leeds	0532752285
CHESHIRE		Herts Hi-Fi, Hoddesdon	0992441172	OXFORDSHIRE		Eric Wiley, Castleford	0977 553066
Car & Home Stereo, Macclesfield	0625 32707	Hi-Way Hi-Fi, Hemel Hempstead	0442235755	Sound 'n' Vision, Bicester	0869246491	Superfi, Leeds	0977 556774
Cobalt Hi-Fi Centre, Warrington	092536215	RadioLux, Watford	0923229734	Witney Audio Centre, Witney	0993702414		0532 449075
Hamlets Audio Visual, Cheadle	061-428 5278	HUMBERSIDE		SHROPSHIRE		JERSEY	
Hamlets Audio Visual, Stockport	061-4286367	Superfi, Hull	048224051	Shropshire Hi-Fi, Shrewsbury	0743 232065	Fotosound, St Helier	053459990
Tomorrow Studios, Chester	0244320414	ISLE OF WIGHT		W. Owen, Telford	0743 232317		
CLEVELAND		Russells, Newport	0983523864	SOMERSET		NORTHERN IRELAND	
Gilson Audio, Middlesbrough	0642248793	KENT		Paul Roberts, Taunton	0823270000	CO. DOWN	
CORNWALL		Howes of Southborough,	0892 528682	Telefringe, Frome	037362598	Hi-Fi Experience, Belfast	
ETS Electriccentres, Helston	0326573285	TurnbridgeWells	0892 537288	STAFFORDSHIRE		LRG Sound & Vision, Belfast	
ETS Electriccentres, Penzance	073664274	Kimberley Hi-Fi, Bexleyheath	081-304 3272	Active Audio, Hanley	0782214994	CO. ANTRIM	
H.B.H. Woolacotts, Bude	0288352269	Panatec Sound & Vision, Gillingham	0634 573141	Active Audio, Tamworth	082753355	LRG Sound & Vision, Larne	
Truro Hi-Fi, Truro	087279809	Panatec Sound & Vision, Maidstone	0622661488	Purkiss Hi-Fi, Hanley	0782265010	Nicholl Bros, Ballymena	
CUMBRIA		V J Hi-Fi, Folkestone	0303568660	SUFFOLK		SCOTLAND	
Kenneth Gardner, Barrow-in-Furness	0229820308	V J Hi-Fi, Margate	0843226977	Avalon Audio Vision, Ipswich	0473281922	GRAMPIAN	
Peter Tyson, Carlisle	022846755	Whistable Tele-Radio, Whitstable	0227272028	Peter Watts, Bury St Edmunds	0284 703045	Autosonic, Aberdeen	
	022846756	LANCASHIRE		System Sound, Sudbury	078772348	Holburn Hi-Fi, Aberdeen	
DERBYSHIRE		Clearstone Hi-Fi, Bolton	020431423	SURREY		MID LOTHIAN	
Active Audio, Derby	0332380385	Kenneth Gardner, Lancaster	052464328	Audiolite, Thornton Heath	081-653 3657	Bill Hutchinson, Edinburgh	
	0332385185	Norman Audio, Blackpool	0253 295661	Cosmic, Addlestone	0932854522	STRATHCLYDE	
Parker High Fidelity, Derby	0332367546	Norman Audio, Preston	0772553057	Tru-Fi, Leatherhead	0932851753	Bill Hutchinson, Glasgow	
Roy Smith Electrical, Chesterfield	0246234953	Romers Hi-Fi, Blackburn	0254 887799	Tru-Fi, Redhill	0372378780	TAYSIDE	
DEVON		Wigan Hi-Fi Centre, Wigan	094237977	SUSSEX EAST		Robert Ritchie, Montrose	
Bernard Smith, Barnstaple	027143503	LEICESTERSHIRE		Smythe & Barrie, Eastbourne	0332329192	WALES	
Radford Hi-Fi, Exeter	0392218895	Mays Hi-Fi, Leicester	0533 625625	Sunderland Electronics, Brighton	0273774113	CLWYD	
Radford Hi-Fi, Plymouth	0752226011	Parker High Fidelity, Loughborough	0509269888	SUSSEX WEST		Lloyds TV, Video & Hi-Fi, Wrexham	
Upton Electronics, Paignton	0803551329	Stuart Westmoreland, Melton Mowbray	0664411511	Cristavision, Chichester	0243 775444	Owens, Colwyn Bay	
DORSET		LINCOLNSHIRE		Sunderland Electronics, Worthing	0903201187	GLAMORGAN	
Movement Audio, Bournemouth	0202529988	Superfi, Lincoln	0522520265	Sussex Audio, Burgess Hill	0444242336	Tele Electrical Services, Bridgend	
Movement Audio, Poole	0202 730865	LONDON		TYNE AND WEAR		GWENT	
	0202 721983	Babber Electronics, W13	081-5796315	Bill Hutchinson, Newcastle-upon-Tyne	091-230 3600	Hi-Fi Western, Newport	
ESSEX		Brians Hi-Fi, W1	071-6311109	WARWICKSHIRE		GWYNEDD	
A C L Radio Services, Grays	0375374666	Covent Garden Records, WC2	071-3797427	Carvels of Rugby, Rugby	0788541341	Owens, Bangor	
A V Tech, Ilford	081-5146688	Hi Spek Electronics, N3	081-3491166	The Hi-Fi Company, Leamington Spa	0926888644		
Chew & Osborne, Epping	037874242	Kamla Electronics, W1	081-3232747	WEST MIDLANDS			
Chew & Osborne, Saffron Walden	0799 23728	Light & Sound, E6	081-4721373	Bridge Hi-Fi, Walsall	0922640456		
Peter Foulkes, Chelmsford	0245491479	Myers Audio, E17	081-5207277	Coventry Hi-Fi, Coventry	0203440529		
Peter Foulkes, Colchester	0206767428	Spatial Audio, W1	071-6378702	Naam Hi-Fi Vision, Birmingham	021-6334944		
Peter Foulkes, Maldon	0621853148	Stereo Regent Street, W1	071-2872458	Naam Hi-Fi Vision, Coventry	0203632086		
	0702206835	Superfi, NW1	071-3881400	Superfi, Birmingham	021-6312675		
Waters & Stanton, Hockley	0702204965	MERSEYSIDE		Universal Electronics, Wolverhampton	090223741		
Waters & Stanton, Hornchurch	0402444765	Beaver Hi-Fi, Liverpool	051-709 9898				
Woolfmans, Basildon	0268285922	Tisdalls, Southport	0704531500				

Who knows th black magic do



Never mind the mysteries of Stonehenge. Forget the riddle of the Wiltshire corn circles.

Here's a phenomenon that's got Britain's boffins well and truly baffled.

Exactly how have Canon

as you move closer towards it?

More to the point, *why?*

Well, allow us to remind you of one of the basic problems that has plagued stereo reproduction ever since it was invented nearly half a century ago.

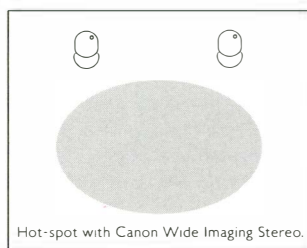
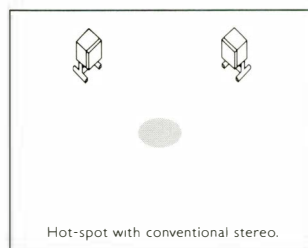
Er, no

The trouble is, the hot spot usually has space for only one listener inside it.

Everyone else has to make do with a rather lop-sided, unfocused version of the stereo sound.

This state of affairs struck the research team at Canon Audio as a little unfair.

How, they wondered, do we create a much bigger hot spot?



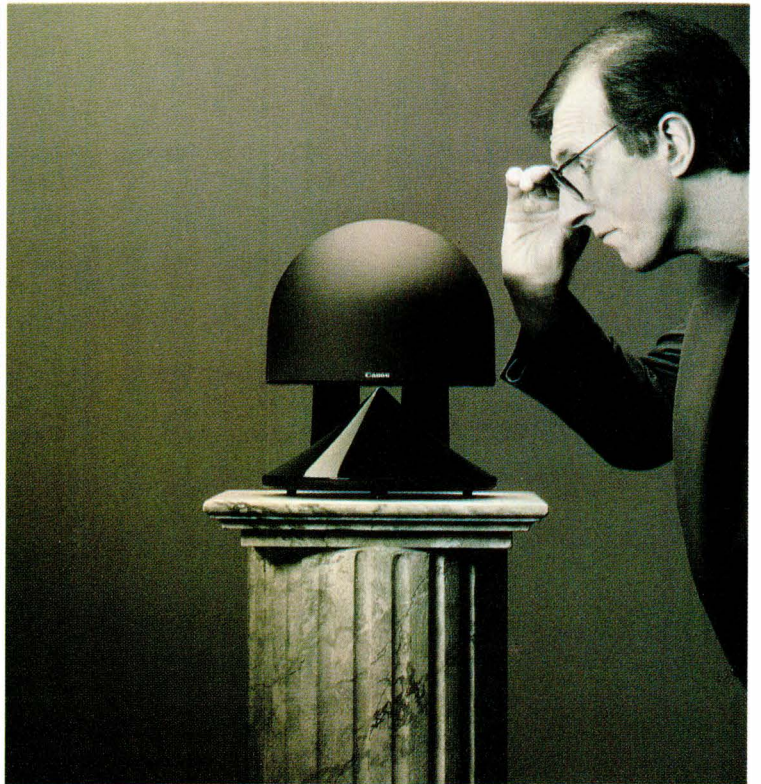
made a speaker that appears to sound louder as you move away from it? And sound less loud

be exactly midway between them.

This position is known by hi-fi buffs as the 'hot spot.'

In order to hear correctly balanced stereo sound from a pair of ordinary speakers, you have to

the secret of the dome-type things?



body.

One that can accommodate an entire sofa and a couple of armchairs, say?

Clearly what was needed was a radical new speaker design.

And as the appearance of the Canon S-50 suggests, that's exactly what they came up with.

For a start, the speaker cone faces not outwards, but is aimed downwards onto a precisely

positioned 'acoustic mirror'

The sound is then reflected out into the room, producing what is called an 'amplitude compensating dispersion pattern.'

This results in something no professor in the country can fully explain.

A psychoacoustic effect that 'fools' the ear into thinking that the speaker furthest away sounds louder, just as the speaker nearest sounds softer.

Inexplicable or not, the S-50 can produce a stereo hot spot

six times the size achieved by any ordinary speaker.

Canon have called this remarkable breakthrough 'Wide Imaging Stereo'. If you'd like to hear it in person, call in at your local Canon Audio outlet and ask for a demonstration.

Oh, and if anyone does discover the secret of the black magic dome-type things, we'd be awfully grateful if they'd let us know.

Canon
WIDE
IMAGING
STEREO.
LOUDSPEAKERS

Choice Sessions

There is now an abundance of tweaks that you can apply to your CDs, but do they work? Andrew Cartmel has been investigating.

What can you do with a Compact Disc? On the surface this would appear to be a fairly straightforward question. You can play it on your CD player, store it in its 'jewel case' or, if you're an old school audiophile, you can use it for skeet shooting. And that, surely, is that?

Nope.

A small industry has grown up around the silvery discs, offering weird and wonderful accessories designed to improve the sound of your CD collection and/or protect it from the ravages of time. Hi-fi tweaks have always been fairly bizarre things, perhaps revealing as much about the psychology of the practitioners as about the fine tuning of their systems. In tweak land you can put crocodile clips on the water pipes or cream on your light bulbs and still stay out of the laughing academy providing it's in pursuit of the perfect sound.

In some ways CDs lend themselves to tweaking more naturally than vinyl because of the variation in sound quality from disc to disc. In the course of assembling your CD collection you may have discovered that despite the 'perfect sound forever' malarkey some CDs simply sound better than others. Old favourites (such as Stevie Wonder's *Innervisions*) can sound sour or mysteriously unpleasant in their new digital form.

If you find yourself in this dilemma the vinyl junkies at *Hi-Fi Choice* wouldn't have

much sympathy. "Get a record player mate," I hear them cry. But that isn't really the answer, because other old analogue favourites have an outstanding sound on CD (check out *Aqualung* by Jethro Tull).

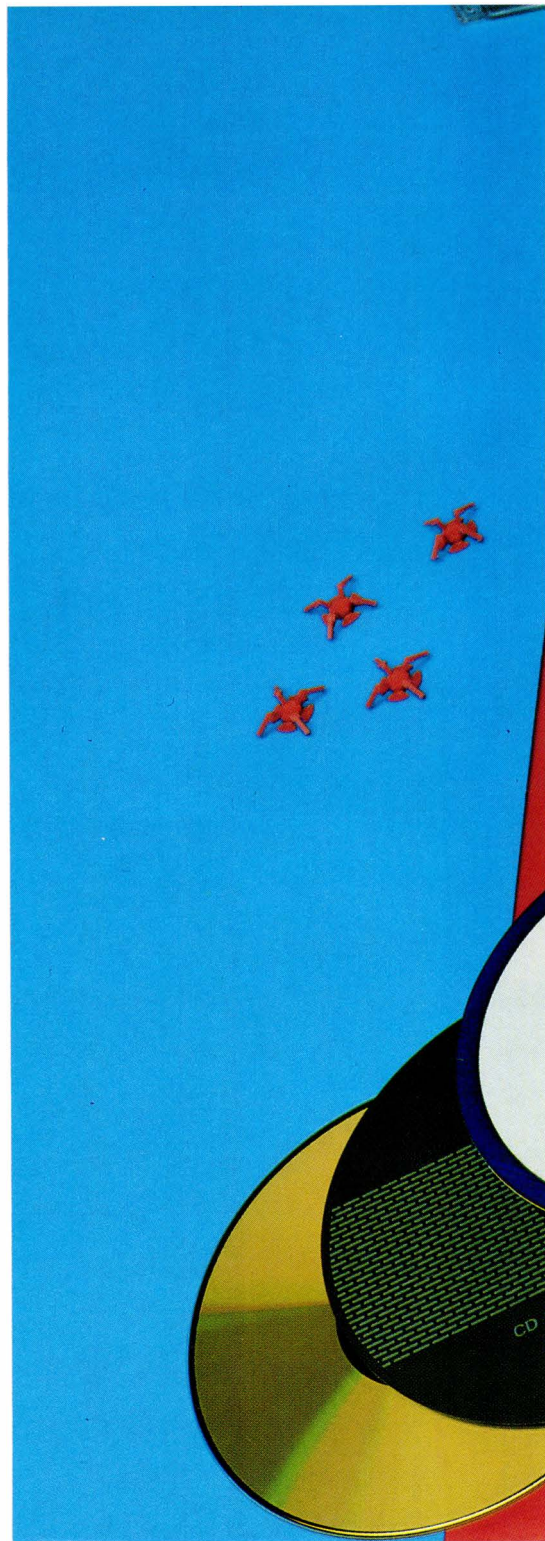
This is where CD tweaks really come into their own; they can be effectively applied to those discs which you know should sound great but don't. And you can tell the vinyl junkies that there's a lot more chance of improving the sound of a rogue CD than there is of sorting out a lousy pressing on vinyl.

Duelling mouth organs

The first of the digital repair kits I tried was the Hunt EDA stabiliser. These are circular pieces of green plastic film designed to fit over the label side of the CD. These are the first samples of a product which Keith Hunt plans to have on sale soon, the price looking to be in the region of £1.40, for which you get a small play side mask and an anti scratch liner for the jewel case as well as the damper reviewed here.

So let's peel one off its backing paper, stick it on the dread Stevie Wonder CD and see what it can do.

An old favourite on vinyl, the digital version of this album has a smeared graininess throughout, with instruments sounding forced and laboured. Certainly, the music is complex and varied, but it might as well be a complex and varied experi-



ment in vivisection on small furry animals for all the pleasure it was offering.

On application of the Hunt green film the disc revealed more fine detail with better shape and echo to the voice. The double harmonica solo, which had previously been a sour howl of mouth organs doing combat now possessed a funky, celebratory quality. The sound overall was more spacious and expressive with far better definition.

Although this tweak consistently produced some of the best results in the test, it did have a couple of drawbacks. If I left a tweaked CD undisturbed for a few hours in the player and then tried to remove it, I found the drawer mysteriously empty. Putting the drawer back into the machine



and then out again caused the CD to reappear, safe and sound. The green film seemed to have caused the disc to stick in the machine somehow. Also, when the films are left on the CDs for prolonged periods they became difficult to remove, in a few cases peeling some of the paint off the label side of the disc. On the whole though I was very impressed with the sound offered by these green things and I began to find them quite addictive, like salted snacks; I always had to try them on just one more disc.

What next? Another green tweak: the Audio-Technica green CD ring stabiliser AT6079 (£5.95 for five). These are thin plastic tyres that fit around the perimeter of the disc. Putting them on is rather a

fiddly process, ironically reminiscent of fitting a belt on my old turntable.

Sound quality considerations aside, the rings also give the CDs some degree of protection and enable you to place them on any convenient surface without contaminating the playing area.

Back to the Stevie Wonder CD for comparison. After repeated listenings to the untweaked version, the harsh and shouty sound of this album was becoming progressively more irritating. After application of the Audio-Technica ring I again found matters improved. The sound of the cymbals was now delicate and actually musical. Jagged edges elsewhere were suddenly smooth, with the singer's voice now well shaped with a suggestion of

natural echo. Synth chords were fatter and snappier and irritants were generally dispelled; it was like removing a stone from your shoe.

On other CDs these green rings consistently provided more air and space and improved timing, making the music decidedly more danceable.

The matt black beast

Just for variety's sake, the next tweak to be tested was black instead of green, the Audio-Technica AT674 (£20) stabilising disc. Like a wafer thin CD this is an 'alumite treated' aluminium disc with a matt black finish. It's refreshingly easy to use after wrestling with the green rings and films. You just set it on top of the CD

Music Link 

See your nearest Music Link dealer for a demonstration.

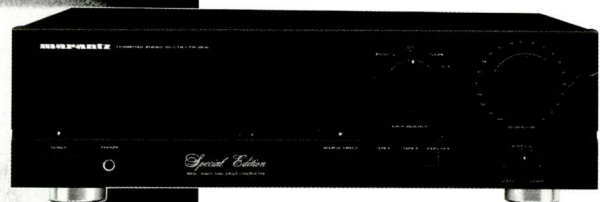
ABERDEEN	
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ZEUS AUDIO	0232 332522
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BRENTWOOD MUSIC	0277 221210
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PETERS HI FI	0244 319392
CHRISTCHURCH	
H.A.T.V.	0202 473901
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CRANLEIGH	
SOUNDS EXCLUSIVE	0483 268185
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V. J. HI FI	0303 56860
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LINTONE AUDIO	091 477 4167
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MUSIC ROOM	041 832 5012
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SURREY HI FI	0883 744755
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TELESKILL	0481 22323
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HUDDERSFIELD HI FI	0484 544668
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LEICESTER HI FI	0533 539753
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GALAXY	071 637 2624
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Hi-Fi Choice, March 1991.



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when you insert it in the player. Using the AT674 I found that the music had far greater definition, producing an intricate shimmer of background strings which just hadn't been there before. The matt black beast was sorting out the tangled strands of fine detail, putting a cleaner acoustic around the strings and more air around the voice. On drums and bass, though, there seemed to be rather less improvement.

Just for the heck of it I also tested a John Hiatt CD which already has a black painted Demon Records label (and a good sound). Again there was a noticeable difference when using the A-T disc. The acoustic had acquired a delicate echo and the timing was much smoother, more relaxed and measured. Possibly these improvements were achieved because the black disc is covering the transparent band around the hole in the CD. Or possibly it lends credence to AT's claims that it's the weight as well as the colour of the disc which effects sound quality.

Stuck inside of Euclid with the digital blues again

Out of the black and into the blue. *CD Upgrade* consists of blue rings printed on transparent adhesive films and features those rather chilling words 'permanent improvement'.

The price depends on how many you want; singly they cost £2, but in boxes of 100 this comes down to 90p each. This product hails from Euclid, Ohio and is being marketed here by Audiofreaks. The adhesive films come complete with lavishly intricate instructions which would suffice for assembling your own tactical battlefield nuclear weapon.

Let's get serious guys; *CD Upgrade* consists of two stickers, one large, one small. The large one goes on the label side of the CD and the small one around the hole on the playing side. You peel off the backing paper and stick them on. This may require six pages of instructions back in Euclid but not here in Rathbone Place.

In action *CD Upgrade* offered a considerably improved focus, smoothing the corners of the sound and cleaning up some background harshness. A Nina Simone piano solo which had previously been a muffled ringing slur now actually sounded like individual notes. Simone's voice was more authentic and engaging and the individual character of the instruments were better spaced in the mix.

Back into the green again. 'It's here!' shouts the packaging for the Lasaway

green pen (£10) which you apply to the outer and inner edges of the CD. I was initially apprehensive about putting paint anywhere near my precious CDs but the pen proved so easy to use that it would take a particularly bungling klutz to get the paint on the wrong part of the disc.

A green tinted version of Ry Cooder's *Crossroads* provided firmer vocals with better resolution and heightened definition elsewhere. The drums were punchier, with a real snap to the percussion and the electric guitar had a steely shimmering precision. A general sense of raggedness and tremor had been removed from the music.

As much as I hate to admit it, all these tweaks worked. The specific effects varied but they all increased the precision and stability of CD sound. The music also often sounded smoother and more deliberate. The green theory is still a fertile area



Painting a CD with the Lasaway pen in a bid to improve sound.

for feuds (see *Readers Write*, page 37) but the most notable improvements in sound did seem to be achieved with the green accessories (Lasaway, Hunt, the A-T rings).

A wafer thin mint, sir?

So, which torture implement to use?

If you're as lazy as I am, and as paranoid about making any permanent change to your CDs, the AT674 black disc is the winner in this test. You keep it in a jewel case among your CDs, pop it on a disc whenever you play one, and lo and behold, the sound is better.

But it has to be said that at £20 this isn't the cheapest of accessories and you do need to be careful when taking it out of its jewel case, or you might discover that this wafer thin mint has a short shelf life.

The blue-ringed *CD Upgrade* films cer-

tainly worked, but had the potential drawback of being permanent. Once you've applied the stickers to your CD it would appear that they are there to stay. They also involve a fair amount of effort to apply, and it would require a lot of them to tweak a reasonable CD collection, though the unit price does drop if you buy in quantity (from £9.95 for five units to £89.95 for 100). Mail order direct from Audiofreaks on (081) 948 4153.

To my ears, the most dramatic improvement in sound quality was achieved with the Hunt green films. Unlike the *CD Upgrades* these films aren't adhesive in the conventional sense. They cling to the disc through the natural tension in the film, so they don't represent a permanent change to your discs.

But you do have to remember to remove them from the discs between playings if you don't want to run the risk of peeling off the painted CD label, and this repeated application and removal may eventually kill their ability to cling. The price is okay (about £1.40 for a single film plus other accessories), so let's hope they are in the shops soon.

If you're somewhat more meticulous and fanatical then try the AT6079 green rings. These had a rather more pronounced effect than the black disc, subtler than the Hunt films but still very effective. And these rings score not only on sound quality but also on providing an insulating edge which can be safely touched and which protects the disc when your little brother leaves it lying around outside the jewel case, playing side down.

None of the CD tweaks are especially cheap, so the price of the AT6079 is competitive at £5.95 for five. If you want the best balance of sound improvement and safely reversible tweakery, then go for these. But be advised that they can be awkward to fit and if you chew your fingernails you'll need a loved one to put the damned things on for you.

The Lasaway pen was effective at improving the sound, having an effect that was close to that of the Audio-Technica rings. But bear in mind the potential drawback that this approach is permanent. On the other hand, one of these applicators goes a long way; even at £10 for a pen it's one of the more economical tweaks for the audiophile on a budget. If you don't mind making permanent changes, have a large CD collection and limited money (probably as a result of obtaining that large CD collection) this is probably the most sensible tweak in the test.



Brideshead rewired

A music-loving property developer decided one of Angus Gibson's systems was the ideal way to pipe sound around his 'new' 17th century rectory. Words by Dan Houston, pictures by Chris Richardson.

"We've only just moved in, the drawing room's full of stuff - you can't photograph in there." The *Aspirations* team was not put off, we had the scent of one of Angus Gibson's through-the-home systems, which is something we haven't covered before, and the opportunity to photograph it in the setting of a 17th Century former rectory.

Gibson's hi-fi systems are more often than not found in settings like this, and he has acquired a reputation among a well-heeled, and even blue blooded clientele.

This rectory is in Oxfordshire and is the new home of property developer James Chilton and his wife, who had moved in just three weeks before our visit. The wooden panelled hallway was decorated with the festive reds and greens of Christmas and even though much of the panelling is new, the place has the timeless charm of the Queen Anne period. The house was built in pale sandstone and the sight of a labrador on the gravel drive gave it a kind of Brideshead feel — nostalgically English.

Aside from the redecorating and repanelling the Chiltons have substantially changed some of the living rooms, moving a wall in the morning room to give it, and the adjacent drawing room, better proportions, and building a new chimney breast. "We didn't use an interior designer to make the changes, my wife is the colour side and I am the architectural side of the team. I really enjoyed drawing up the plans for the hallway," James Chilton told me.

The house originally belonged to the church and reflects the importance and power of religion in 1690s Britain. James Chilton explained that it was bought by one of the resident rectors and then belonged to a Frenchman who built a small Catholic chapel here in the 1920s. "That was being used as a billiard room when we came here but we have since reverted to using it as a chapel," he said. "It strikes



One of Angus Gibson's bijou source select and volume control panels.

me as a good place for weddings, especially since I have three daughters — though there is probably only room for about six guests!"

There'd be no need for an organist though — the wedding march could be relayed around the house from the hi-fi in the morning room just down the corridor. Around the house here also includes the drawing room, kitchen, bathroom, sitting room and James Chilton's study.

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But only in the drawing room and the morning room is there any evidence of hi-fi equipment. Signals travel through cables buried in the wall and are locally amplified to speakers mounted in the ceiling. Chilton remarked that he was surprised by the capability of the KEF ceiling speakers, but the best sound quality is available in the drawing room where a pair of Tannoy DC2000s are installed—or in the morning room where a pair of bookshelf speakers, namely KEF 101/IIs are almost hidden between the tomes. This is where our hosts spend most of their evenings—listening to a collection of ‘mostly classical’ music.

It's hung with paintings and has its share of ducks which the Chiltons collect. “We must have about 400 but most of them are still in packing cases,” James said.

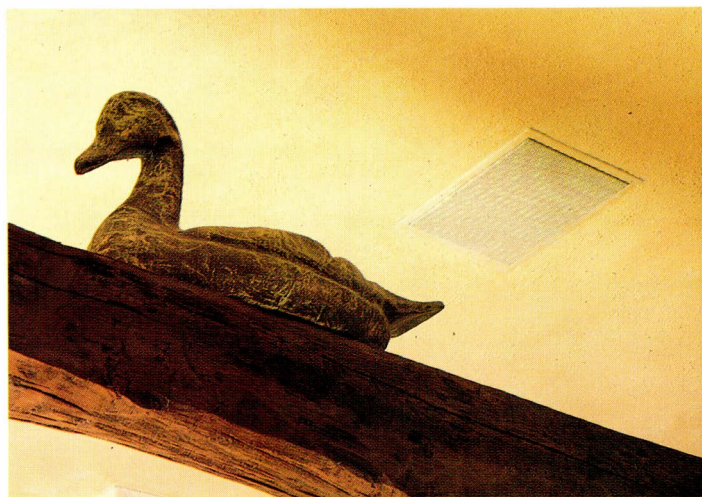
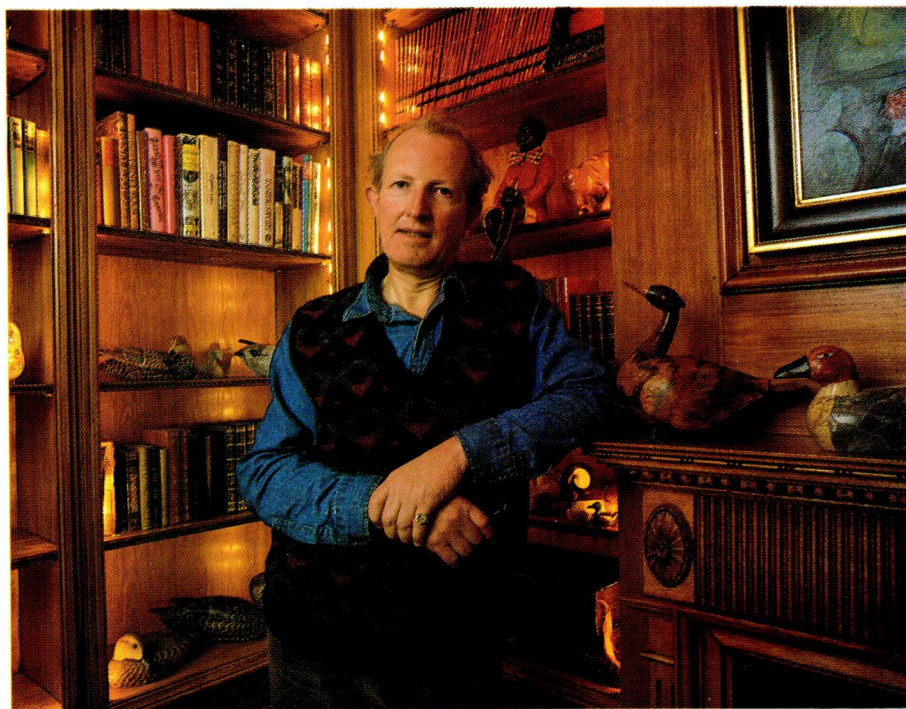
One of the cupboards here opens to reveal the television and video recorder though this isn't wired into the audio system. A Quad amplifier, to power the loudspeakers in the drawing room next door, and the guts of the zoning system are hidden in another. In one corner the stack of source components is the only part of the system obviously on show.

No more rats nests

These are some of the main advantages of through house hi-fi: it allows one system to be used in many rooms, it's discreet, and it's also theoretically cheaper.

Chilton describes himself as a music lover rather than an audiophile and says that the aesthetic aspects of the new system were all important to him (as opposed to his view of specialist hi-fi as tangled wires and unattractively boxed gadgets). But his new system includes some of his previous equipment, namely a Revox B77 reel to reel tape recorder which is famed as an audiophile tool. “I used to have a complete Revox system

More ducks than you can shake a stick at, James Chilton and just a few of his 400 decoys. Below: another distracts from the discreet speaker grille.



and I wanted to keep the reel to reel tape deck because I used to record tapes off air,” James said. The other component carried over from his old system is a Tech-

The equipment

Nakamichi Receiver 2
 Nakamichi Music Bank CD player 3
 Nakamichi Cassette Deck 2
 3 x Denon TU-260L tuners
 Revox B77 reel to reel tape recorder
 Technics turntable
 Quad 405 power amplifier
 AG CS3-12 Zone controller
 Gibson phono preamp
 4 x Gibson A285 power amplifiers
 KEF CR200 ceiling speakers
 KEF CR160 ceiling speakers
 KEF 101/II bookshelf speakers
 Tannoy DC2000 floorstanding loudspeakers

Supplied and installed by

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 Stephendale Rd, London, SW6.
 Tel: (071) 384 2270.

tics turntable. “I doubt whether I shall ever use that again,” James mused affirming conversion to his new Nakamichi Music Bank CD player which holds a total of seven discs, it is loaded on Sunday and plays all week!

Our host met Angus Gibson through a mutual acquaintance and liked the idea of having a ‘system for each room’ without the evidence so to speak.

The Gibson system, like other through housesystems, relayssources such as turntable, cassette deck or CD player to different zones in the house. The clever part is a box of modules known as the CS3-12 rack. This allows customers a choice of 12 sources in any of 18 zones, which should cater for most tastes. The system achieves its flexibility, effectively giving each room its own hi-fi system, through the flush mounted ceiling speakers, and allows the user to control the volume and source material through a simple wall mounted keypad.

One of the most important aspects is the wiring, which ideally should be run at the same time as any redecorating work. “There is an awful lot of wire to go to the various rooms, and if you weren't redecorating anyway then you would have to do so afterwards,” James said. The wire for this system consists of four core control panel cable, interconnects to the amplifiers and then six core loudspeaker cable. It was supplied by Gibson Music, but installed by a local electrician. An extra room, the main bedroom, was wired up so that a pair of speakers and a control panel can easily be added at a future date without having to resort to redecoration.

The system installation and testing was carried out at the time of the move and took three days to complete, most of the time being taken up with the installation, the wires being soldered rather than

THE LISTENER



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Aspirations

crimped together. However, after the first checks a wire had to be re-run when it was found to have been shorted out by a builder's nail!

The new equipment included the Nakamichi cassette deck and *Music Bank* CD player, and three Denon tuners with a Nakamichi receiver which powers the system in the morning room. The KEF ceiling loudspeakers, Quad power amplifier and Gibson Music's own power amplifiers were all installed around the house.

The four tuners are necessary because the system does not allow station presets to be accessed or bands to be scanned. Gibson Music says this is part of the philosophy of flexibility; it allows someone to listen to a different radio station elsewhere in the house.

That applies to other systems like Audio Access but in the latter's case there is also the facility to tune into different stations — from anywhere in the house. For James Chilton the four tuners represent a desire to listen to radio most of the time, and he has them tuned to his favourite stations.

This system is controlled by a keypad on the wall with eight simple buttons and an on/off switch. Sound levels in individual rooms can be altered and sources swapped and the whole system can be operated without needing to go near the hi-fi. Remote control units using cable are available but Chilton opted for pads on all the walls in a bid to banish wiring.

Getting it sussed

Like all similar systems familiarisation takes time and although in essence it's simplicity itself to use, James Chilton said he was still on a steep area of the learning curve.

"It's mostly very straightforward, but I really haven't worked out the various options yet, and the multi-room equipment doesn't allow you to set things like treble and bass levels," James said. "One of the problems with it is that when you go out you may have been using a CD or cassette which has finished and then you have to go around the rooms and work out which was the one you switched the system on from — in order to turn it off. I think on the MkII version there should be an LED to show you which room you turned the system on in."

One way around this is to use the manual override, positioned next to the main system. As it is some aspects are still slightly confusing — the components are all automatically switched on by the

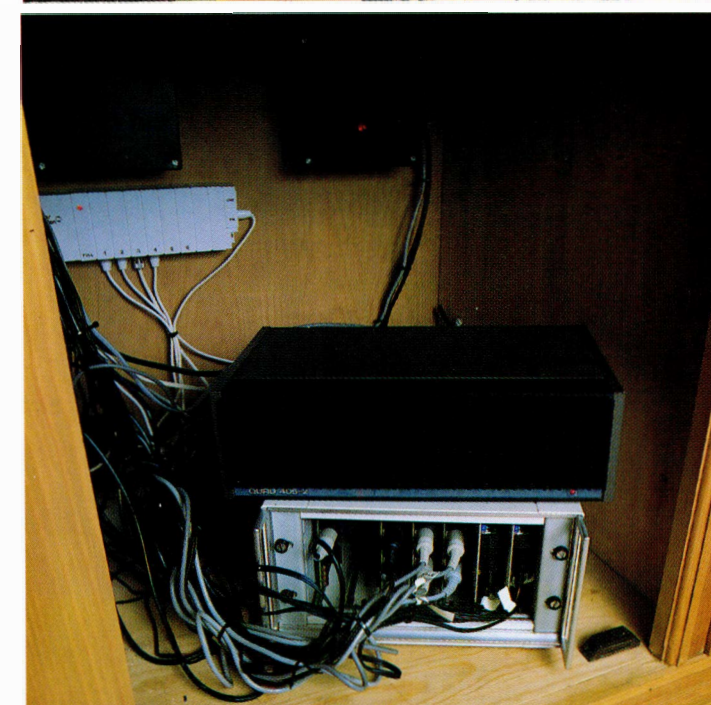
Gibson box, except the Revox which has to be started manually.

As a new user of multi-room I asked James Chilton whether he felt that his system degraded the business of listening to music — pushing it into the background as it were. "In some ways this system is geared to muzak, if you describe Mozart through the house as that. But if you do want to sit down and listen seriously to a piece of music then you can. It's the best of both worlds."

A multi-room system is not for everyone, and purist audiophiles would tell you to spend your money on the best sounding components available. But purist audiophiles seem to prefer not to listen to music in the bath, or while they prepare a meal. It was a shame not to hear the Tannoys here — the drawing room is long with a high ceiling and will undoubtedly prove the best situation when the move is complete and the boxes and packing cases have gone.

Hi-fi like this, which caters for six rooms, costs just over £7,000 including consultancy, labour and all the equipment. And this didn't include the cost of James Chilton's Revox reel to reel tape recorder, or his Tannoy speakers. But if you wanted to put Nakamichi equipment in each room with its own pre and power amplification the bill would be much higher — and you'd have an awful lot of wire to contend with.

Top: a substantial Revox B77 sits comfortably next to a stack of Denon and Nakamichi electronics. Middle: The guts of the machine. Bottom: unobtrusiveness is the key with this system.



Southern Approaches

Back in January Choice visited the home of B&W's chairman Robert Trunz, and we were so impressed with the speakers he was using that we sent Dan Houston to the B&W headquarters to investigate further.

The last time we were in the village of Steyning in West Sussex it was to visit Alistair Robertson-Aikman (see *Choice* May 1991) whose factory produces the world famous SME tonearms. We had blithely driven down the high street thinking it odd that such a quaint village should house a company like SME — a more appropriate setting might be in the industrial heartlands of Birmingham or Sheffield. But Steyning must be on some kind of hi-fi ley line, because down another one of its flinty lanes is the research and development centre for B&W Loudspeakers, a firm which has a reputation with sound buffs around the world.

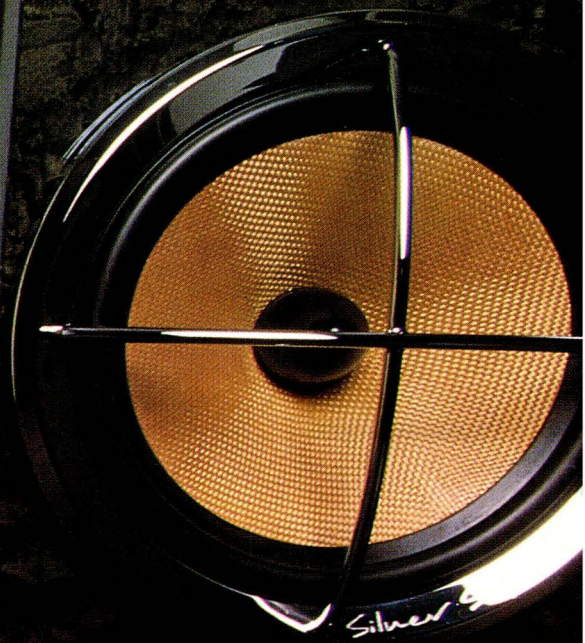
The B&W research centre is several miles from the main factory and offices, which are in Worthing, and the quiet atmosphere is conducive to creative thought. A team of six engineers, including two company directors, carefully develop future and existing product lines from here, aided by a couple of technicians and a tool maker, who turn the ideas into reality.

B&W was founded in 1966 by John Bowers who began his business making loudspeakers from the back of a hi-fi shop

in Worthing: Bowers and Wilkins. Overseas markets were quickly established and the name came to prominence but it wasn't until 1982 that Bowers' long held dream of an R&D facility was established. And it wasn't until much later, only during the last two or three years that its true purpose was realised: as a think tank which would take loudspeaker design into the next century.

Breaking down the barriers

The cover of *Choice's* January 1992 issue showed one of the stunning new products from B&W, the *Emphasis* loudspeaker which uses a quarter wave horn in a design which looks like a saxophone. We also previewed the *Nautilus* loudspeaker, a giant snail-like design which takes engineering back to the basic principles, a no holds barred clean-sheet design. For those who still like speakers in a box there is the *Silver Signature* which with pure silver



Two men and their creations, left: Lawrence Dickie and a prototype Nautilus. Right: John Dobb with his tribute to JB, the Silver Signature.

internal wiring promises sound quality to match its beautiful finish.

Aside from radically differing looks, and a price difference of around £6,000 both *Nautilus* and *Silver Signature* are state of the art loudspeaker systems.

However, the designers of the two systems, Lawrence 'Dic' Dickie and Dr John Dobb, look as different as their creations. And although Dic's *Nautilus* and Dr Dobb's *Silver Signature* are ultimately the product of teamwork, the differing character of the speakers reflects the diverse talents at B&W, where individual engineers are responsible for complete speaker systems. Bowers' replacement as chairman, Robert Trunz, has declared his intent to take the company 'as wide as possible' and it certainly seems that this plan is bearing fruit.

Dr John Dobb is the projects manager

at B&W. "Like most people I got my basic grounding at Wharfedale which was heavily researching the effects of materials in loudspeaker design," he told me. "After three years there I was made redundant and moved to Tannoy where I worked on both the professional side and multiple driver systems like the *Mercury* and *Wildcat*." In spite of being 'virtually his own boss' at Tannoy, Dr Dobb was lured south to the warmer climes of Sussex in 1984.

"I realised that the expanded engineering team here meant the company was engineering rather than sales and marketing led," he explains. "The thing about B&W is that you get to work on a system whereas at Wharfedale I tended to work on a tweeter or just one drive unit. Here

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The Craftsman

an engineer is given a brief and then from the original idea through to the finished product it's his project. For instance I was thrown in at the deep end straight away with the CM1 design. From that came the CM2 which uses the CM1's integral column stand to incorporate rear firing drivers in a three way design."

The listening room — the final frontier

This isn't to say B&W is a mere tweekers' paradise where engineers flaunt their wildest dreams. The firm is a £16M turnover operation, boasting 95 per cent exports and a claim to a third of the entire British loudspeaker industry output.

Some of Dr Dibb's projects at B&W include overseeing the development of the 800 loudspeaker system using the 'Matrix' honeycomb structure designed by Lawrence Dickie. He has also refined the use of the finite element analysis programme which 'virtually takes the guesswork out of loudspeaker design'.

"We are almost at the stage of being able to truly see what happens in a loudspeaker system — on the computer itself," Dr Dibb said. The programme can be applied to all aspects of design; Dr Dibb has used it to refine B&W's aluminium dome tweeter and the use of Kevlar in mid and bass range units. It is now being employed to develop B&W's *Room Adaptive System*.

"I see the problems created by the room itself as the final frontier in loudspeaker design," Dibb said. "Our system will put an impulse through the loudspeakers and measure the distortion in terms of time of that impulse (which takes the effects of the room into account).

"The system effectively measures what a room sounds like. It then plays another impulse (over music) which enables you to remove the effects of room distortion. In other words you put some distortion into the music signal (before the power amp stage) which largely negates the character of the listening environment so that what you hear is the recording situation."

This new black box requires a microphone at the listening position, but the equipment (which shapes sound entirely in the digital domain) will come in one easy to install box. "Of course it allows you to correct your loudspeakers as well," Dibb added, "I can show you graphs where speaker responses can just be flattened out completely." In loudspeaker

terms a flat response is the opposite of what a layman may think; audiophiles love 'flat' speakers.

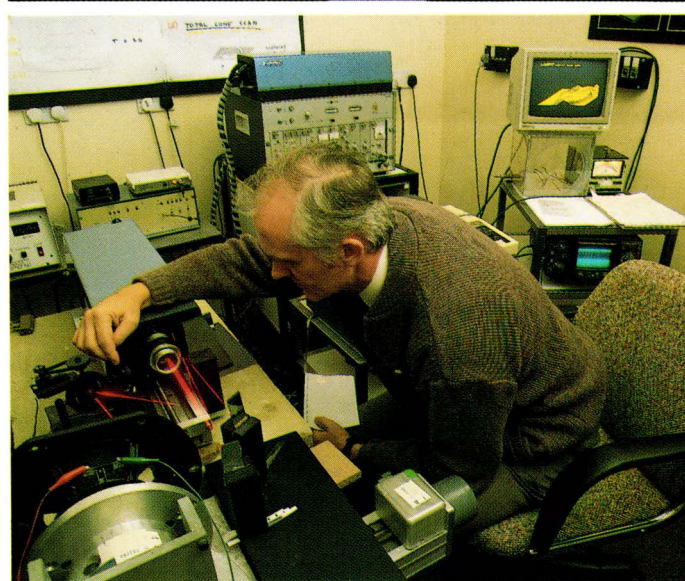
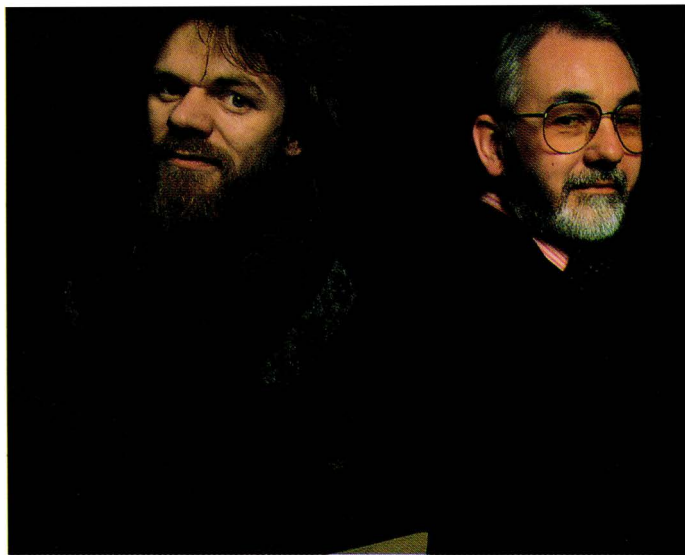
Allowing for the usual provisos, if and when the system works it will radically alter loudspeaker design. "Once we have conquered the room we'll be able to go much further with loudspeaker design," Dr Dibb affirmed, "We're doing things like rolling the bass off artificially to compensate for room resonance at present."

For years audiophiles have tried to do much the same thing themselves; hanging rugs on 'live' walls to acoustically deaden harsh echoes, and placing all manner of objects around the room to absorb the standing waves which are audible to the sensitive. It certainly takes time to get used to the sound of a room, and as Lawrence Dickie mentioned, using hi-fi in a tent would be best!

Dibb's work on the *Silver Signature* loudspeaker started 18 months ago, in preparation for B&W's Silver Jubilee year in 1991. The finished speaker has a tactile quality which breathes class, a quality that is in no small part due to the two finishes it is supplied in, a grey stained bird's eye maple and a warm red bobinga root veneer.

It's a two way system with an outboard crossover using a Kevlar mid/bass unit and an aluminium tweeter. The latter sits atop the cabinet and is built into a solid piece of machined steel, chrome plated to match a Fifties sports car side-light; it's mounted on a shock absorber to decouple it from the cabinet. Kenneth Grange, the industrial designer who has been the visual genius behind the appearance of many of B&W's designs, worked closely with Dr Dibb in the design. According to Dibb the tweeter's egg shape will minimise any diffraction from the surrounding surfaces.

Mounting the tweeter off centre also removes diffraction from the right and left edges of the loudspeaker cabinet; or rather diffraction occurs at frequencies which aren't harmonically related. The



Top: The bearded boys from B&W - Dic, the Doctor and a bit of Matrix. Below: Peter Fryer gets his lasers aligned.

same applies to the cabinet which has side frames in grooved aluminium (anodised in slate effect by SME) to break up diffraction.

Both the drivers are protected by simple cross shaped grilles. In the case of the tweeter it's a compromise between Grange's visual sense and Dr Dibb's purism; the grille before the main drive unit apparently has no effect on sound quality.

Precious metal solutions

The idea of using silver wire internally was incorporated early on and now the entire system, including the external crossover, is wired with the precious metal. Even the dedicated loudspeaker cable which comes with the system is silver.

"In the early development I looked at Kevlar drive units which we refined for the 800 series. We had also upgraded our laser scanning system and now had something much more sensitive which showed us cone behaviour. Kevlar seemed the optimum material but in the product it didn't sound as good as we expected,"

AUDIO NOTE COPPER & SILVER CABLES

It is perhaps on time that I introduce the most important Audio Note product; the Audio Note cables.

Without the Audio Note Silver wires and cables, none of the qualities of the Audio Note products would be possible, the ONGAKU has several kilometers of 99.99% pure silver wire in its output transformers, the Audio Note lollv and loLtd cartridges have a few centimetres of the same wire, and the wire contribute, in both cases to a great deal of the sonic qualities that both these outstanding products possess, the wire is as integral and proprietary a part of each design, just as silver is central to the total Audio Note philosophy.

Audio Note was the first company in the world to realize and demonstrate that the cable materials and their manufacturing processes affect the sound quality of a hifi system. In so doing Audio Note were also the first to see the benefits of pure silver wire (99.99%) and as such are the originators of audio cables as a science.

Audio Note have since then gained a totally unique knowhow in the art and science of making audio cables and wires that perform far above their price range, regardless whether they have silver or copper conductors.

Audio Note Silver Cables

The first Audio Note audio interconnect cable, the AN-V, was designed in 1974, and offered to audiophiles and music lovers in Japan in 1976. It was produced in very small quantity and only in late 1978 did the AN-V reach Europe. In 1985 the AN-V was joined by the AN-S silver cable, which is basically a downscaled AN-V, its production time, and therefore cost, reduced through the use of less critical materials. The original AN-V remained unchanged until mid 1989, when it was replaced by its current version. The AN-V was replaced at the top of the Audio Note cable range in October this year by the AN-Vx reference, which is the culmination of several years study into all aspects of cable design, suffice to say that all who have heard it agree that it has the most amazingly uncluttered sound they have ever heard.

Audio Note introduced a silver speaker cable in 1979, dubbed the AN-SP. It was unavailable for a considerable time during the 1980's and was reintroduced in 1988 following a substantial order from me.

A fully silver wired system has yet to be assembled here in the UK, although that should happen sometime in 1992, but for every part of the system where copper wire or cable is replaced with Audio Note silver cable

or wire the improvement is always immediate, but don't take my word for it, try for yourself, using our no-nonsense 14 day try-before-you-buy offer.

Audio Note silver cables fall in the following price categories,

Interconnects

AN-S	£110.00/m terminated
AN-V	£175.00/m terminated
AN-Vx	£485.00/m terminated

Speaker cables

AN-SP	£110.00/m per channel
AN-SPx	£350.00/m per channel

Termination of speaker cable costs £16.00 per set with either gold 4mm banana plugs or spades.

Using the purest available silver as a conductor, naturally has the same effect on price as it has on sound quality, it is automatically high.

Audio Note Copper Cables

The desire to offer some more affordable cables in the Audio Note range as well as ultimate ones, made Mr. Kondo start an investigation into the use of copper wire in audio cables in 1983.

One problem with copper wire is that when it is produced, it is not normally coated immediately after it is drawn and the wire therefore oxidizes before it is coated. The copper wire therefore develops clusters of copper oxide crystals on its surface, which generate a rectifying effect (this is the reason why so many copper and silver cables sound best in one direction, which is the direction where the rectifying effect is the smallest!). This rectifier effect is present in all copper wires, regardless of whether they are oxygen or hydrogen-free or have single crystal structure or not, unless they have been coated immediately upon leaving the die.

If you try to solder a copper wire where an oxide film has formed, the solder will not stick without flux, the oxide layer also has a hardening effect on the wire itself.

Low level electrical signals are not able to pass easily through the oxide film on the surface of the wire, and this worsens an already existing problem in copper wire. The cohesion between crystals in copper is quite poor, and if you stretch a copper wire it breaks relatively easy, this lack of flexibility is caused by weak crystal boundaries. This weakness in the contact between the crystals creates a fairly high "electrical wall" between crystals, which disables small signal transfer between crystals, as the electrons have difficulty passing the "wall".

This is the reason for the continued attempts by many manufacturers of cables and wire to make copper wire with long crystals.

The emergence of oxygen-free coppers like OFC, OFHC, POCC etc., made it possible to design cables around better quality wires provided the wires were manufactured to the right specification.

As a result the first Audio Note audio cable with copper wire, the AN-C (red), was launched in mid 1985, it shared most construction details with the original AN-V silver cable, as it was a twin coax, with symmetrical conductors, in a heavily damped double jacket.

The copper wire used was an OFHC, 99.99% pure copper, drawn in true Audio Note tradition through a diamond die and coated immediately after the die with six coats of polyurethane, to prevent any oxidation forming on the surface.

After six years the AN-C is still available and was joined by the AN-A, yellow, in 1989, both these cables represent exceptional sonic value at a very modest price.

In 1990 the first Audio Note copper speaker cable, the AN-B, arrived. This speaker cable incorporated a number of new ideas, partly to reduce cost without sacrificing sound quality, but also to incorporate reduced RF interference problems, which is not found in the Audio Note silver speaker cables.

The two main problems in speaker cable are caused by the amount of current passing through the cable, this firstly creates considerable "magnetic distortion" in the wire itself, more so in copper than in silver, regardless of copper type and cable design. "Magnetic distortion" is always accompanied by "wire crying", which is a resonance in the surface molecules, this is caused by a weight change in the molecule itself, as the electrons pass. As copper has higher DC resistance than silver, the electrons affect the molecule mass more, with increased "wire crying" as a result.

Secondly, the low frequency content of the signal always leaves an amount of mechanical energy behind, which "smears" the signal following, mainly concealing the low level content of that signal.

To combat this phenomenon, Mr. Kondo chose to use two thicknesses of wire for the AN-B, with the thinner wires bundled tightly at the center of the cable, surrounded by thicker wire bundles on the outside, all very tightly compounded in a vinyl jacket. This provides an efficient and inexpensive damping system (damping by differential masses), which reduces inter-conductor resonance by more than 80% because the different gauges of wire will damp each other as they have different resonance frequencies.

The vinyl jacket is surrounded by a screen, which allows AN-B to be used in a pseudo-balanced mode to reduce incoming RF interference.

To further allow the use of Audio Note quality speaker cables in lower priced systems the AN-D was introduced only a month ago, being a derivative of the AN-B it shares the simple and effective damping arrangement of this Audio Note cable, as well as most of its qualities.

So today Audio Note offers the following audio cables with copper wire,

Interconnects

AN-A	£25.00/m terminated
AN-C	£49.50/m terminated

Speaker cables

AN-D	£6.99/m per channel
AN-B	£12.50/m per channel

It is strongly recommended to buy the AN-B in terminated sets to achieve the full benefit of the pseudo-balanced configuration. Termination cost per set with high quality gold plated 4mm banana plugs, £16.00.

Apart from their quite superior sound quality, the AUDIO NOTE cables are very flexible, so if you are tired of the "hosepipe" technology most other manufacturers use, you will be relieved to connect up a set of AUDIO NOTE interconnects or speaker cables, they are flexible and will not pull your speakers off their stand or your amplifier or CD player off its shelf!

Furthermore there are copper or silver wires and cables available for rewiring tone-arms, amplifiers, loudspeakers, most speaker coils, inductors, winding transformers etc., for general systems upgrade and improvement. I should say, however, that these are not available under our try-before-you-buy scheme.

If the above has wet your ears "appetite", then perhaps you should use our try-before-you-buy, guaranteed money back scheme, which allows you to try any standard length interconnect or speaker cable for 14 days and if not satisfied return it for a full refund, all it will cost you is the postage one way.

Peter Qvortrup

**Audio Note Co.
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Dibb explained. "We looked at the different aspects but we couldn't understand why we weren't getting the improvements in sound that we knew were possible. Then it dawned on us that the ten metres of copper wire we were still using on the choke could be having an effect. So we replaced the whole lot with silver and the improvements were dramatic. Silver is a better conductor than copper — not much better, but it still made that difference. Sound quality improves as you upgrade using copper wire to oxygen free copper to single crystal copper to silver. It just doesn't have the impurities that copper has. We had hit a brick wall because our drivers were better than the materials we were using with them."

The silver wire is insulated with the best material available. "It's a no compromise product and we wanted PTFE which is the best in terms of insulation and therefore sound quality. But it cost us 50 pence a metre just to have it tape wrapped and then flame bonded; each lead inside the speaker costs us £12."

The extent to which components have been specially sourced for the speakers includes custom made capacitors, specially forged magnets and dedicated slate stands. It was almost disheartening to hear Dr Dibb say that B&W only intends making 500 pairs (at present) but the design will pay off in future projects. He is justifiably pleased with his latest brainchild. He describes it as having textbook characteristics: flat as a ruler from 25Hz to 20KHz and with a sensitivity of 88dB, quite high for an eight ohm system of this volume.

Adventures with the massive mollusc

Walking around the research facility with its two anechoic chambers, sawdusty workshops and test rooms, I came across a variety of giant snail shaped creations. In various sizes, some curvilinear, some curled up box shapes, they are the forerunners of the *Nautilus*, B&W's latest design and brainchild of Lawrence Dickie.

Dic, as he prefers to be known, is a raffish 31 year old electronics engineer who arrived at B&W eight years ago on a brief to help the company design the electronics for an active range of loudspeakers. He designed B&W's power amplifiers, the *MPA1s* and latterly the *M800* stereo power amplifiers. But perhaps he is best known for a simple honeycomb structure

which spawned the famous *Matrix* range of loudspeakers — something he originally designed in his own time "to avoid embarrassing myself". In 1987 he was given an open ended research project to rethink the design of loudspeakers.

Again to coincide with the 25th anniversary, B&W has put his ideas together and production of *Nautili* was due to begin during January this year.

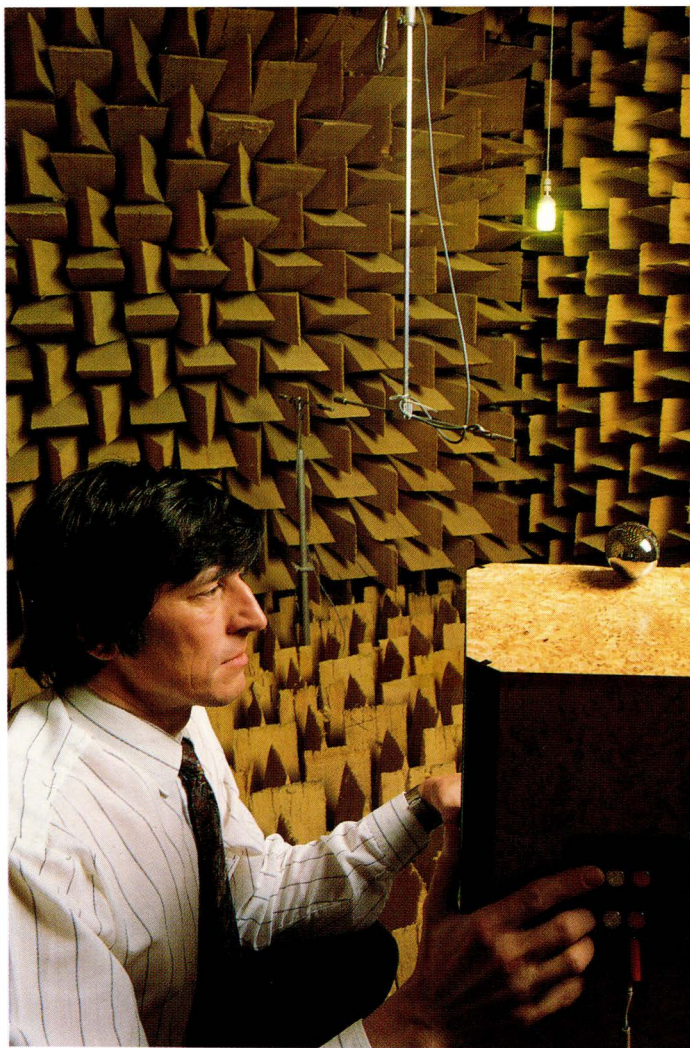
"I started by doing a lot of research into dipole type loudspeakers and also looking at moving coil drivers," Dic explains. "From that I concluded that it wasn't the nature of a dipole so much as the minimal contribution that the cabinet makes (to overall sound).

"Dipoles do have their problems and I went back to looking at monopole design and concentrated on trying to absorb the radiation from the rear of the loudspeaker. I was basically trying to create one sound source. The important thing appeared to be 'lack of cabinet', and so I was using cylindrical shaped cabinets, and found that you can reduce the cabinet contribution as much as with a dipole. The problem then was that the character of the drive unit was left high and dry. So I started to work on drivers."

To cut a long story short, and four years does make for a long story, Dic eventually decided on a true four way active system which has a 25mm aluminium tweeter, and a 50mm high-mid dome driver, both of which were specially developed for the *Nautilus*.

Both use a magnet outside the coil to allow the rear-firing energy to pass unhindered through the back of the driver. Originally, a four driver array employing 50mm domes was to be used, but because of off-axis anomalies a single 100 mm unit was brought in to cater for the frequencies between 200 and 800Hz, replacing the entire array. The *801's* standard 13inch bextrene cone is employed for the deep bass.

In order to create his single source, Dic became a "born again transmission line enthusiast" experimenting with various



B&W is a firm advocate of scientific product assessment, here a Silver Signature is put through its paces.

lossy wave guides to eliminate the rearwards energy created by the drivers. Exponential or tapering horns filled with wool provided the answer. Energy is dissipated behind the mid and HF drivers by channeling it down tapering 'antennae'. The radical shape of the speaker came from simply coiling up the bass unit's three metre horn. Some horns are folded but Dic pointed out that this led to discontinuities in the wave guide.

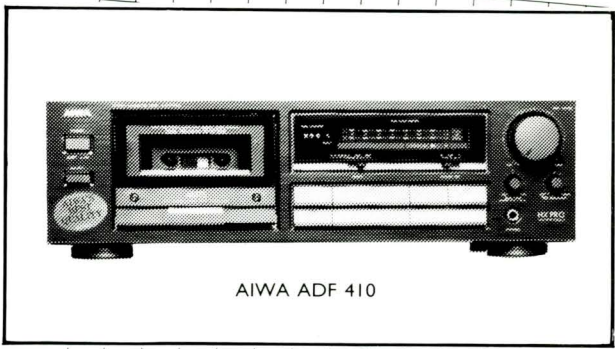
Early models were made of wood but B&W intend to resin cast the cabinets with a high pressure moulding system. "If there were still ammonites in the world we'd probably try to use an old shell," Dic joked.

The shape of the *Nautilus* is described as form following function; no Kenneth Grange touches here, although Dic did draw on the creative help of designer Alison Risby, from Brighton Polytechnic, to finalise its unique appearance.

So how much does it cost? Well Chairman Robert Trunz gives the traditional answer, that if you need to ask then you can't afford it, but the price tag is likely to be in the region of £10,000. The next step for B&W will be using this type of loading in models for the sort of people who do need to ask about price.

music made live... music made live... music made live... music made live... music made live...

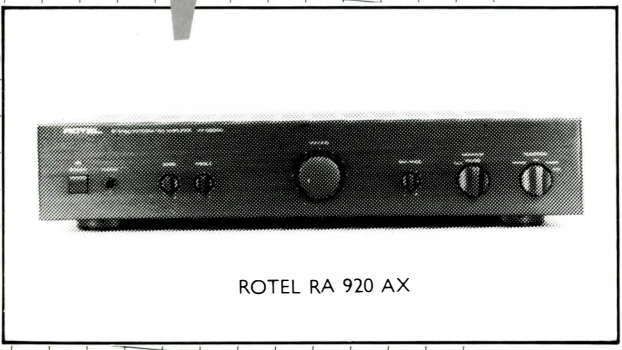
Music



AIWA ADF 410



ARCAM ALPHA 3



ROTEL RA 920 AX

SUGGESTED SYSTEMS

Amps	Speakers						
	Mission 760 Wharfedale Delta 30.2 JPW Sonata Vinyl Finish	Celestion 3 Royd A 7 II Tannoy 603 Wharfedale Diamond 4 JPW Sonata	Mission 761 KEF C 15 Royd Seven JPW Sonata +	Tannoy 605 Celestion 5 B&W DM 600 KEF K 120 Infinity Ref 10 Mission 761ii (Extra £10)	Wharfedale 505.2 Tannoy 607 Mission 762 B&W DM 610 Royd Sapphire Celestion 7	KEFK 140 Cerwin Vega AT 20	Tannoy 609 Rogers LS4A-2 (Extra £30) B&W DM 620 (Extra £50)
Pioneer A300	324.95	336.95	356.95	368.95	404.95	428.95	444.95
Marantz PM30	299.95	316.95	332.95	348.95	380.95	396.95	420.95
Marantz PM30SE	316.95	328.95	348.95	359.95	396.95	412.95	436.95
Marantz PM40	364.95	380.95	396.95	412.95	444.95	460.95	484.95
Marantz PM40SE	388.95	404.95	420.95	436.95	468.95	484.95	508.95
NAD 3020i	316.95	328.95	348.95	359.95	396.95	412.95	436.95
NAD 3225PE	332.95	344.95	364.95	376.95	412.95	428.95	452.95
NAD 3240PE	356.95	368.95	388.95	399.95	436.95	452.95	476.95
Rotel RA920AX	299.95	312.95	332.95	344.95	379.95	396.95	419.95
Rotel RA930AX	324.95	336.95	356.95	368.95	404.95	420.95	444.95
Sony TAF440 E	339.95	352.95	372.95	384.95	419.95	436.95	459.95
Sony TAF 540 E	379.95	392.95	412.95	424.95	459.95	476.95	499.95
Yamaha AX 550	388.95	399.95	419.95	432.95	468.95	484.95	509.95
Pioneer A 400	436.95	454.95	472.95	490.95	526.95	544.95	571.95

IMPROVED TURNTABLES (INC. CARTRIDGE)

Dual CS 430 deduct ... £30.00	Dual CS 505-4 add ... £25.00	NAD 5120 deduct ... £43.00
Revolver Rebel add ... £33.00	Rotel RP 855 add ... £55.00	Systemdek One 900 inc AT110E add ... £65.00
Systemdek IIX/900 + inc Moth Arm + AT110E add ... £155.00		Thorens TD 280 II add ... £45.00

CD INSTEAD OF TURNTABLE FRONT END

Aiwa XC 700 add £35.00	NAD 5425 add £55.00	Sony CDP591 add £20.00
Denon DCD580 add £35.00	NAD 5440 add £155.00	Sony CDP791 add £37.00
Denon DCD660 add £55.00	Philips CD618 add £25.00	Sony CDP991 add £79.00
Denon DCD860 add £115.00	Philips CD624 add £55.00	Sony CDPK1 (Karaoke) add £54.00
Denon DCD960 add £155.00	Philips CD634 add £85.00	Sony CDPX 222 ES add £139.00
Marantz CD42 add £35.00	Philips CD850 II add £250.00	Technics SLPG 200 add £15.00
Marantz CD52 add £55.00	Pioneer PD7700 add £105.00	Yamaha CDX 450E add £29.00
Marantz CD62 add £155.00	Pioneer PD8700 add £155.00	Yamaha CDX 550E add £54.00
Marantz CD72 add £255.00	Rotel RCD955 add £115.00	Yamaha CDX 750E add £97.00
NAD 5420 add £35.00	Sony CDPM51 add £20.00	

CASSETTE DECK INSTEAD OF TURNTABLE

Aiwa ADF500 add £55.00	Pioneer CT676 add £145.00	Sony TCW320 add £25.00
Aiwa ADWX515 add £25.00	Pioneer CT339 add £45.00	Yamaha KX250 add £45.00
Aiwa ADWX777 add £85.00	Pioneer CTW650 add £95.00	Yamaha KX330 add £75.00
Marantz SD40 add £45.00	Rotel RD945 add £45.00	Yamaha KX530 add £125.00
Marantz SD50 add £125.00	Rotel RD955 add £75.00	Yamaha KXW232 add £95.00
Marantz SD315 add £75.00	Sony TCK470 add £45.00	
NAD 6325 add £65.00	Sony TCK520 add £65.00	
NAD 6340 add £115.00	Sony TCK570 add £95.00	

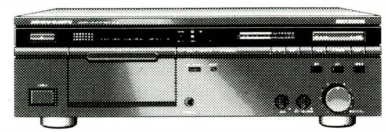


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MODEL 103/4

Accessories

MODEL	DESCRIPTION	PRICE
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ZO 32	STACKABLE STARTER 269mm HIGH	56.00
ZO 33	ADD ON UNIT 169mm HIGH	35.75
ZO 33 A	ADD ON UNIT 254mm HIGH	35.75
ZO 34	SELF ASSEMBLY THREE SHELF RACK	67.50
ZO 34 AD	ADAPTORS FOR ADD ON UNITS (4)	5.00
ZO 35	COMPACT DISC STORAGE RACK	15.25
ZO 38	SELF ASSEMBLY FIVE SHELF RACK	99.95
TARGET		
AER 2	2 SHELF RACK 515mm HIGH	103.99
AER 3	3 SHELF RACK 515mm HIGH	120.49
AER 4	4 SHELF RACK 660mm HIGH	146.49
AER 5	5 SHELF RACK 845mm HIGH	159.99
TTW 1	SINGLE SHELF WALL BRACKET	50.49
TTW 2	2 SHELF WALL BRACKET	61.49
TTF 1	SINGLE SHELF RACK 95mm HIGH	36.49
TT 2	2 SHELF RACK 490mm HIGH	65.99
TT 3	3 SHELF RACK 795mm HIGH	94.00
TT 4	4 SHELF RACK 620mm HIGH	109.49
TT 5	5 SHELF RACK 795mm HIGH	131.49
TT 5 T	5 SHELF RACK 995mm HIGH	142.49
MS 1	WALL BRACKET FOR MIDI SYSTEMS	38.49
TRIPOD		
1 S	SINGLE SHELF RACK 90mm HIGH	54.95
1 M	SINGLE SHELF RACK 125mm HIGH	54.95
1 L	SINGLE SHELF RACK 165mm HIGH	54.95
2 S	2 SHELF RACK 180mm HIGH	69.95
2 M	2 SHELF RACK 250mm HIGH	69.95
2 L	2 SHELF RACK 330mm HIGH	69.95
3	2 SHELF RACK 350mm HIGH	74.95
3 F	A3 WITH ISOLATED TOP SHELF	91.25
3 R	A3 WITH RECORD STORAGE SPACE	135.95
F	ISOLATED SHELF FOR RACKS	16.30
R	RECORD STORAGE UNIT	59.95
4 M	4 SHELF RACK 500mm HIGH	99.99
TRIS KOM		
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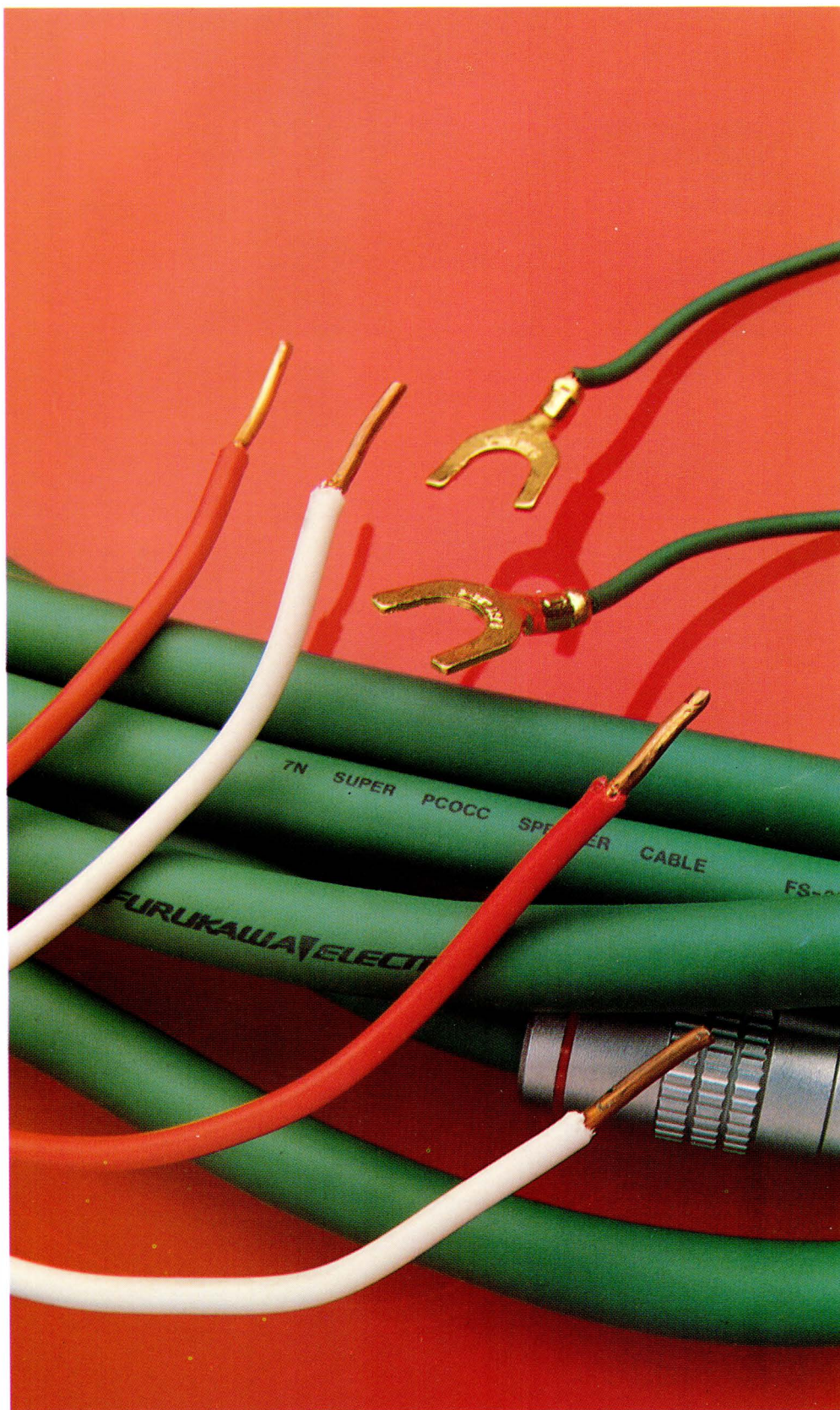
This month's mouth-watering prize consists of two seven metre lengths of Furukawa's finest 7N PCOCC speaker cable and a pair of one metre balanced analogue interconnects made of the same material. The designation '7N' indicates that the copper is 99.99999% pure; PCOCC stands for Pure Copper by Ohno Continuous Casting, a patented process for extruding copper which eliminates all grain structure, ensuring that the delicate audio signal is not impeded by inclusions of hydrogen and oxygen. This audiophile's dream retails at £350 per metre but it can be yours for free . . .

How To Enter

Our simple hi-fi quiz requires six answers which must be written on the entry form provided. Fill in the form, remembering to include your name and address (yes, some people do forget) and send it to the address shown in bold type at the bottom of the form. Mark your envelope **Furukawa Competition**.

The Prizes

The first correct entry drawn from our mailbag after the closing date will win both the speaker cables (£4,900) and the interconnects (£700). Some people have all the luck.



and interconnects!

The Questions

Please write your answers in the space provided on the entry form.

1. Name the hi-fi accessory which originates in a place called Euclid.
2. What was the shop name that gave rise to the initials B&W?
3. How many ducks does James Chilton reckon he owns?
4. Vinyl has recently disappeared from which major retail chain?
5. Which well known hi-fi company has recently taken a U-turn by making a CD player?
6. Which amplifier company manufactures the *Quattra*?

Entry Form

NAME:

ADDRESS:

POSTCODE: TEL:

HFC/MARCH/92

Closing date: Monday, 6th April, 1992

Your answers:

- 1.....
- 2.....
- 3.....
- 4.....
- 5.....
- 6.....

COMPETITION RULES

- 1) All entries must be on the entry forms provided. Photocopies will not be accepted. Incomplete forms will not be considered.
- 2) There is no cash or other alternative to the prizes.
- 3) Employees of Dennis Publishing Ltd and associated companies, the manufacturers and suppliers of the prizes, their agents and relatives, are not eligible to enter the competition.
- 4) The competition is not open to readers living outside the United Kingdom.
- 5) The prizes will be awarded to the first sets of correct answers opened after the closing date. No correspondence whatsoever will be entered into regarding the competition. The Editor's decision is final and binding.
- 6) The winners will be notified by post and the results will be published in *Hi-Fi Choice*.
- 7) Please notify us if you do not wish to be informed of any special offers and promotions.

Send your completed forms to:

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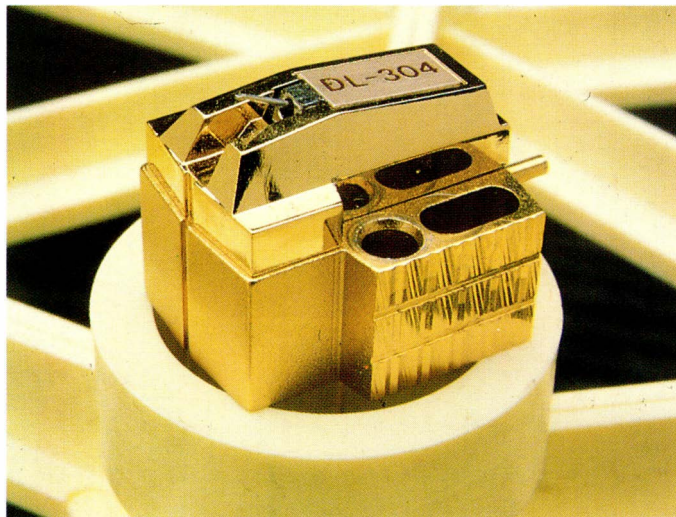
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Readers Write

CHOICE ANSWERS

My last London Super Gold

It would seem that upgraded Decca cartridges have either reached the market or are due to in the near future — at least the listings at the back of the current issue of another magazine mention three that I haven't heard of before. These are the London Maroon Decapod, the London Gold Decapod, and the London Super Gold Decapod. I am currently contemplating a final upgrade in the turntable department before the LP record dies out and would like to know how they compare to the Dynavector 17D2. So is there any chance of a review in the next issue of *Hi-Fi Choice* devoted to turntables? Michael Martin, London SE9



The Denon DL304 is a very fine and capable £200 cartridge.

Er, no. But the Decapod Deccas are conventional Decca cartridges with a more rigid clamp for attaching them to headshells. More details can be had from Presence Audio tel: (0403) 891777.

However, in the light of Richard Black's findings in his issue 84 Super Gold review it is debatable whether Deccas or Londons (as they are now known) are that wise a choice. He found

that the cartridge's low tip resonance had a modifying effect on the test records he was using, which doesn't bode well for the long term health of your increasingly valuable LP collection. Having used a MkIII Decca myself in the past I can't report any significant effects, but my taste has changed since then. Maybe it changed because the Decca'd records no longer sounded any

good. I'll have to investigate.

To get back to your query, the 17D2 is probably not in quite the same league when it comes to speed but is a far more balanced cartridge all-round and a much safer bet when it comes to record wear. But before you part with the hard earned stuff have a look at RB's review of a new Denon called the DL304; at £200 it's something of a bargain.

The perplexing Cyrus upgrade

I wish to replace my ageing Cyrus 1 amplifier but am perplexed as to what to get instead. The nigh on legendary Pioneer A400 seems a strong contender but as a vinyl user I'm not sure whether it would represent a real upgrade over the Cyrus in this respect. And there are of course alternatives from Marantz, Arcam and Sony to mention but a few.

I use a Linn Basik/K9 front end and listen quite extensively through a pair of Beyer DT-990 headphones. A Tomblin, Leeds, W. Yorkshire.

Of the budget amps on the market the A400 is probably the only one that offers a significant upgrade over your Cyrus, the alternatives around

the £200-£250 mark won't be dramatically better. For that sort of improvement you'll have to look at models costing £350 plus, things like the Aura VA-50 and Audiolab 8000A which would do justice to your turntable.

The reason that the A400's phono stage is little praised is more to do with the fact that it's such an excellent line amp

that people expect its performance with cartridges to be equally high. In fact it can perform quite effectively with most MMs and some high output MCs. However, its revealing top end has been known to upset some budget loudspeakers, so have a listen before taking the plunge.



An Aura of sophistication surrounds the tasty little VA-50.

The long options

My system comprises a Michell Gyrodec/Gyropower PS, with the non metallic platter but the old non inverted bearing, it's fitted with an Alphason Xenon MCS arm and an Audio-Technica AT-OC9 cartridge. The rest of the system consists of a Musical Fidelity A1 amp, JPW AP3 loudspeakers on HBS1 stands.

I am reasonably happy with the sound but I know that improvements can be made in most, if not all, areas and I'm planning a series of upgrades. The options I have, as far as I can see are; 1. Upgrade the bearing on the deck to the inverted type. 2. Change the arm to an Alphason HR100S or an SME V. 3. Upgrade the amp to a pre/power combo such as a Michell Iso/Croft line pre/Musical Fidelity P180. 4. Change the speakers to either Proac Studio 1s, Audio Note AN-Ks or Spondor SP2/2s

What do you think of these options and in what order should I work through them? David Bennett, Warrington.



The bearing mod is a must and an arm upgrade seems like a pretty good idea, though where you're going to find a dem of these arms on a Gyrodec I'm not sure.

As for the rest of the system, your suggestions seem logical, potentially well matched and likely to improve the system's fidelity and resolution. However, I would suggest you take the time to listen to some systems in the price range that you are aiming to end up in, before taking the plunge. By doing this you'll know how far and in precisely which direction you need to go. Then you can start buying the components required to reach that goal.

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NO 8

The dream was short-lived. A few days later he called me in desperate straits. His amplifier had overheated so much that it's feet had melted. When he tried to pick it up it was so hot he had dropped it onto the CD player, damaging that too!

I went round there immediately - it was still so hot that I had to use his boxing gloves to move it. Back at the shop I phoned Arcam. "How awful",

they said, "you'll have a new Delta 70.2 tomorrow."

"You may be interested to know that our customer is a boxer," I teased. "In that case we'll try and get it to you today!"

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More fuel for the CD tweaking feud

I would like to take advantage of your magnificent publication to air my views on a subject that has been intriguing me for several months now. I am talking of the ever increasing selection of accessories with which to plaster your valued collection of CDs in the hope of extracting better definition, detail and tonal balance, to name but a few. These apparently miraculous devices take on the guise of sticky plastic films with blue coloured rings on them, highly priced pens and a number of other items with which your readers are no doubt familiar.

Whatever the method of execution, the apparent purpose of these devices is the same. The colour chosen supposedly absorbs the light produced by the player's laser. Placing such a colour in the vicinity of the edge of the CD prevents light that has been refracted by the clear plastic from leaving the disc, bouncing off reflective surfaces inside the player and re-entering the photo-diode, potentially degrading the sound.

To be effective the film must be opaque in the the light frequency band of the laser, (ie, it absorbs the light). It is important to understand that this statement does not necessarily mean visually opaque. Laser diodes produce a light that has a very narrow frequency band; even



The Lasaway Digital Audio Applicator, but is green the right colour to stop laser light?

painting the edge of a CD with a black pen may not prevent it from escaping. Our job is made more difficult by the fact that the light produced is not within the visible spectrum. I have conducted a number of experiments with pens and stick on films and I am somewhat perplexed by the colours chosen by the majority of manufacturers.

Unless I and a number of writers on the subject are mistaken, the light produced by the majority of CD players is in the blue end of the spectrum. Logic would therefore indicate that a colour towards the opposite end of the spectrum would be required to absorb it (ie, red). However, the colour used in the majority of commercial products is green which seems the least suitable.

This can be proven by taking

one of your less prized CDs and painting the playing side. If it continues to play then the colour is obviously not absorbing any light. Not wishing to be the cause of a large quantity of ruined discs I have experimented with a few commercially available products. The majority of stick on films are capable of preventing laser-light from penetrating, although only because they are totally opaque. The same cannot be said for a number of the pens sold for this purpose.

I have found that you can do a lot worse than painting the edge of your CDs with a pen designed for overhead projection such as a red Staedtler Lumocolor 317 (about £1). This totally prevented information retrieval on my player, and the ink is very durable. I have examples that were drawn on a plastic base four or five years ago

that have not faded, cracked, or caused any damage to the plastic.

The resulting sound from the CD is slightly tighter in the bass region with a slightly more detailed mid and treble. I emphasise the slightly. John Beardon, Taunton.

Anyone who refers to Hi-Fi Choice as a 'magnificent publication' deserves our respect, and indeed the Roksan interconnects. However, there are a couple of flaws in your argument, although they certainly don't negate your observations.

The first point is that laser light generated by the GaAs semiconductor used in a CD laser has a wavelength of some 775nm, which falls somewhere between red and infra-red and certainly nowhere near blue. The reason you may think it is blue is probably due to the fact that if you look at the convex plastic lens used in most CD players this has a bluish tinge to it, but this has no bearing on the colour of the laser light itself.

The second point to bear in mind is the matter of absorption itself.

A green plant, for example, appears green to our eyes because it absorbs all colours other than green. Thus a green layer will absorb all colours other than green.

In fact the only colour that will reflect the unwanted light is red itself, which would tend to explain the dearth of red CD enhancing accessories.

**Roksan
Interconnect
Winner**

Another step up the ladder to digital nirvana

I am considering replacing my Denon DCD1520 and Black Box 2 with a Meridian 206B.

I would like to know if you think the improvement in sound quality would be immediately discernable. My dealer assures me it will be.

**Thanks for the guidance offered in your excellent magazine.
H N Smith, Stroud, Glos.**

If your dealer assures you that there is an immediately discernible difference then he will undoubtedly be able to



The substantial and uniquely styled Meridian 206B should prove a worthy successor to Mr Smith's current combo.

demonstrate this to you. We would expect the Meridian to outperform your current set-up if the amp and speakers in the system are revealing enough.

However, you might find that a 'hot hatch' like Rotel's RCD-965BX will give an equally impressive account at a considerably lower cost. Although, looking to the future, it is less likely to make as good a transport as the Meridian, and as you seem the upgrading type, this factor is obviously important. But while you're visiting dealers, have a listen.

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Six months later he came in search of further satisfaction. We delivered and installed a Meridian CD player.

NO 5

He was back soon after, his passion burning a hole in his pocket. His wife stayed in the car now, looking as abandoned as her antique music centre.

This continued for a few years - the sad story of a man consumed.

The last time I saw him, however, he was triumphant: "I'm retiring, selling my business and moving to Spain

with my Meridian and Ferrari" (his passion for the best didn't stop at hi-fi). "How's your wife?" I asked, naively.

She'd given him an ultimatum. "Either the hi-fi goes or I go."

"What else could I say?!"

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Paul Gould - Manager, Audio T
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What price DCC?

What do you think about the proposed pricing for DCC tapes, the current pricing of CDs, or any other software related topic? We want to know your views and ideas, so send 'em in and each month we'll award a record token (that should just about cover the price of a CD) to the writer of the most witty or interesting contribution.

Tape formats are a real non starter

Yes, I agree that £11.99 is a ridiculous price to pay for a CD or DCC. Likewise I have seen LPs and cassettes of chart albums as high as £8.99. This is pure profiteering. When you consider that Woolworths often sell hour long budget label CDs at £2.99 - £3.99 then someone

is coining it in on these full price discs and tapes. The price of the £11.99 CD does not reflect the true cost of mass production. Look at

what good value a pre-recorded video cassette is at a price of £7.99 - £11.99. Come to that I have just purchased five new Sony E180 video tapes for less than a tenner.

Never mind all the fuss over the new DCC format. About five or six years ago, Sony marketed a Video 8 home video deck that recorded up to 18 hours of PCM digital audio on one tape! I think that DCC is already an outdated technology. Surely we are one step away from a solid state digital



The offending article, would you pay £12 for one of these?

storage medium. I am amazed at the amount of money wasted on new magnetic tape formats (ie DCC, DAT) and wonder what the manufacturers hope to achieve. All it does is confuse the poor old public, just as with Betamax, V2000 and VHS video formats back in the early Eighties. Any new

format that relies on head to tape contact is a real non starter in my opinion. But then does anyone care about my opinion? I am only the consumer after all!

Richard Malin, Leamington Spa, Warwickshire
PS: What a bloody good magazine for £2.95!

Modern fetishes

You are quite right to keep the cost of CDs in the public eye, even though the longer term result of lower prices might be to bring the LP's demise even nearer.

The behaviour of the record companies deserves scrutiny not only in the light of the continuing indefensibly high cost of CDs but also for their premature killing off of the LP.

One has to accept that the majority of software users cannot tell the difference between LP and CD, and sound quality is not always the determining factor in any case.

It is the modern fetish for convenience which is at the root of the problem: CD is the equivalent of the TV meal or even TV itself, for tired workers who don't need any more brain strain.

Dr R Brown, London, W9.

Hatchet job

Record companies are living in a very rarified atmosphere, the purity of which must be affecting their brains.

I would like Mr Radeiki to give concrete proof of one retail outlet reducing the price of CDs, except for sale items. The shop would never be able to get enough stock to satisfy demand.

I can buy CDs by mail order from the United States and allowing for postage etc they cost £8 compared with £12 to £14 in the UK for the same discs.

Finally, I suspect that a £12 plus price for DCCs will mean that record companies will do the same hatchet job on ordinary cassettes as they've done on LPs.

T Wilson, Tutbury, Staffs.

Equal pricing is just not on

DCC is clearly going to be over priced, as CD already is and other formats are becoming. As tape formats are less convenient and more prone to wear, equal pricing is just not on.

Press and TV reports tell us that we pay unfair prices for all manner of goods and services: cars, beer, books, banking and more. Other considerations must override any thoughts on fair pricing, or we'd be buying our cars in Belgium and brewing our own beer.

To most people's ears CD sounds far superior to LP and cassette. In midi systems the CD player takes the lion's share of the cost and the quality of other sources is sacrificed to the feature count.

LPs are disappearing from the major outlets, and often have less tracks than other formats. Portable and personal CD players are getting cheaper, and the 'stylish' silver disc, marketed as well nigh on indestructible, becomes more attractive. Next to

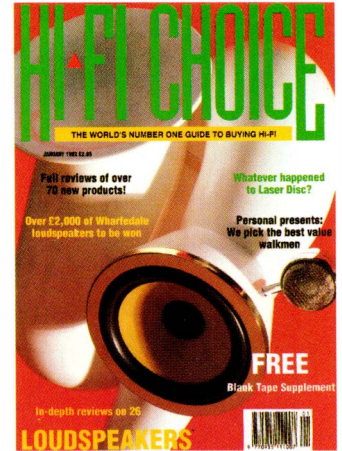
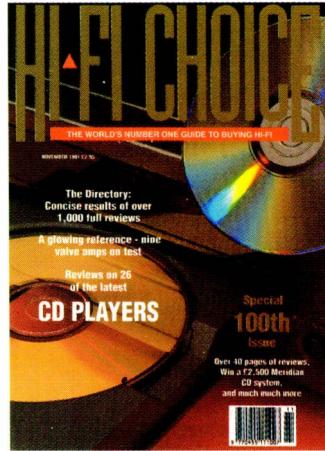
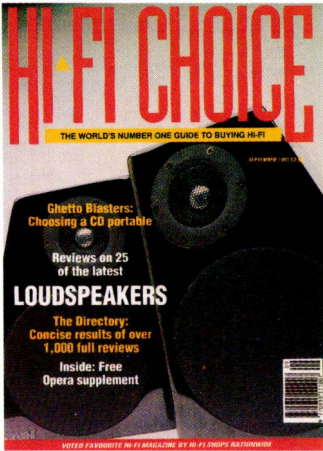
LPs or tapes now costing up to £9, CDs at £12 begin to look quite good.

The only rule of CD pricing seems to be to charge whatever the market will bear. They are cheap enough to produce that they can be given away with magazines, yet a recording such as Jacqueline Du Pre's *Elgar Cello Concerto* made in 1965, re-mastered for CD in 1986 and a best seller ever since, now sells for £14.49.

M Entwistle, Bury, Lancs.

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21st Century Fox

It is the end of an era", quoth W H Smith at the beginning of January when announcing that its record shops would phase out vinyl LP sales by April. This prompted everyone and their dog to have their say on the matter. It was what they call in the trade 'a slow week' for real news.

It seems very odd that so many people who used to complain about the poor quality of LP pressings now mourn the passing of the LP. As someone who grew sick and tired of paying good money for bad pressings I mourn only the loss of comprehensive sleeve notes. But the record industry had already grown lazy over sleeve notes long before the CD was launched. Anyone with a large LP collection spanning many years will know that re-issues often lacked the information that was contained on the original release sleeves.

Only about half of W H Smith shops now sell vinyl LPs anyway and they account for under ten per cent of record sales. Last October the IFPI, world trade body for the record industry, reported annual world sales of around 1.5 billion cassettes, 0.8 billion CDs and 0.3 billion LPs (a billion is a thousand million, by the way). "The LP seems certain to disappear in the

As vinyl vanishes and the price of CDs continues to skyrocket, Barry Fox reflects on the nature of corporate greed — is it the price we have to pay?

near future", predicted the IFPI.

The best spin-off from the W H Smith news was seeing Jonathan Ross, on his TV show, pushing Rob Dickins of Warner and British trade body the BPI on the perennial question:

"CDs are now as cheap to press as LPs, so where does the extra £4 go?"

Dickins floundered as Ross pitched in: "Carry on lining your pockets — that's a lovely pair of shoes you're wearing".

The audience applause said it all, but of course the BPI won't listen. It will still get ratty with anyone, like the Consumers' Association, who dares suggest that premium CDs are over-priced. Anyone who buys CDs abroad knows the BPI hasn't a leg to stand on.

Well this year, 1992, could be crunch time. The coming of DCC re-writes the ground rules for record company greed.

Polygram's plan to charge as much for pre-recorded DCCs as premium CDs (tempered slightly at the Las Vegas CES to a dollar less) simply drives the public into buying blank DCCs and copying either their own, or borrowed, CDs.

You don't know it yet, because you haven't had the chance to find out, but there is a glorious ease in making a digital dub from CD to DCC (or any digital tape or disc format). There is no gain control to adjust, no meter to watch, no overload peaks to worry about and no need for limiting or compression. You just enter a command similar to the copy-floppy command on a computer and the digits flow across. Once

the public gets hold of this convenience there will be no going back.

In its usual ignorance of technology, the record industry has been side tracked all along by the red herring of copy cloning. The record companies resisted DAT because they thought the public would make a DAT copy of a CD, and then copy the DAT tape onto another tape, and so on, with no loss of quality. The record companies like DCC because it has the Serial Copy Management System, SCMS. This stops tape cloning but does nothing to stop someone making a series of those super convenient digital copies from the same CD onto several cassettes.

Philips has now had to delay the launch of DCC from April, to September, albeit still with a trade awareness campaign to begin in April. Philips, by the way, says there is no 'delay', because there was never a firm commitment to an April launch. This follows some fancy footwork by Philips.

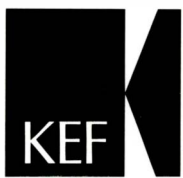
But unless things get worse, DCC still looks likely to be on the shops ahead of Mini Disc, and cheaper, too. It also looks, like CD Audio, strong enough to survive what is known in the trade as the 'Philips effect' — too many egos running round making promises they can't keep.

Several tape manufacturers, including BASF and Tandy/Memorex, have already said they will make and sell blank DCCs. At Las Vegas BASF confirmed the price of a DCC 90 minute cassette at between \$8 and \$10 (under £5). BASF will, from day one, also sell DCC 120 minutes cassettes. Put all this together, and it is nothing short of suicidal for the record industry to try and charge as much for a pre-recorded DCC as a premium CD.

Behind the scenes, the record industry is hoping to protect its over-pricing, by pushing for a tax on tape or disc recorders, and blank tapes and discs. This has already been agreed in the USA, but only on digital recording equipment. The IFPI and BPI want a tax on analogue or digital equipment. The most repugnant aspect of the tape tax is that it dumps unearned income into the laps of the record companies. There is no technology yet available, or likely to be available, which can channel collected tax money to the artists who may have lost sales through copying. It can only be shared out on the basis of the most successful artists getting the lion's share, and the record companies grabbing a share too. Will this money be spent on giving new artists a chance or will it go on executives' salaries, lunch bills and airhead office staff? I know what I think.

Last year EMI Records asked me to film an interview for a corporate video, talking about the future of recording, DCC and Mini Disc. I said yes, on the understanding that EMI Records would make a donation to an apolitical charity, in this case Guide Dogs for the Blind.

Months later I had heard nothing, and sent a reminder. I still heard nothing so checked with Guide Dogs for the Blind. And no, EMI had never paid. Payment had been 'actioned' but EMI's Accounts Department had forgotten. I am sure payment will now be made. But would you trust a tape tax to a record company which fails to pay a debt to a charity?



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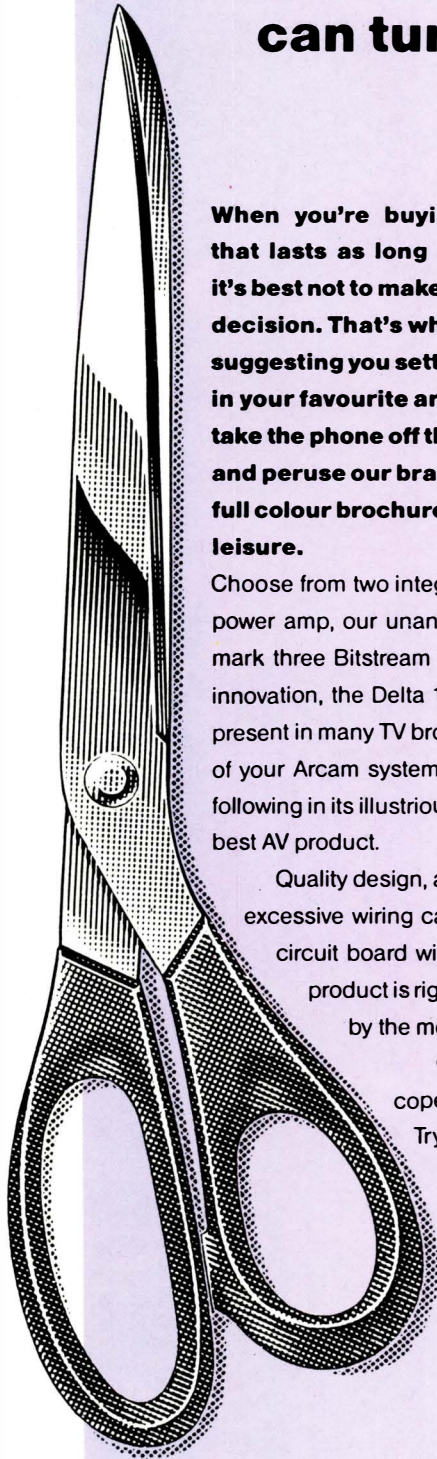
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HFC/3/92

Choosing and Using . . . Amplifiers

At the heart of every hi-fi system there is an amplifier, the one component that links every other. This is the product that allows you to copy from CD or vinyl onto tape in addition to, more importantly, providing an interface between source and loudspeaker. A simple task, you might think, but in reality it is one dominated by extremes, from handling the minute voltages produced by a moving coil cartridge to levels 100,000 times higher demanded by the inefficient and power hungry loudspeaker.

Just how adequately an amplifier copes with these extremes is reflected in both its technical and subjective performance, though these two arbiters are not mutually dependent. For instance, the higher powered amplifier with vanishingly low levels of distortion will not necessarily sound better than a weaker model with crate loads of unwanted harmonics in tow. Otherwise, the small but hotly contested market for valve amplifiers would have died long ago.

Obsessed with control or merely seeking power? Let Paul Miller introduce you to the wonderful world of amplifiers.

Nevertheless the bulk of amplifiers made today are solid state in design, because these are simply more efficient, flexible and reliable in execution than their valve forefathers. But even here there is a wide range of style and design, including the archetypal feature-laden and button-strewn amplifier which continues to dominate the mass market.

Still, you rarely see a graphic equaliser or dubious power display on an amp these days, and a good thing too because these superfluous widgets do nothing to enhance the sound. After all, every bit of extra electronics that processes the audio signal cannot but add a little smudge of its own. And all these smudges, or colorations, help obscure the natural colour and vibrancy of the music itself.

Circuit training

It was this sort of thinking that kick started the specialist amplifier market; minimalist designs devoid of bass and treble controls, loudness contours or even a balance control. Their brief is a simple one with all efforts concentrated on circuitry that's absolutely crucial to the music signal. Circuits like the RIAA stage used to boost and equalise the signal that comes off vinyl disc, line stages for the tuner, tape deck and CD player plus a final built in power amp to grapple with the speakers.

Do you really need tone controls or other widgets? If you do, then perhaps an imbalance lies within the system itself. Don't buy an amp just to tweak the bass control, choose one instead that gives you the clout you're after without recourse to an electronic band-

aid. It's what system matching and upgrading is all about.

Once again, this is not to say an amplifier with sensibly tailored tone controls cannot sound respectable. Indeed many popular models include a tone defeat facility in an attempt to offer the best of both worlds. Even the Japanese majors like Pioneer, JVC and Sony are getting in on the act, providing minimalist amplifiers especially for us in the UK. Furthermore, with the inevitable decline in vinyl sales, some new amplifiers are being offered with or without MM/MC disc stages. After all these are the most difficult stages to engineer, so why waste money if the amp is destined for life in a CD based system?

But whatever their origin, all amplifiers must tackle the extremes we mentioned in the opening paragraph. A conventional integrated amplifier has the toughest job because the sensitive MM/MC stage and rugged power amp are both beaver away within the confines of a single case. It's rather like trying to perform micro surgery in the middle of an earthquake.

Preamplifiers separate the job of signal processing (tape and input selection, MM/MC disc equalisation, tone controls and line stages) from the heavy duty power amp which provides the muscle needed to control the speaker. Each gets on with its allotted task without influencing the other via the common power supplies, earth tracks and casework shared in an integrated amplifier. Pre/power amps do flaunt the promise of higher quality sound, but then they occupy a price bracket well above the ordinary integrated product.

Nevertheless, simply looking at an amplifier will give you very little clue to its prowess, whether it be a pre/power combination or budget integrated model. So the first rule is to find yourself a good and patient dealer willing to let you hear a variety of different models. The second rule is not to worry too much about 'matching' the nominal output of the amp to the power rating of your speakers. If the boxes have 50W slapped on the back this does not prohibit the use of a 30W or even a 100W amplifier, for instance.

If it sounds right then it is right; after all, you're the one that has to live with the decision, not your dealer. In fact it's easier to damage your speakers by pushing an under powered amp too hard than blasting out the occasional clean peak from a monster amp. Don't get hooked on power though, because more power does not mean more quality.

So what's all this fuss about peak current? Well, current comes into the equation because a certain number of Amps (or milliamps) are required to maintain the voltage across the speaker load, and the lower the load the more current is demanded for any given power level. Wind up the wick too far and the current runs dry, causing a massive increase in distortion which, in turn, screws up the speaker. If this happens then you can always turn to our loudspeaker issue and track down a replacement.

WHEN THE SUM IS EVEN GREATER THAN THE PARTS.

Improbable, you may think, considering that here we have three outstanding audio components, each one highly acclaimed in its own right.

For example, no single integrated amplifier has been so widely praised around the world as the NAD 3020 series, making it the largest selling amplifier in audio history.

With the introduction of the new, upgraded 3020i, Hi-Fi Choice commented; 'This latest version of the classic 3020 is as competitive as ever, it sounds fresh and buoyant but still sharply focused and delightfully detailed.' Not surprisingly, the NAD 3020i was judged as a 'Best Buy' by the same magazine.

The NAD 5420 compact disc player has also received extraordinary acclaim from the audio critics. 'Genuinely convincing music that lives and breathes!' is one quote from Hi-Fi Choice which we feel says it all. Once again, a

'Best Buy' was awarded.

On to the final link. British loudspeaker design at its very best. The NAD 8225 Mini-Monitor – the latest advance

beyond measure ... the 8225 gets you closer to the music than other speakers at this price – and closer than some at twice this price or more.'



from our research and development team. Here's what High Fidelity magazine had to say; 'Captivating ... this little speaker impressed me

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Akai (UK) Ltd, 12 Haslemere Heathrow Estate, Silver Jubilee Way, Hounslow, Middlesex. Tel: (081) 897 6388



At a time when 'UK-oriented' amplifiers are all the rage it's quite refreshing to stumble across a new, perfectly ordinary mass-market amp that's free of hype. This, then, is the AM-47, a big amp that is equipped with plenty of knobs and glowing widgets. By way of good fortune, it also happens to sound rather splendid.

Behind the bold, black fascia there's plenty of fresh air but there is also a very competent line and power amp, an all-discrete affair with luxury touches like LEDs (light emitting diodes) to bias the constant-current sources.

The power supply is pretty generous too, feeding a complementary Sanken output stage complete with relay-fired speaker protection.

Return your gaze to the front and it's hard to avoid the huge volume control flanked, in this instance, by tone, balance and rec-out controls. The three tape, four line and moving magnet phono inputs are all selected via a series of pushbuttons. This can hardly be described as the most 'direct' signal routing ever, but then Akai has never claimed otherwise.

Lab report

Short signal paths are not a feature of the AM-47. So you'll not be bowled over by the 67-68dB stereo separation nor by the high-ish 0.13ohm output impedance. The latter is caused by lengths of thin ribbon cable that run from the power amp to the speaker selectors before wending their way to the output terminals. These are 4mm sockets, but you'll have to prise out the plastic inserts fitted by Akai to comply with German safety requirements.

Other than this, the AM-47 is a model pupil. Its RF sensitivity is low, the signal to noise ratio is acceptable and overload margins are within +30dB at 1kHz. Power surges to 162W into 4ohm, an increase of +1.9dB, though its performance at the frequency

extremes and under dynamic conditions is less spectacular.

Lashings of feedback keeps distortion at 0.001 per cent via CD and 0.0025 per cent via MM which, if you take a look at the 3D plot, consists mainly of 'safe' second order products.

Sound quality

A row of appreciative, nodding heads greeted the sound of this amp, a sound that, if slightly raw, was also praised for its depth, spaciousness and sense of detail. At its best it enjoys a very lively and fresh balance, reflecting the widest dynamic contrasts with ease.

Sharp transient detail, including the bite of lead guitar or the leading edge of piano are portrayed with an unmasked, youthful enthusiasm.

So this amp had plenty of 'grip and bite' if not the caution or refinement of its peers. The listening panel could hear the 'skin' of Rachmaninov's tympani as easily as the low rumble of euphonium from Marty Paich's jazz ensemble, even if a slight inconsistency in its resolution of upper and lower bass detail was remarked upon.

This said, the various inputs themselves were very similarly balanced. Whether we chose MM disc or CD, the music seemed to unfold in an easy, fluid fashion that imposed no stress or strain on our listeners. A fine result.

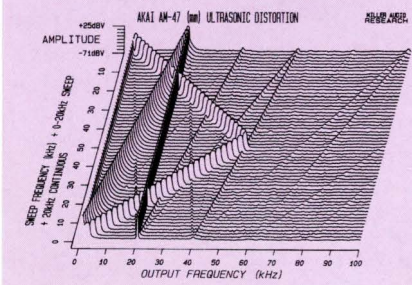
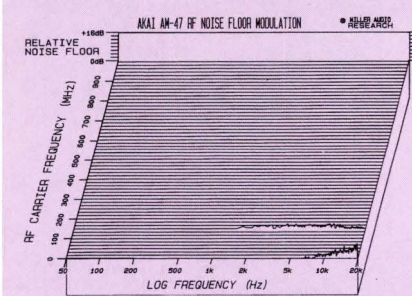
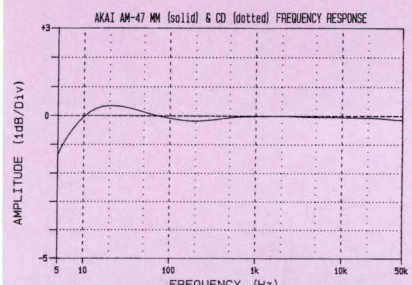
Conclusion

Here we have a lusty amplifier that's sensibly-priced, although sadly something of an aesthetic nightmare. Fortunately it sounds rather better than it has any right to, so don't make the mistake of judging it by appearance alone.

With this level of performance in mind it would be rather churlish to deny the Akai AM-47 anything less than a very warm Recommendation.

TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output			
8ohms	98.0W	104.4W	101.5W
4ohms	143.8W	162.2W	145.0W
Dynamic Headroom (IHF)+0.12dB (107.4W)			
Peak Current (5msec, 1% THD)+18.3A			
Output Impedance 0.133ohm			
Damping Factor 60.3			
	CD/Aux	MM	
Stereo Separation			
(1kHz)	68.0dB	67.0dB	
(20kHz)	53.4dB	47.2dB	
Channel Balance			
(1kHz, -20dBV)	0.07dB	0.00dB	
(-60dBV)	0.85dB	0.80dB	
Total Harmonic Dist.			
(0dBW)	-98.2dB	-91.2dB	
(2/3 power)	-99.0dB	-91.9dB	
CCIR Intermod. Dist.			
(0dBW)	-96.5dB	-90.6dB	
(2/3 power)	-98.6dB	-92.5dB	
A-wtd Noise			
(0dBW)	-84.3dB	-75.8dB	
(2/3 power)	-96.2dB	-76.9dB	
Residual noise			
(unwtd)	-72.1dBV	-72.1dBV	
Input Sensitivity			
(for 0dBW)	17.9mV	303µV	
(for full output)	185.2mV	3.14mV	
Disc Overload			
(1kHz)		164.5mV	
(20kHz)		1449mV	
(50kHz)		3011mV	
Tape Output/Impedance	9.68V (disc) / 1.83kohm		
Input loading	38kohm/300pF	46kohm/160pF	
DC offset, left/right	-	2.2mV/-3.6mV	
Retail Price			£200



In the run-down cattle market of Dodgey City, a new Hi-Filutin' trading post opened - purveying audio-visual wonders from the boys back east; valve equipment from the Old World; the widest range of audio and video wangdoodles this side of Kansas: all at the best prices and shown off in the best danged demonstration room you ever did see.

Needless to say, the cowboys are headed for the hills...

KAMICA

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Albarré PP1

Ortofon UK, Hayden House, Chiltern Hill, Chalfont St Peter, Bucks SL9 9EW. Tel: (0753) 889 949



Any company that launches a new £430 amplifier these days needs to have a card or two tucked up its corporate sleeve. In Albarré's case that card is flexibility: by offering the *PP1* in four different guises one, at least, will be tailor-made for the value-conscious enthusiast!

Aimed at CD-based systems there is the £400 line-only *PP1* while, for just £30 more, you can add an 'economy' MM phono stage. An optional MM + MC board brings the total to £500, the same price as a 'special' MC-only phono section. This is called hedging your bets.

We've the economy MM version, selected on Albarré's traditional red perspex fascia via a rotary control that also caters for the four line inputs. Alongside there's a source/tape monitor plus a facility for extra gain to accommodate tuners or tape decks with a low (ie 100-200mV) output. Never, and I mean *never* connect a CD player to the *PP1* with this extra gain engaged, because the amp is instantly plunged into clipping, regardless of the volume position.

Lab report

Albarré's +16dB active line stage actually provides +17dB of gain, raising the amp's sensitivity from 512mV (passive) to 72mV (active). Nevertheless any line input above 1.54V (or MM disc input above 7.9mV) soaks-up the remaining headroom and sends distortion through the roof. Oddly enough, prior to clipping THD is actually lower (0.0035 per cent) via the active input than it is via the normal or 'passive' CD input (0.022 per cent).

Still, Albarré's power supply is both generously specified and admirably 'stiff', surging +2.3dB from 48W to 81W into 4ohm. Unfortunately, the optically-coupled protection circuit prevented me from obtaining a figure for peak current!

The £30 MM input betrays a mixed heritage with IM distortion increasing by a fac-

tor of nearly 20 times (headroom is a poor +19dB at 20kHz, see 3D plot) while boasting a wide S/N ratio of 83dB. Meanwhile, the +0.5dB bass boost and -2.25dB loss in treble (20kHz) was clearly detected by our listeners - someone at Albarré has his maths in a muddle!

Sound quality

In spite of my trepidation, the bold, solid and authoritative sound of this amp proved a welcome relief from a run of so many 'small-scale' amplifiers. The disc input was a rather dark in tone, the panel suggested, lacking a little 'snap' at times and influencing the brilliance of classical strings if not the solidity and impact of the tympani. By way of compensation our jazz LP sounded springy and ambient, possessed of a 'bouncy quality' that was both full, rich and warm. Hardly a model of neutrality, but no-one seemed to mind.

Nevertheless the listeners still considered its line input (passive, I might add) to be better balanced. Certainly, the interplay between Julia Fordham's voice and the various backing instruments was now delightfully obvious, each note feeding off the other within a deep and, once again, ambient soundstage.

Furthermore, despite its additional colour, the *PP1* succeeded in revealing the naturally raw and husky tone of Christy Moore's voice, elaborate detail that did not smother the harder timbre of steel guitar.

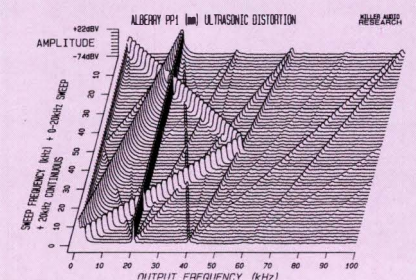
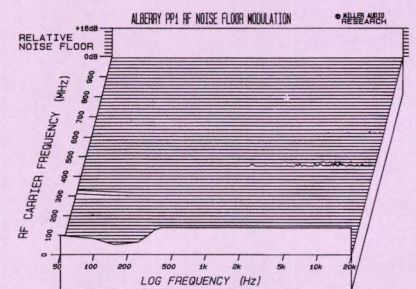
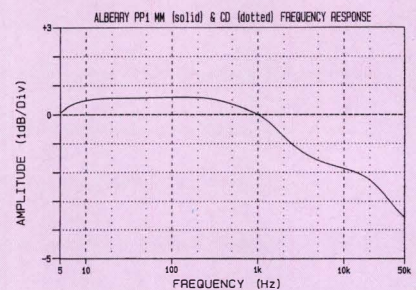
Conclusion

A good 'un, this. Not without its technical foibles I'll agree, but it'll only honk if you make the mistake of mixing CD with the +16dB facility. Stick to the passive setting and you'll not go far wrong. It's coloured, certainly, but it struck a responsive chord with our listeners after a hard day's toil. Engaging enough, with hindsight, to earn Albarré a Recommendation.

TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output,			
8ohms	45.6W	48.0W	47.0W
4ohms	74.1W	81.1W	79.3W
Dynamic Headroom (IHF) +0.66dB (55.9W)			
Peak Current (5msec, 1% THD)			
Output Impedance	0.019ohm		
Damping Factor	402.7		
	CD/Aux	MM	
Stereo Separation			
(1kHz)	96.0dB	97.0dB (84.3dB)	
(20kHz)	71.3dB	71.3dB (77.9dB)	
Channel Balance			
(1kHz, -20dBV)	0.10dB	0.15dB	
(-60dBV)	1.23dB	1.25dB	
Total Harmonic Dist.			
(0dBW)	-72.9dB	-80.4dB (clip)	
(2/3 power)	-80.8dB	-81.3dB (clip)	
CCIR Intermod. Dist.			
(0dBW)	-91.1dB	-68.3dB (67.7dB)	
(2/3 power)	-96.1dB	-68.4dB (-67.1dB)	
A-wtd Noise			
(0dBW)	-99.0dB	-83.2dB (-82.7dB)	
(2/3 power)	-111.4dB	-83.3dB (83.0dB)	
Residual noise			
(unwtd)	-89.1dBV	-89.1dBV	
Input Sensitivity			
(for 0dBW)	73.2mV (10.3mV)	398µV (52µV)	
(for full output)	512mV (72.1mV)	2.77mV (365µV)	
Disc Overload			
(1kHz)		70.2mV (7.89mV)	
(20kHz)		458mV (104.5mV)	
(50kHz)		338mV (190.5mV)	
Tape Output/Impedance		12.9V (disc) / 106ohm	
Input loading	6.7kohm / 165pF 47kohm / 130pF		
DC offset, left/right	-0.3mV / -1.9mV		
Retail Price	£430 (MM option)		

Results in brackets refer to +17dB mode



Arcam Alpha 3

A&R Cambridge Ltd, Denny End Industrial Centre, Waterbeach, Cambridge CB5 9PB. Tel: (0223) 861550



Close encounters with the unexpected are just one feature of the truly blind listening test, whereby the panelists have no advance knowledge of the makes or prices of the products being reviewed. Precisely matched listening levels remove another potential distraction and the end result sometimes doesn't tally with previous expectations and prejudices.

So it turned out with the *Alpha 3*, which entirely failed to justify the praise that has, up until this point, been lavished upon it here and elsewhere. This is something of a pity because its predecessor, the *Alpha 2*, was awarded a Best Buy way back in issue 68. It's all the odder still because of the very close relationship between *Alpha 2* and *3*, the only externally visible difference being a 'Direct' (tone bypass) facility included on the newcomer.

Inside the same general topology is evident, with the same MM vinyl disc stage and power transistors but serviced by updated 10,000µF power supply caps. There's a new transformer too, with higher secondaries to sustain the beefed-up 50W output.

Detail revisions include removing one of two coupling capacitors in the signal path and opting for air-cored rather than ferrite-cored inductors in the zobel network.

Lab report

So what's gone wrong? Differences between the *Alpha 2* and *3* give us few clues though the tenfold increase in IMD suffered by the power amp from 1W to two-thirds output might be relevant. Isolated third-order products can be seen on the 3D plot, and the 30-100MHz susceptibility to RF noise is also badly placed.

Although its power output has increased from 41W to 53W, the fact that the maximum current rating is a poor 6.9A, the lowest in the test group, may be relevant. The improved sensitivity of the MM disc stage

(ref 1W) also suggests an extra +2.5dB of gain has been engineered in the NE5532 line buffer.

The 2A speaker fuses might usefully be replaced by 3.15A devices — after all, the output transistors are rated at 15A. Heatsinking, meanwhile, is barely adequate.

Sound quality

Two examples were auditioned over four separate sessions employing a total of six different listeners. The Compact Disc input was considered better than the MM stage, primarily because of its greater composure, more realistic soundstaging and better sense of involvement.

Even here it was far from neutral, however, emphasising Julia Fordham's natural sibilance, for example and becoming progressively softer and hazier as more instruments joined the fray. 'Plenty of top-end' the listeners said, while also acknowledging a lisp or 'rider' on guitar strings, vocals and percussion.

The moving magnet vinyl disc input tended to throw the music forward, causing remarks that the soundstaging was not as precise as it could be. 'A little diffuse', the listening panel ventured, particularly with the busy horn and string interplay from the Rachmaninov *Symphony*. The sound had weight and body but somehow lacked form or tangibility - a further reference to the diffuse impression.

Jazz strings were also less distinct than usual, but the character of the woodwind was undeniably sweet.

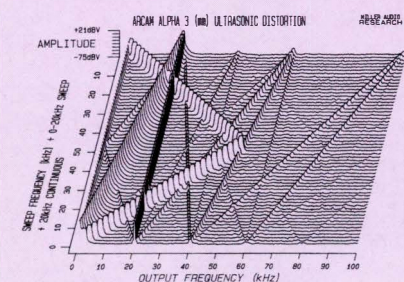
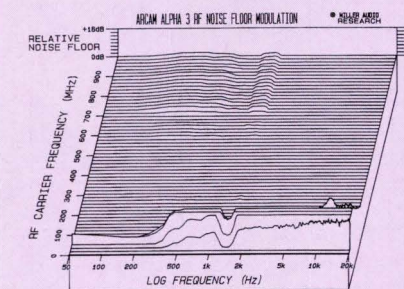
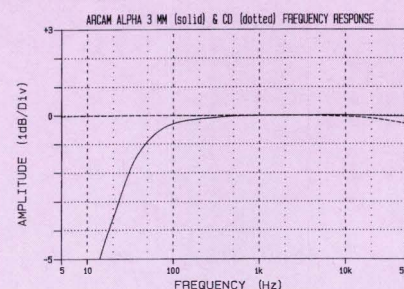
'Easy listening' was the slightly condescending conclusion, and it was considered that competitors offered a considerably more engaging performance.

Conclusion

What more can I say? We gave the *Alpha 3* every chance to shine but it consistently failed to justify its reputation.

TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output			
8ohms	50.4W	52.5W	51.2W
4ohms	71.5W	78.0W*	73.7W*
Dynamic Headroom (IHF)	+1.25dB (70.0W)		
Peak Current (5msec, 1% THD)	+6.9A		
Output Impedance	0.071ohm		
Damping Factor	113.1		
	CD/Aux	MM	
Stereo Separation			
(1kHz)	79.2dB	78.2dB	
(20kHz)	54.8dB	53.5dB	
Channel Balance			
(1kHz, -20dBV)	0.20dB	0.12dB	
(-60dBV)	0.40dB	0.41dB	
Total Harmonic Dist.			
(0dBW)	-88.1dB	-77.0dB	
(2/3 power)	-73.9dB	-75.1dB	
CCIR Intermod. Dist.			
(0dBW)	-96.0dB	-80.3dB	
(2/3 power)	-77.5dB	-77.6dB	
A-wtd Noise			
(0dBW)	-87.2dB	-81.0dB	
(2/3 power)	-98.3dB	-82.1dB	
Residual noise			
(unwtd)	-76.6dBV	-76.1dBV	
Input Sensitivity			
(for 0dBW)	26.9mV	302µV	
(for full output)	197mV	2.23mV	
Disc Overload			
(1kHz)		103.5mV	
(20kHz)		981mV	
(50kHz)		2023mV	
Tape Output/Impedance	9.22V (disc) / 1.84kohm		
Input loading	19kohm/380pF	46kohm/170pF	
DC offset, left/right		+0.3mV/+1.2mV	
Retail Price		£200	



Creek CAS-6060

Creek Audio Systems, Unit A1 Hazelton Industrial Park, Horndean, Hants. PO8 9JU. Tel: (0705) 597 772



Glance too quickly at the photo above and you might mistake this latest CAS-6060 for the older CAS-5050, reviewed in issue 74. Broadly speaking the '6060 shares the same casework and complement of facilities as its forebear, but it was the budget CAS-4040 that served as inspiration for its electronics.

So, there's no change in the separate rec-out and input selection of its three line inputs, two tape decks and disc stage while both MM and MC cartridges are still distinguished using a switch at the rear. Inside, a discrete low-noise MC head amp precedes the main disc stage which utilises a combination of Signetics and Motorola op-amps together with 'tweaky' Siemens layer capacitors and close-tolerance resistors.

If only Creek paid as much attention to the quality of the detented ALPs volume control, then perhaps the balance would improve at low levels. Anyway it's fair to say that the overall construction - and reliability - of this amp has improved since its launch a year ago, while extras like the bridging facility and separate pre/power mode help sweeten the £470 pill.

Lab report

Creek has clearly decreased the gain of both MM disc and power amp stages because its sensitivity has fallen to 695mV and 3.6mV respectively, while distortion, at two-thirds output, has improved to just 0.005 per cent. Nevertheless the gain of the MC head amp is sufficiently high to prematurely overload the input to the power amp, plunging it into clipping with inputs as low as 3.36mV (1kHz).

So, though the overload figures suggest a disc headroom of +22.3dB the 'real' headroom is just +16.5dB - a fact reflected in the nasty intermodulation products wending their way through the 3D plot. Peak current is limited by Schrack protection relays, while sensitivity to RF noise in the 80MHz region is typical of Creek's TIP35/36 power amp

stage. This amplifier is phase inverting, so do experiment with your red/black speaker leads.

Sound quality

A big, meaty and confident sound greeted our listeners, similar in demeanour to the Albery and, indeed, the Rotel RA-830AX if not quite as vivid or forward. After some deliberation they decided it had a 'rich, sweet and romantic midrange', enhancing the lush quality of strings (via MM disc) while portraying vocals in a very 'human' fashion.

Dynamics were well represented too, though neither the extreme bass nor the high treble were quite so well controlled. The bass was typically big and fulsome but it also sounded faintly 'one note' or lumpy, a trait that tended to passify the raw tension we had come to expect from the Christy Moore CD.

In every other respect our panellists appreciated what they considered to be 'a very musical sound' commenting on the convincing way that individual elements were strung together. Moreover, certain tracks, including the Julia Fordham Compact Disc, seemed to enjoy an additional degree of expression and emotiveness, her voice 'easing across' and engulfing us in a realistic presence that was merely hinted at by much of the competition.

Conclusion

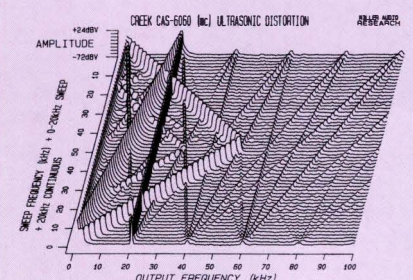
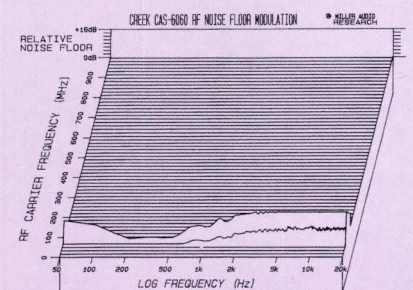
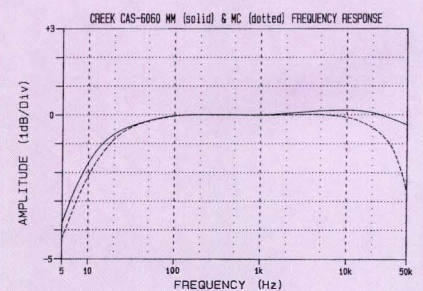
On these grounds alone the *Choice* listening panel felt the CAS-6060 vindicated itself, though I remain less impressed by over-sights in the implementation of the MC disc input and in Creek's selection of the volume control.

Ok, so few people purchasing the '6060 will be doing so for its MC option, but at this high price I would expect all inputs to be fully optimised. After all, the CAS-5050 never had these problems. For this reason, formal recommendation has been withheld.

TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output,			
8ohms	80.2W	80.8W	75.2W
4ohms	123.1W	129.8W	115.5W
Dynamic Headroom (IHF)+1.18dB (105.9W)			
Peak Current (5msec, 1% THD)+12.4A*			
Output Impedance 0.056ohm			
Damping Factor 141.9			
	CD/Aux	MM	MC
Stereo Separation			
(1kHz)	59.6dB	56.5dB	56.8dB
(20kHz)	51.6dB	38.1dB	38.7dB
Channel Balance			
(1kHz, -20dBV)	0.86dB	0.67dB	0.51dB
(-60dBV)	8.39dB	8.45dB	8.40dB
Total Harmonic Dist.			
(0dBW)	-88.0dB	-91.0dB	-**
(2/3 power)	-85.5dB	-86.6dB	-**
CCIR Intermod. Dist.			
(0dBW)	-76.5dB	-75.0dB	-33.4dB
(2/3 power)	-60.9dB	-62.4dB	-33.0dB
A-wtd Noise			
(0dBW)	-79.5dB	-77.4dB	-75.1dB
(2/3 power)	-91.0dB	-81.6dB	-80.5dB
Residual noise			
(unwtd)	-65.9dBV	-65.9dBV	-65.9dBV
Input Sensitivity			
(for 0dBW)	77mV	409µV	22.7µV
(for full output)	695mV	3.64mV	203µV
Disc Overload			
(1kHz)		115.8mV	6.53mV
(20kHz)		1056mV	56.3mV
(50kHz)		1630mV	65.7mV
Tape Output/Impedance	10.39V (disc) / 1.13kohm		
Input loading	42kohm/140pF 47kohm/140pF 95ohm		
DC offset, left/right	+26.4mV/+5.7mV		
Retail Price	£470		

** See lab report



Dual CV600RC

Ram Projects, Unit 27 Stretford Motorway Estate, Barton Dock Road, Stretford, Manchester M32 02H



Encouraged by the recent success of its Rotel-built separates, Dual has finally decided to go it alone and launch a series of genuine 'in-house' models. The CV600RC lies at the heart of this new budget range, serving as the nerve centre for Dual's matching CD player, tape deck and tuner. Each of these products is pitched at about £150, with a comprehensive system remote control included in the price of the amplifier.

The grey plastic fascia and tacky spring-clip speaker terminals are hardly inspiring but flexibility, well, that's another matter. All inputs, including MM disc, tuner, CD, video and two tape decks, are logic-controlled and so come under the dominion of the remote handset. Other functions, like direct track access, play, record and pause obviously refer to Dual's other separates, though the amp's volume control can also be manipulated from the comfort of an armchair. You can even power-down at the flick of a forefinger.

Peripheral facilities like bass, treble, balance and loudness controls are operated manually from the fascia, as is A/B speaker selection and source 'direct'. Still, I'm sure it won't be long before someone thinks of motorising these controls as well!

Lab report

Little to whinge about here, though it's worth knowing the CV600RC is phase-inverting so do experiment with the polarity of your speaker leads. The power output exceeds its 50W rating at 63W into 8ohm and 93W (+1.7dB) into 4ohm but it's rather less comfortable at 20kHz where the output drops by 0.8dB or so.

This is also reflected in the 3D plot where distortion (particularly intermodulation) picks-up towards the right of the picture. Nevertheless its 14.7A current delivery is surprisingly generous. In fact this amp is one big surprise.

After all it's one of the few to comply with the toughest regulations on interference (remember, Dual is a German company) which means ghastly ceramic caps strung across all inputs (including the power supply) as well as the speaker outputs. With this, logic switching and untidy cabling in tow, the CV600RC has absolutely no right to sound as good as it does. But it does anyway, and that's what counts.

Sound quality

Our listeners were quite oblivious to my concerns, turning their full attention to the music that blossomed before them. Overall they preferred the MM disc input for its lively and open sound, a sound that sustained the raw quality of Marty Paich's sax as effectively as the depth and impact of Rachmaninov's bass.

Massed strings possessed a naturally vibrant tone while the music as a whole had a very dramatic presence - beefy and impressive. Plenty of drive and 'grunt', they ventured in response to the conclusion of this busy symphony.

Switching to Compact Disc brought no dilution of subtlety, yet the overall feel of the music was both cooler and faintly 'steely'. Christy Moore actually sounded too smooth in this instance, lacking the gruffness and rough huskiness of his voice. Comfortable enough, the panel suggested, but slightly sanitised.

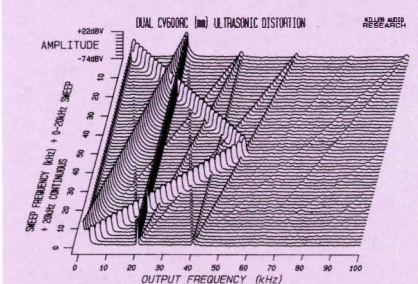
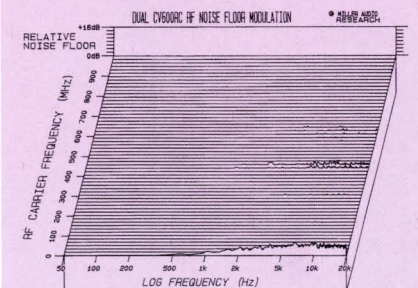
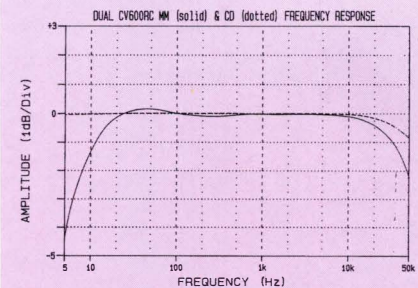
Conclusion

Surprises are part and parcel of hi-fi, though few are as unexpected and, indeed, pleasant as the CV600RC. My advice is not to look too closely at it before you sit down and listen!

Once you're there of course you have the convenience of remote control to adjust the volume or simply hop from input to input. Just one more reason why the Dual CV600RC earns itself a recommendation.

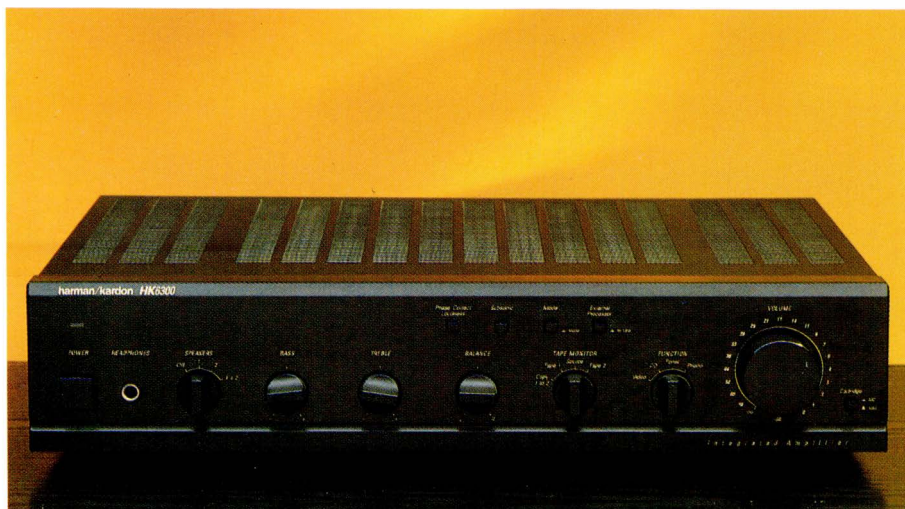
TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output			
8ohms	57.6W	63.3W	54.0W
4ohms	80.2W	93.1W	76.7W
Dynamic Headroom (IHF)+1.1dB (81.4W)			
Peak Current (5msec, 1% THD)	14.7A		
Output Impedance	0.146ohm		
Damping Factor	54.7		
	CD/Aux	MM	
Stereo Separation			
(1kHz)	60.0dB	59.9dB	
(20kHz)	39.0dB	38.6dB	
Channel Balance			
(1kHz, -20dBV)	0.19dB	0.20dB	
(-60dBV)	1.75dB	1.74dB	
Total Harmonic Dist.			
(0dBW)	-91.8dB	-91.8dB	
(2/3 power)	-89.6dB	-89.6dB	
CCIR Intermod. Dist.			
(0dBW)	-96.3dB	-93.6dB	
(2/3 power)	-95.8dB	-92.6dB	
A-wtd Noise			
(0dBW)	-81.8dB	-77.1dB	
(2/3 power)	-94.9dB	-79.0dB	
Residual noise			
(unwtd)	-70.2dBV	-70.1dBV	
Input Sensitivity			
(for 0dBW)	27.3mV	366µV	
(for full output)	219.9mV	2.94mV	
Disc Overload			
(1kHz)			146mV
(20kHz)			98mV
(50kHz)			1500mV
Tape Output/Impedance	10.6V (disc) / 1.58kohm		
Input loading	46kohm/750pF	40kohm/750pF	
DC offset, left/right			-0.3mV/-4.5mV
Retail Price			£150



Harman Kardon HK6300

Harman (Audio) UK Ltd, Mill Street, Slough, Berks SL2 5DD.
Tel: (0753) 769111



Just when I thought we'd reviewed every Harman amplifier in existence, it pulls another from the hat. This is the *HK6300*, a model that looks very similar to the *HK6100* (issue 80) and *HK6200* (issue 97) but, featurewise, is linked to the more substantial *HK6500* (issue 92). Got that?

Like its partner, the *HK6300* offers a gaggle of gadgets that include phase-correct loudness, subsonic filtering and mono/stereo mode selection. Then there's the third tape monitor loop, designed to accommodate an external surround processor or, heaven forbid, a graphic.

A couple of selectors distinguish between the remaining tape, video, CD, tuner and phono inputs but there's no independent rec-out facility. And, like the *HK6500*, this amp will also cope with MC in addition to MM phono cartridges.

With all these features, plus tone and balance controls under its wing you'd have thought a 'source direct' option was worth having. Evidently, HK does not. Neither has it fitted decent 4mm terminals for the various A and B speaker outlets - a further indiscretion at this price. The internal construction is rather messy too even if, true to the HK tradition, there's not an IC in sight.

Lab report

Inside it's clear that while the *HK6300* enjoys the add-on facilities and extra MC disc input of the *HK6500*, the main line and power amp circuit is taken from the cheaper *HK6200*. The *HK6300*'s rail voltage is fractionally higher so its power output is proportionally higher too at 61W (8ohms) and 95W (4ohms) respectively. Nevertheless, the 14A current rating is identical. So too is its pattern of distortion which, unlike the *HK6500*, increases from 0.014 to 0.027 per cent as power is increased.

On the other hand, the 3D plot looks a carbon-copy of the *HK6500* because both amps employ the same MC disc input. As

usual, this MC input lacks sufficient headroom (+23.5dB) and precipitates a rash of intermodulation distortions ahead of the power amp stage. This is what lies behind the surge of distortion tracking to and fro across the 3D plot.

It's as well to remember, however, that our listening was accomplished through the MM rather than the MC disc input where its performance is more likely dominated by the power amp.

Sound quality

A chorus of disapproval greeted the first track from our CD selection as the panel cried out for mercy and access to the on/off switch! So, in complete contrast to the warm reception earned by the *HK6500* a year ago, the smaller *HK6300* was roundly condemned. It is an amplifier, the listeners suggested, that combined the ability to be boring as well as offensive — adjectives such as bright, grating, mechanical, edgy, and rasping are just a selection of what it attracted.

Via MM disc it was similarly coarse, percussion was strained while its midband suffered an oddly 'cupped' quality. The bass, meanwhile, was obviously recessed. Asked to elaborate on any favourable quality, a hushed silence descended over the panel. Not a good sign.

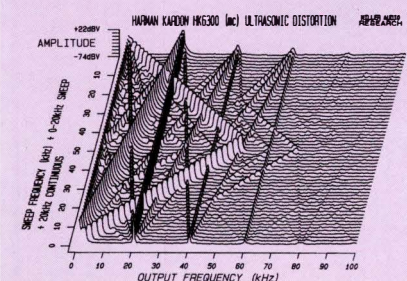
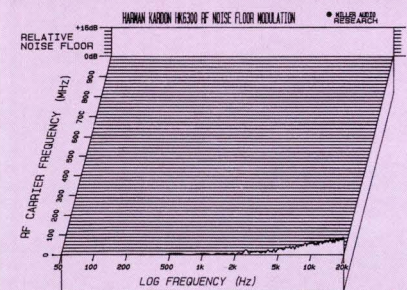
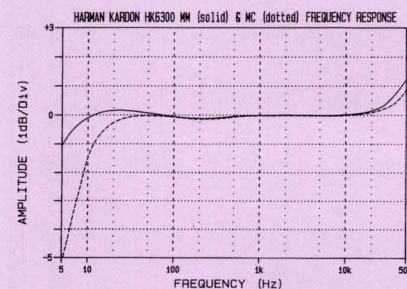
Conclusion

Oh dear! So HK's amplifiers are getting rather long in the tooth, but none of us would have predicted this sort of result. In practical terms the *HK6300* furnishes an adequate series of measurements, characteristic of all its amps in fact. Yet, subjectively, it would appear to be the weakest of the range and clearly related to the cheaper *HK6200*.

To quote one unsympathetic listener 'a good laboratory amplifier but sadly unsuited for audio work'. My sentiments exactly.

TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output			
8ohms	60.4W	61.4W	60.3W
4ohms	92.7W	95.1W	93.2W
Dynamic Headroom (IHF)+1.13dB (79.7W)			
Peak Current (5msec, 1% THD)+14.1A			
Output Impedance 0.151ohm			
Damping Factor 52.9			
	CD/Aux	MM	MC
Stereo Separation			
(1kHz)	81.1dB	75.0dB	74.8dB
(20kHz)	57.1dB	50.0dB	49.9dB
Channel Balance			
(1kHz, -20dBV)	0.39dB	0.44dB	0.51dB
(-60dBV)	1.50dB	1.35dB	1.18dB
Total Harmonic Dist.			
(0dBW)	-76.5dB	-77.4dB	-60.3dB
(2/3 power)	-71.3dB	-72.2dB	-59.4dB
CCIR Intermod. Dist.			
(0dBW)	-76.7dB	-71.5dB	-31.5dB
(2/3 power)	-71.8dB	-71.3dB	-30.9dB
A-wtd Noise			
(0dBW)	-80.5dB	-80.1dB	-76.6dB
(2/3 power)	-92.7dB	-84.2dB	-78.1dB
Residual noise			
(unwtd)	-73.5dBV	-73.5dBV	-73.5dBV
Input Sensitivity			
(for 0dBW)	17.8mV	296µV	14.7µV
(for full output)	142mV	2.36mV	116µV
Disc Overload			
(1kHz)		156mV	7.5mV
(20kHz)		1277mV	27.2mV
(50kHz)		1650mV	19.6mV
Tape Output/Impedance		9.5V (disc)/983ohm	
Input loading		27kohm/380pF	39kohm/125pF
DC offset, left/right			-35.9mV/-10.1mV
Retail Price			£330



Heybrook C3/P3

Heybrook Hi-Fi Ltd, Estover Close, Estover Industrial Estate, Plymouth, Devon PL6 7PL. Tel: (0752) 780311



We first cocked an ear at Heybrook's pre/power combination way back in issue 85 where the *C3/P3* was laid unceremoniously to rest. Prematurely it would seem, for this very early sample has since matured into the more reliable duo presented here. Visually there would appear to be little change, though the *P3* power amp now features two pairs of 4mm sockets per channel as an aid to bi-wiring.

Otherwise the preamp's combination of input and rec-out selectors plus its unusual L/R volume controls (linked via a thread and pulley) have been retained. Still, the 'feel' of the volume controls has been improved even if the appearance of the unit is still, well, quaintly British. Once again, light oak casework is available instead of the ABS mouldings used for the standard models - just add £65 for the power amp and £75 for the preamp.

Inside the preamp any active circuitry is reserved for the MM and MC disc network, as the tuner, CD and video inputs are simply routed via the two parallel volume controls. This so-called passive line stage is mildly sensitive to the capacitance of interconnecting cables, but no more so than conventional add-on passive pots. Either way, the output of today's CD players is more than sufficient to drive the *P3* directly, though you may not achieve full power with all tuners or tape decks.

The *C3* still uses a single-rail shunt-regulated power supply to feed the disc network with, unusually, a DC servo rather than decoupling caps to block the DC offset. Because the preamp lacks any effective

shielding, you'll need to take added care in siting the unit - keep it well away from the *P3* or it'll hum like a good 'un!

Talking of which, Heybrook's *P3* now features improved heatsinking with changes to both the layout and type of cabling used inside. Small changes to the feedback loop have influenced both the gain and linearity of the power amp too, while an extra resistor helps pad the output against capacitive speakers. The *P3* is an inherently stable amp, but it's worth knowing the solid core Heywire speaker cable provides added protection from reactive loads even if it wastes any potential benefit of the low output impedance.

Lab report

Let's start with the *P3* power amp. Having modified its gain both the maximum output, input sensitivity and distortion have been duly effected. It now offers some 146W into 8ohms, rising by +1.9dB to 227W into 4ohm or by +1.3dB (to 196W) under dynamic conditions. The peak current rating of 28A is generous and suggests the *P3* will whip any difficult speaker into shape.

Distortion has dropped by about 10dB to a best figure of 0.012 per cent - a feature clearly revealed by the 3D plot which shows a preponderance of intermodulation rather than harmonic products. On the debit side, however, Heybrook's re-wiring of the amp has altered both its electronic 'environment' and susceptibility to RF noise, reducing activity in the 100-200MHz region while worsening it at 600MHz.

The *C3* preamp has rather less going for

it. Both 3D and response plots show that the general 'character' of the amp is unchanged while the huge 35dB channel balance error at -60dBV means these volume controls have an effective range of just 55dB. More importantly, the passive disc equalisation stage still suffers from inadequate headroom, just +16.9dB relative to IEC levels or a paltry +13.5dB relative to its own non-standard 7.4mV input sensitivity. Some cartridges will barely drive the pre/power combination to full output while others will clip the disc stage on peaks.

To measure the underlying distortion of the disc input I was forced to reduce the test input by 4-5dB, but even under these circumstances THD fell between 0.063-0.14 per cent. At least the second order 'fingerprint' of the 3D plot indicates this is a very innocuous sort of distortion.

Sound quality

Another from the big, bold and powerful school of hi-fi design, remarked our listeners in response to the general 'heftiness' evident through all inputs. This combination has an obvious and unflappable character that manifests in several key areas. For a start our Rachmaninov LP enjoyed a very solid bass, the tympani grunting with confidence just as the woodwind and double bass from the Marty Paich selection grumbled with energy.

Furthermore there was a heightened sense of interplay between individual instruments. Almost as if each performer were working in concert with the others to build an artificially grand acoustic. One listener

TEST RESULTS

described this effect as 'embracing', a most welcoming sound.

This said, the CD input was not quite so convincing. Heybrook's customary weight and enthusiasm was just as evident but the pent-up energy lacked direction and precise focus, lending an amorphous feel to the basic rhythm of the piece. Vocals, too, were slightly gritty in tone even though there was no undue brightness or glare in the voice. In fact the higher harmonics of percussion - and cymbals in particular - seemed rather restrained, dampening the natural fizz and sparkle of the music.

Here was the apparent contradiction of the line input: on the one hand it could sound reserved or even muted while, on the other, it could just as easily seem slightly rough or uncouth. Nevertheless there remains a basic fingerprint stamped over both disc and CD inputs, a performance that's almost always bottom-heavy and, perhaps as a result, marginally understated. A 'dark sound with detail' concluded the panel, closing with the thought that this combination was neither as sophisticated or refined as some of the better integrations in the survey.

Conclusion

Having had time to settle into production, Heybrook's C3/P3 combination emerged all the more successfully this time around. It hardly passed with flying colours but the sound is clearly more robust and confident than it was some 18 months ago. Nevertheless, technical bugbears remain and I'm thinking in particular of its limited disc headroom and the volume controls.

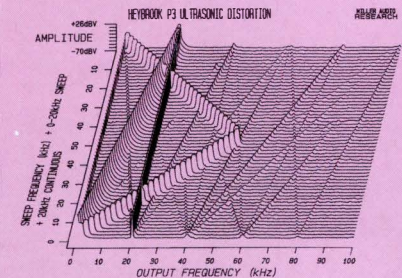
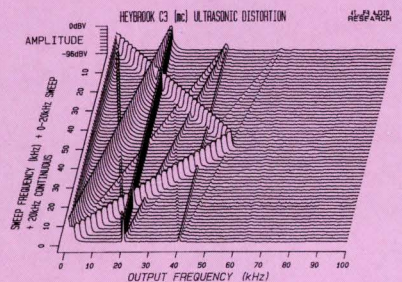
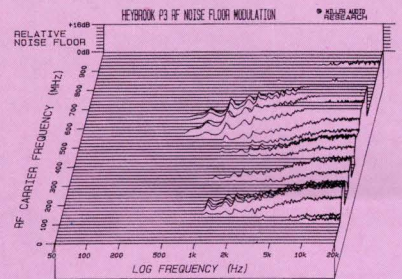
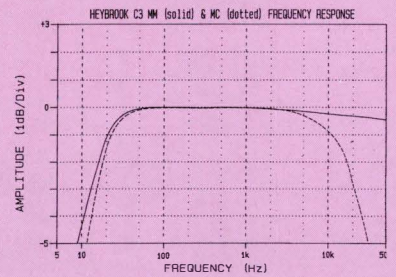
All of which brings us onto the subject of cost, for in its most basic form the C3/P3 has risen in price by a substantial 27 per cent from £898 to £1,139. Bearing in mind the conspicuous home-spun appearance and engineering of these units, I'd say this was rather steep. The listening panel agreed, suggesting the C3/P3 be relegated to Worth Considering status.

Preamplifier: Heybrook C3

	Aux/CD	MM	MC
Stereo separation:			
(20Hz)	99.3dB	83.8dB	53.5dB
(1kHz)	96.7dB	91.8dB	71.6dB
(20kHz)	75.5dB	71.7dB	72.3dB
Channel Balance @ 1kHz:			
(0dBV)	0.00dB	0.03dB	0.07dB
(-20dBV)	1.32dB	0.89dB	0.82dB
(-60dBV)	35.5dB*	37.9dB*	33.8dB*
Total Harmonic Dist @ 0dBV:			
(1kHz)	<-115dB	-63.9dB**	-63.6dB**
(20kHz)	<-110dB	-57.4dB**	-54.9dB**
CCIR Intermod. Dist.	<-110dB	-69.7dB	-57.5dB
A-wtd Noise			
(20Hz-20kHz)	-110.6dB	-75.9dB	-71.6dB
Residual noise			
(unwtd)	-108.8dBV	-108.5dBV	-108.5dBV
Input Sensitivity			
(for 0dBV)	1003mV	7.42mV	713µV
Disc overload:			
(1kHz)		35.0mV	3.32mV
(20kHz)		350mV	33.5mV
(50kHz)		852mV	83.8mV
Input Loading		5.4kohm/80pF	50kohm/100pF
Preamp Output/Impedance		4.77V (disc)	1.49kohm (disc)
DC Offset, L/R			-43µV/-31µV
Retail Price			£479 + £75

Power amplifier: Heybrook P3

	20Hz	1kHz	20kHz
Maximum Continuous Power Output,			
8ohms	145.7W	145.7W	141.5W
4ohms	221.3W	227.3W	225.8W
Dynamic Headroom (IHF)	+1.29dB (195.9W)		
Peak Current		+28.0A	
(5msec, 1% THD)			
Output Impedance	0.057ohm	0.067ohm	0.106ohm
Damping Factor	141.1	119.8	75.4
Stereo Separation			
(0dBV)	122.2dB	111.6dB	82.2dB
Total Harmonic Dist.			
(0dBV)	-77.7dB	-76.2dB	-63.4dB
(2/3 power)	-67.3dB	-78.5dB	-68.2dB
CCIR Intermod. Distortion			
(0dBV)			-75.4dB
(2/3 power)			-79.1dB
A-wtd Noise			
(20Hz-20kHz) 0dBV			-91.8dB
(20Hz-20kHz) 2/3 power			-110.0dB
Residual noise			
(unwtd)			-71.9dBV
Input Sensitivity			
(for 0dBV)			74.6mV
(for full output)			915.2mV
Input Loading			22kohm/230pF
DC offset, left/right			-4.7mV/+8.4mV
Retail Price			£660 + £65



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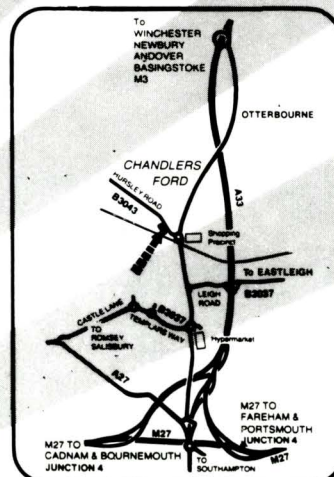
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JVC AX-A441

JVC (UK) Ltd, Eldonwall Trading Estate, 12 Priestley Way, Staples Corner, London NW2 7BA. Tel: (081) 450 3282



One year ago we looked at JVC's no-frills AX-A3, an amp that earned itself a recommendation at just £140. Add another £70 and you end up with the AX-A441, top of JVC's newest range and equipped with rather more frills by way of justification. In reality, however, this amp bears closer comparison with the cheaper AX-A341 - same controls and basic circuitry but topped-off with both MM and MC cartridge options.

These and the other five line inputs are sourced via a couple of rotary controls which also offer independent rec-out selection. Unfortunately only the CD input may truly bypass the extra tone and balance circuits. Still, beneath the titanium coloured bonnet JVC has made a gesture towards short signal paths by employing remote input selectors.

The basic design is from JVC stock: a discrete MC headamp, active RIAA based around a JVC op-amp and a complementary high-gain power amp to complete the package. Tweaky components? Not really but the 'Great Supply' reservoir caps from Nichicon look interesting!

Full electronic protection is provided for the two sets of speaker outputs though JVC's efforts to 'reduce output impedance' and 'render harmless the effects of counter-electromotive forces' are at least partially thwarted by the clumsy speaker selection procedure.

Lab report

Glance at the curves opposite and you'll see that the MM disc response is both amazingly flat but alarmingly extended, peaking by +0.9dB at 0.38Hz before falling sharply to a -3dB point of 0.2Hz. Just sit back and watch those woofers wobble! Otherwise the MM/MC disc inputs are relatively conventional, enjoying very low -90dB and -73dB A-wtd noise figures with a headroom of +28dB and +26.5dB respectively.

On the face of it the +1.9dB boost from 93W to 145W into 4ohm seems good going, but the 11A peak current capability means similar increases will not be sustained into progressively lower speaker loads. On the other hand, judicious application of feedback means that distortion is a fairly consistent 0.001-0.002 per cent - just look at the 3D plot. However, intermodulation increases from 0.0008 per cent (CD) through 0.003 per cent (MM) to 0.03 per cent (MC) as the amplifier's gain is steadily eaten up.

Sound quality

Some liked it, others most certainly did not while the rest 'blew hot and cold'! Our initial impressions were of a big sound, plenty of ambient space and body yet frustratingly devoid of emotion. The tension of Rachmaninov's *Symphony*, for instance, was simply too intangible. Furthermore, disc surface noise seemed to be more obvious than usual, partly because the music itself was both superficial and uninteresting. Not a good start.

With CD in tow it sounded distinctly 'quieter' than other amplifiers we had heard earlier in the day. Our listeners would not condemn it for this of course but were less bashful in their criticism of its 'veiled and recessed presentation', a close sound that robbed Christy Moore's voice of its natural fullness and vibrancy.

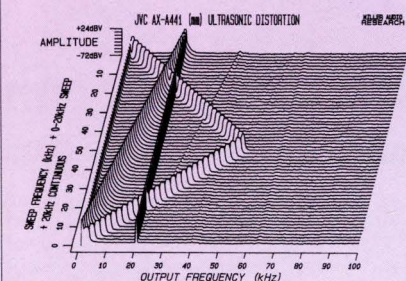
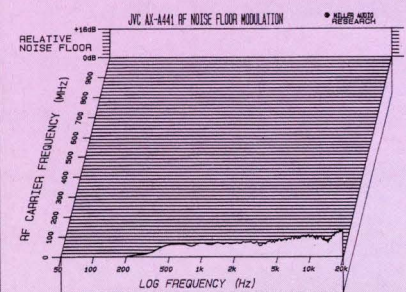
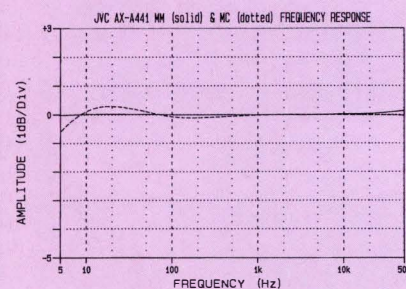
Conclusion

The hesitancy demonstrated by the panel is simply a reflection of the inconsistency of the amplifier itself. It is not an awful product by any means yet, however impressive it might have seemed via Compact Disc on occasions, the end result failed to draw us in.

This leaves us with a technically competent amplifier, designed to pass muster on the lab bench but retire unrewarded in the listening room.

TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output , 8ohms	93.9W	93.2W	80.8W
4ohms	137.9W	144.9W	124.2W
Dynamic Headroom (IHF)+1.32dB(126.2W)			
Peak Current (5msec, 1% THD)	11.0A		
Output Impedance	0.072ohm		
Damping Factor	111.9		
	CD/Aux	MM	MC
Stereo Separation			
(1kHz)	70.8dB	70.1dB	69.5dB
(20kHz)	44.4dB	43.7dB	42.5dB
Channel Balance			
(1kHz, -20dBV)	0.38dB	0.35dB	0.30dB
(-60dBV)	0.30dB	0.33dB	0.35dB
Total Harmonic Dist.			
(0dBW)	-98.4dB	-97.4dB	-91.3dB
(2/3 power)	-99.3dB	-95.6dB	-91.6dB
CCIR Intermod. Dist.			
(0dBW)	-96.2dB	-86.8dB	-64.2dB
(2/3 power)	-95.6dB	-84.8dB	-64.0dB
A-wtd Noise			
(0dBW)	-81.5dB	-80.7dB	-72.7dB
(2/3 power)	-97.9dB	-89.7dB	-73.0dB
Residual noise			
(unwtd)	-79.5dBV	-79.4dBV	-79.4dBV
Input Sensitivity			
(for 0dBW)	23.9mV	294µV	24.4µV
(for full output)	233mV	2.860mV	239µV
Disc Overload			
(1kHz)		126.3mV	10.6mV
(20kHz)		1080mV	92.6mV
(50kHz)		1750mV	240mV
Tape Output/Impedance	10.2V (disc)/788ohm		
Input loading	39kohm/360pF	46kohm/380pF	105ohm
DC offset, left/right	-6.5mV/-7.4mV		
Retail Price	£210		



Kenwood KA-4040R

Trio-Kenwood UK Ltd, Kenwood House, Dwight Road, Watford, Herts WD1 8EB. Tel: (0923) 816 444



Remotely-controlled amplifiers are certainly becoming more popular, particularly when they can be linked to compatible separates like tape decks, tuners and CD players to effect full system control from a single handset. This is certainly the case with Kenwood's *KA-4040R*, an amp that combines sophisticated internal logic with an eccentrically sculptured front panel.

A digital encoder scans the rotary input selector, enabling you to dial-up either MM/MC disc or any of five line sources which are then routed via a series of gas-filled relays. Hi-tech stuff to be sure, but it does successfully isolate all the logic circuitry from the main audio path.

In fact the underlying design of the *KA-4040R* is taken from the older *KA-4020*. Ok, so Kenwood has changed the power amp transistors but the Class A drivers, the power supply and MM/MC phono stage remains pretty much the same. Additional features include A/B speaker switching, loudness, bass/treble and balance controls in addition to a separate (mechanical) rec-out selector. Oh yes, then there's 'Source Direct' which enables you to bypass much of the frippery that you've just paid £220 for.

Lab report

Based on the *KA-4020* it might be, yet Kenwood's revised power amp offers a lower 82W output even if the 11A peak current is in the same ballpark. With all this logic floating about you'd think Kenwood might have used relay-switching for the A/B speaker outputs. But, no, it has stuck with conventional push-buttons and ribbon cabling - a far cry from 'Logical Flow Construction' and sufficient to increase the output impedance to 0.11ohm.

Meanwhile the amp's stereo separation and channel balance have been improved along with the residual hum and noise which clocks in at -75dBV. The MC disc input also

has a good 3dB extra signal to noise at -76dB (A-wtd) though the disc frequency response, ultrasonic distortion (3D plot) and RF performance are virtually identical to the older *KA-4020* (see issue 97). This said, its RF filtering is rather brutal.

Sound quality

With hindsight, not only do the old '4020 and new '4040 share a common technical heritage, but there's also a certain congruence in their subjective performance. Just compare this little lot with the comments made back in issue 97.

A clean, lively and very 'friendly' sounding amplifier, the listeners proposed, and one that paints a fairly realistic picture of dynamics and scale. Nevertheless it was the extra weight and warmth of the MM disc input that attracted the most favourable comments. For here the amp picked out the vibes from Marty Paich's ensemble as eloquently as the delicate bells from Rachmaninov's *Symphony*.

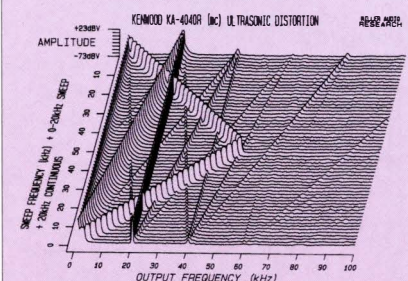
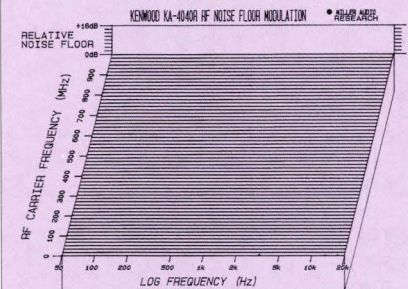
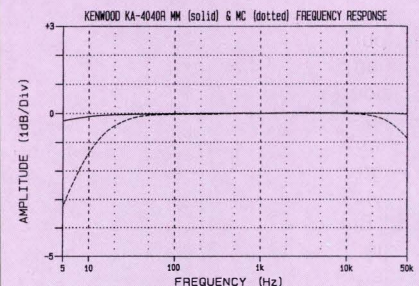
By way of contrast our panel felt its CD input was drier in tone but not as tightly focussed, encouraging a less substantial sound that lacked both body and detail despite its superficial cleanliness. Piano, for example, was lost on the Julia Fordham track just as some percussive detail was submerged by the vocals of Christy Moore. His voice was oddly 'cloyed' in this instance, faintly thick instead of fresh, raw and naturally husky.

Conclusion

The new *KA-4040R* scores plenty of brownie points in the features and flexibility stakes. Yet this hi-tech fledgling is rather less convincing when the chips are down. It's good, certainly, but lacks the spark of vitality, the spirit and atmosphere to conjure a truly persuasive sound. And with a £50 premium on the original *KA-4020*, this does little to help its case.

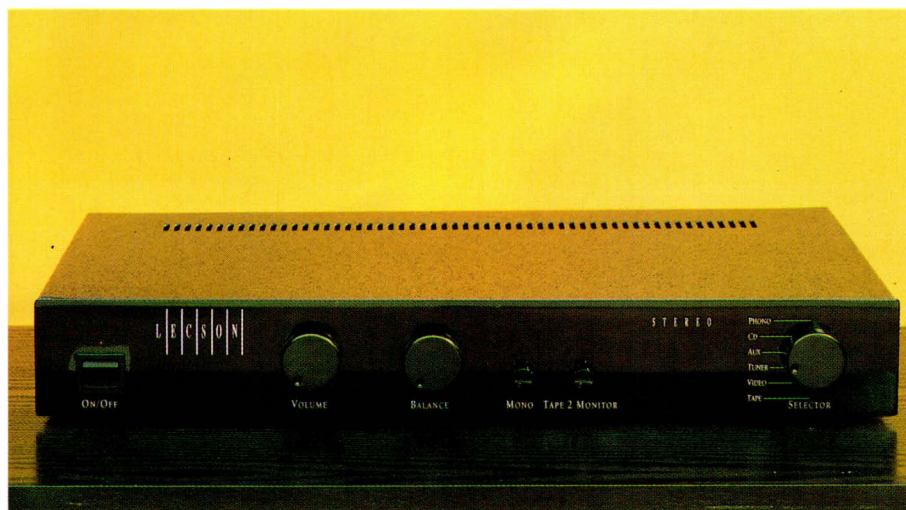
TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output			
8ohms	83.4W	82.1W	81.8W
4ohms	116.0W	120.9W	118.7W
Dynamic Headroom (IHF)+1.34dB (111.9W)			
Peak Current (5msec, 1% THD)+11.0A			
Output Impedance 0.113ohm			
Damping Factor	70.9		
	CD/Aux	MM	MC
Stereo Separation			
(1kHz)	74.0dB	73.5dB	73.1dB
(20kHz)	54.4dB	53.8dB	53.5dB
Channel Balance			
(1kHz, -20dBV)	0.26dB	0.41dB	0.52dB
(-60dBV)	0.75dB	0.82dB	0.98dB
Total Harmonic Dist.			
(0dBW)	-91.0dB	-78.0dB	-76.6dB
(2/3 power)	-74.6dB	-76.9dB	-77.6dB
CCIR Intermod. Dist.			
(0dBW)	-96.1dB	-91.6dB	-89.2dB
(2/3 power)	-73.2dB	-73.4dB	-73.9dB
A-wtd Noise			
(0dBW)	-82.4dB	-81.6dB	-75.1dB
(2/3 power)	-98.5dB	-92.1dB	-75.8dB
Residual noise			
(unwtd)	-75.2dBV	-75.4dBV	-75.5dBV
Input Sensitivity			
(for 0dBW)	26.7mV	327µV	25.7µV
(for full output)	244.3mV	2.99mV	235µV
Disc Overload			
(1kHz)		131.9mV	10.4mV
(20kHz)		1176mV	97.4mV
(50kHz)		1700mV	175mV
Tape Output/Impedance	10.7V (disc) / 1.46kohm		
Input loading	320kohm/230pF	44kohm/680pF	103ohm/1.9mV
DC offset, left/right			-0.9mV/-1.9mV
Retail Price			£220



Lecson Stereo

Advanced Assembly Services Ltd, B1/2 Edison Road Industrial Estate, St Ives, Huntingdon, Cambs PE17 4LF. Tel: (0480) 65552



A cautionary tale this. A tale of an amp that had a Best Buy within its grasp, but blew it at the last fence. You see, the people at Lecson have spent a considerable amount of time and effort getting the construction, finish and sound of the new *Stereo* amp, well, just right.

Its glossy black fascia is obviously based on the successful *Quattro* design (issue 92) and there's even an input for MC as well as MM phono cartridges. You'll have to make do without the separate rec-out facility however, but an additional tape monitor option is provided by way of compensation.

Inside, the high quality sealed ALPs volume control, PMI op-amps in the disc network (as used by Meridian) and TIP141/146 Darlington's in the power amp (as used by Albarry) all have a respectable heritage. Great so far. But unfortunately no-one thought to test the amp near full output for any length of time.

Hook the *Stereo* up to a pair of insensitive speakers, wind up the wick and, before you know it, the output stage overheats, goes short-circuit and sends the substantial 160VA power supply back to meet its maker. Who, incidentally, would have found himself in deep water had any of these amps reached the shops before reaching *Choice* . . .

Lab report

This is a very much more powerful amplifier than the *Quattro*, but one with an unusual pattern of distortion that increases beyond one per cent through 15-60W at 20kHz but falls below one per cent prior to true clipping. Intermodulation also increases from 0.016 to 0.06 per cent with increasing level.

THD through low and mid frequencies is almost exclusively second harmonic (the amp would not have survived the 3D plot).

Sensible design, rather than brutish filtering has eliminated all RF IMD while the low -87dB noise figure (MM), fine +28.5dB

headroom and 2.7mV sensitivity are all quirk-free. Even the tape loop is correctly buffered with a low 6.7ohm output impedance.

Sound quality

The frightening unreliability of the *Stereo*, as supplied, really took the wind from our sails. Teamed-up with a pair of very sensitive speakers, like the Audio Note *Js* used here, it sounds positively glorious. But then we coerced no more than a few watts from this unlucky amplifier - it smoldered but never expired.

Nice to get a decent '3D' picture for once, commented one listener. This was particularly true via MM where it was rich, full but rarely rumbustious, leaving the Rachmaninov *Symphony* to expose its impressive weight, power and authority. Genuinely open and rounded in impact, the panel concurred. At the other extreme its handling of string and percussive tones was equally engaging - sweet but detailed and infused with a captivating ambience.

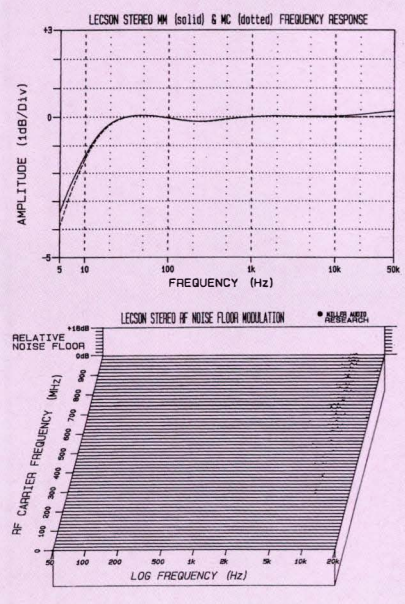
It proved slightly drier and cooler via CD and though this diluted the impact or the 'slap' of skins, it did not detract from the very precise, sophisticated sound and grand sense of performance. Either way its music simply opened out, welcoming in our row of appreciative listeners who, on the basis of this alone, would have awarded it an enthusiastic Best Buy.

Conclusion

'A good bang for the bucks', concluded one listener, not knowing just how close to the truth he was. Still, Lecson has assured us that all future *Stereos* will be furnished with adequate heatsinking. The price might go up by £10 or so to accommodate the extra metalwork. But if it can retain this superb sound quality while improving reliability then it will have a genuine stormtrooper on its hands. Until that time, however, Best Buy status will have to be withheld.

TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output,			
8ohms	71.7W	75.9W	73.5W*
4ohms	108.5W	115.5W	110.2W*
Dynamic Headroom (IHF) wouldn't risk it			
Peak Current (5msec, 1% THD) ditto			
Output Impedance 0.039ohm			
Damping Factor 206.0			
	CD/Aux	MM	MC
Stereo Separation			
(1kHz)	60.4dB	63.7dB	64.9dB
(20kHz)	35.4dB	38.9dB	40.2dB
Channel Balance			
(1kHz, -20dBV)	0.20dB	0.16dB	0.14dB
(-60dBV)	0.15dB	0.18dB	0.21dB
Total Harmonic Dist.			
(0dBW)	-78.1dB	-78.0dB	-79.7dB
(2/3 power)	-74.8dB	-75.1dB	-79.3dB
CCIR Intermod. Dist.			
(0dBW)	-70.3dB	-73.0dB	-60.0dB
(2/3 power)	-58.8dB	-59.9dB	-62.1dB
A-wtd Noise			
(0dBW)	-76.9dB	-76.4dB	-67.7dB
(2/3 power)	-90.8dB	-86.5dB	-68.9dB
Residual noise			
(unwtd)	-61.3dBV	-61.4dBV	-61.4dBV
Input Sensitivity			
(for 0dBW)	74.8mV	308µV	28.7µV
(for full output)	658.4mV	2.68mV	252µV
Disc Overload			
(1kHz)		130.5mV	12.0mV
(20kHz)		1025mV	86.5mV
(50kHz)		1369mV	125.5mV
Tape Output/Impedance		12.1V (disc) / 6.7ohm	
Input loading	65kohm/100pF	30kohm	100ohm
DC offset, left/right		-21.4mV/-23.5mV	
Retail Price			£200



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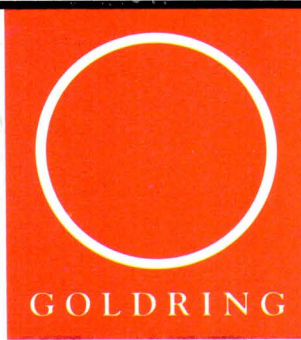
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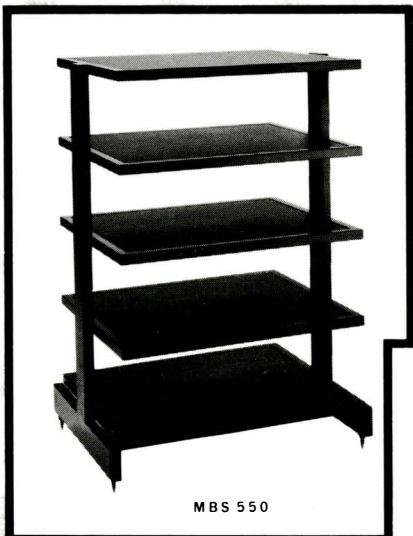


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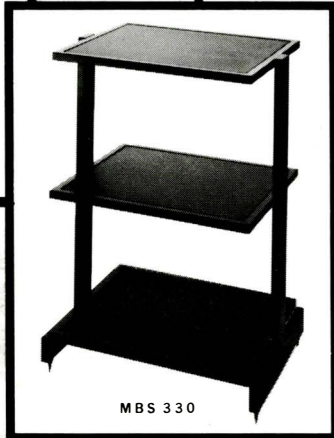
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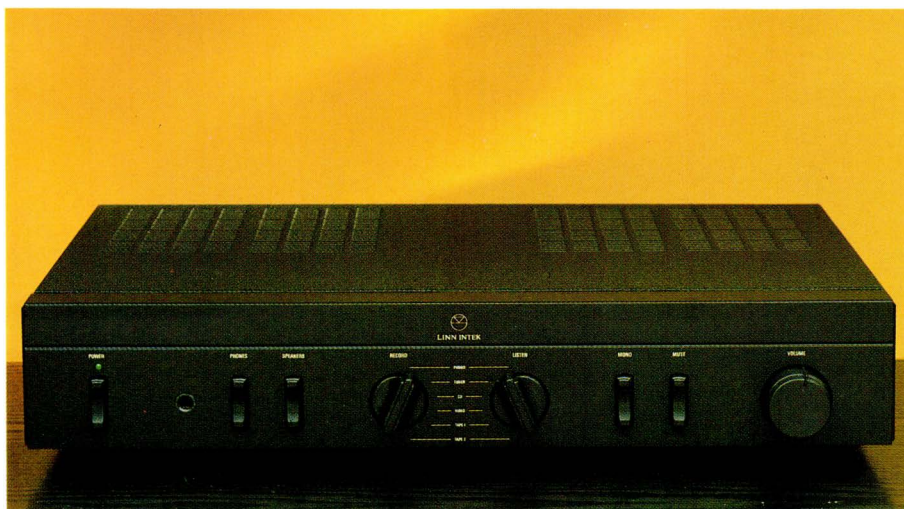


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Linn Intek (II)

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Magnanimous to a fault, not only has Linn implemented a variety of improvements to its *Intek* amplifier but it has also slashed the price by an amazing £150. A new robot-testing system and in-house PCB facility may have improved production efficiency but it was left to our last amplifiers survey to highlight a basic design fault in the original *Intek*.

As a consequence all *Inteks* purchased after June 1991 benefit from significant internal revisions even if there's no obvious evidence of change. When it suits Linn, it would seem that specifications are more relevant to hi-fi than bananas . . .

It's hard to fault the *Intek's* construction with its reinforced alloy fascia, over-sized power supply and beautifully designed circuit-board. From the outside you only get to see various plastic controls catering for independent rec-out and input selection, volume, mute and speaker/headphone options. But inside you'll find quality components like Rubycon BGF signal-path electrolytics (made popular by Rotel) plus precision polypropylene and polystyrene caps dotted throughout the part-active, part-passive disc equalisation network.

Lab report

This amplifier is equipped with an incredibly 'stiff' power supply, executing a near-perfect +2.9dB increase from 55W into 8ohm to 106W into 4ohm. On the debit side this also puts the brakes on its dynamic headroom (just +0.4dB) even though the substantial 20A peak current capability is not to be sniffed at.

Linn has revised the gain of the *Intek* so it's now substantially more sensitive via all inputs (2.2mV rather than 3.9mV via MM disc for instance). Distortion from 1W to two-thirds output remains a constant 0.006 per cent through the midband.

Nevertheless, premature slewing means that odd-order IMD is still some 25dB higher

than the second order figure quoted in the test, a feature that also limits its headroom - especially via MM disc. Furthermore distortion also picks up when driving lower impedances (a parasitic RF resonance is no help) as you can see from the, well, very 'busy' 3D plot.

Sound quality

Our first review of the *Intek* was superceded by changes to its design and so never appeared, as planned, in issue 97. At the time it was applauded for its fine sense of control, bringing deeper and more resonant strings like the cello to the fore. Yet others complained of a lack of liveliness or oomph, for though the extra bass was welcome it seemed to 'drag its feet'.

Now, six months on, the same panel of listeners thought the amp sounded intrusively loud 'from the word go'. It was not busy and ripe with detail like the Rotel (another loud-sounding amp) but rather abrasive and lacking in weight or purpose. Soundstaging was pretty good, the panel ventured, and its sense of life was also admirable, but there was not the beefy confidence or authority to support its forward character.

The Rachmaninov *Symphony* sounded slightly brash or 'hi-fi' but the amp could just as easily sound grey and uninteresting. Via Compact Disc its sound hardened still further, exacerbating any natural sibilance and causing several members of the listening panel to visibly wince.

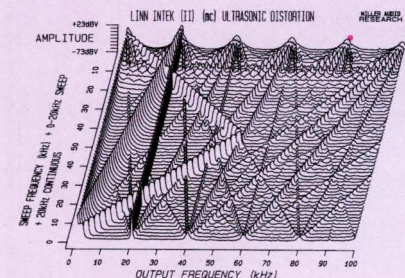
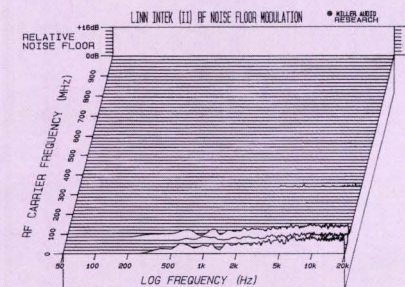
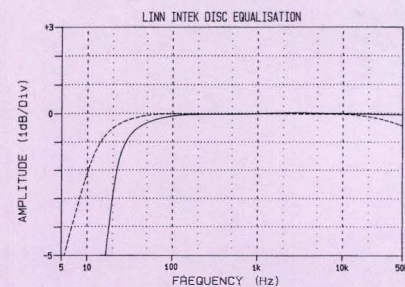
Conclusion

Significantly improved or not, Linn's latest *Intek* is still a rather mixed-up product betraying a mix of excellence and oversight in its technical design. Drawing aside some bugs has simply exposed others, lying undisturbed beneath.

Informed of the price our listeners concluded it was 'not in the game'.

TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output			
8ohms	54.0W	54.5W	51.9W
4ohms	105.0W	106.1W	102.0W
Dynamic Headroom (HF)+0.42dB (60.0W)			
Peak Current (5msec, 1% THD)+19.9A			
Output Impedance 0.011ohm			
Damping Factor 756.2			
	CD/Aux	MM	MC
Stereo Separation			
(1kHz)	83.1dB	84.5dB	84.2dB
(20kHz)	62.7dB	61.9dB	61.1dB
Channel Balance			
(1kHz, -20dBV)	0.13dB	0.15dB	0.17dB
(-60dBV)	0.08dB	0.09dB	0.11dB
Total Harmonic Dist.			
(0dBW)	-86.4dB	-85.0dB	-84.0dB
(2/3 power)	-86.0dB	-86.8dB	-85.3dB
CCIR Intermod. Dist.			
(0dBW)	-96.1dB	-53.9dB	-78.3dB
(2/3 power)	-78.7dB	-53.3dB	-78.2dB
A-wtd Noise			
(0dBW)	-81.1dB	-79.2dB	-78.5dB
(2/3 power)	-94.1dB	-83.1dB	-81.9dB
Residual noise			
(unwtd)	-67.7dBV	-67.6dBV	-67.6dBV
Input Sensitivity			
(for 0dBW)	28.9mV	302µV	28µV
(for full output)	216.5mV	2.20mV	203µV
Disc Overload			
(1kHz)		73.8mV	6.75mV
(20kHz)		185mV	16.3mV
(50kHz)		165mV	14.5mV
Tape Output/Impedance		7.0V (disc) / 535ohm	
Input loading		19kohm/100pF	46kohm/100pF
		98.5ohm	
DC offset, left/right		+19.5mV/-2.2mV	
Retail Price			£398



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Marantz PM-30

Marantz Hi-Fi (UK) Ltd, Kingsbridge House, Padbury Oaks, 575-583 Bath Road, Longford, Middlesex UB7 0EH. Tel: (0753) 680 868



This review is a somewhat belated look at a product that serves as the building-block for Marantz' popular *PM-30SE*. We reviewed that amp way back in issue 92 but, as you might expect, the basic *PM-30* itself is no mere also-ran. You'll save some £30 over the SE version, trading the option for quick and easy bi-wiring for a pair of bass and treble tone controls. Controls, I might add, that can be bypassed along with the tape monitor and balance facilities by opting for the 'Source Direct' mode.

Round the back lurk a single set of unswitched speaker terminals but exactly the same range of MM disc, three line and two tape inputs. Inside, however, the *PM-30* is saddled with Marantz' most basic power supply, including a pair of 4700µF reservoir caps that are best described as 'cute'.

The topology of the moving magnet disc and line stages remains largely unchanged but costs are saved by using a cheaper op-amp in the RIAA network and ceramic rather than polystyrene capacitors for input filtering. Nasty things, ceramic coupling-caps, even if the *PM-30* seems to emerge unscathed.

The power transistors are less substantial too, though this has little effect unless it's asked to drive insensitive or arduous speaker loads. Otherwise the *PM-30* is an elegant, well-finished and quirk-free design.

Lab report

Compare these results with those in issue 92 and you'll see the only advantage offered by the *PM-30SE* is an extra 2.2A of available current and a very slight increase in power at 20kHz. Distortion has hardly budged, clocking-in at a reliable 0.0056 per cent (two-thirds output) from input to input. Indeed, the respective 3D plots are nigh-on indistinguishable, as are the frequency response curves for both CD and MM disc inputs.

The *PM-30* retains its admirably wide S/

N ratio with some 86.8dB available via MM and 99.5dB via CD (A-wtd). Plenty of headroom, too, on the disc input though the slight deterioration in channel separation and balance are probably within the tolerances of manufacture.

Sound quality

Congratulations for its lively, expressive sound and impressive strength of bass, this amplifier made all our listeners sit up and take notice. Marty Paich's trombone took on a genuine sense of life and vitality while the Rachmaninov *Symphony* growled with a tension matched only by the Rotel and Lescon amplifiers.

The various detachments of strings and horns were also defined with pin-point clarity, though no mention was made of the extra warmth attributed to the *PM-30SE* a year ago.

Turning to the CD input revealed new string detail on the Julia Fordham CD, a disc which was now blessed with a marvellous sense of space and vocal clarity without any obvious compromise in bass or treble extension. Christy Moore now had his rich, rough timbre returned intact - full of emotion and 'presence'.

Conclusion

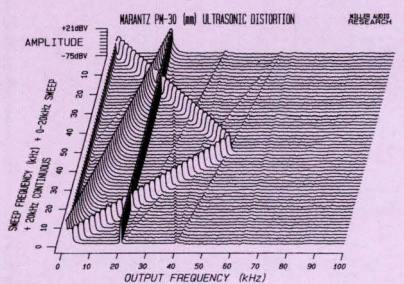
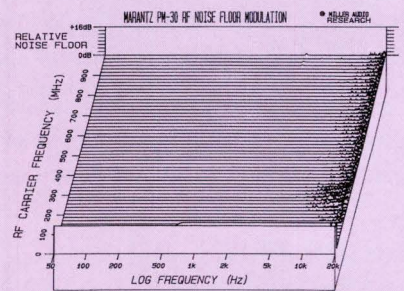
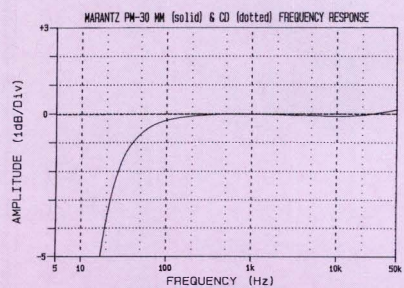
A year ago Marantz' Special Edition *PM-30* just failed to retain a Best Buy because of its attractive, but sadly inconsistent performance between inputs. This time around and with the unadulterated product in the hot seat, our listeners found very little to criticise.

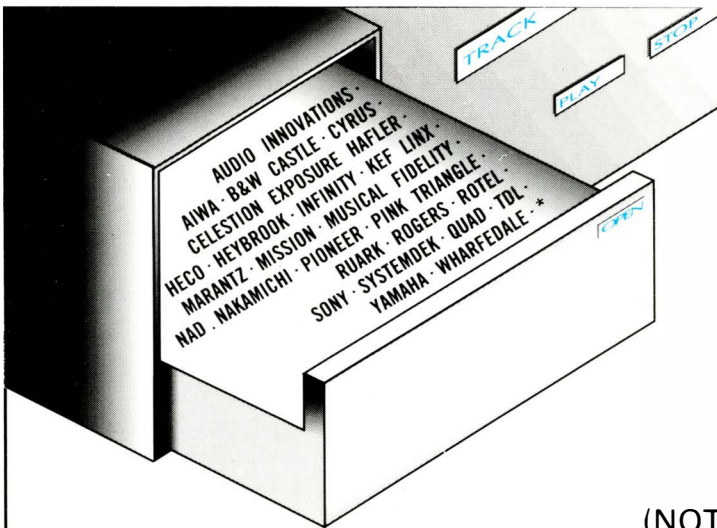
All inputs scored highly, though CD nudged ahead of MM disc with its marginally better dynamics and explicit resolution. A superb all-rounder, they volunteered, which at just £130 makes an excellent choice for the first-time buyer. And with no technical quibbles to blot its copybook, the *PM-30* drops neatly into the Best Buy slot.

TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output			
8ohms	45.1W	49.0W	43.5W
4ohms	60.2	69.5W	62.6W
Dynamic Headroom (IHF)	+1.39dB (67.5W)		
Peak Current (5msec, 1% THD)	10.9A		
Output Impedance	0.046ohm		
Damping Factor	173.8		

	CD/Aux	MM
Stereo Separation		
(1kHz)	84.9dB	83.2dB
(20kHz)	62.6dB	60.9dB
Channel Balance		
(1kHz, -20dBV)	0.23dB	0.23dB
(-60dBV)	1.15dB	1.15dB
Total Harmonic Dist.		
(0dBW)	-96.3dB	-94.6dB
(2/3 power)	-85.0dB	-84.5dB
CCIR Intermod. Dist.		
(0dBW)	-96.2dB	-85.6dB
(2/3 power)	-96.0dB	-84.6dB
A-wtd Noise		
(0dBW)	-89.9dB	-84.5dB
(2/3 power)	-99.5dB	-86.8dB
Residual noise		
(unwtd)	-76.9dBV	-76.9dBV
Input Sensitivity		
(for 0dBW)	29.7mV	509µV
(for full output)	210mV	3.62mV
Disc Overload		
(1kHz)		167.7mV
(20kHz)		149.3mV
(50kHz)		199.5mV
Tape Output/Impedance	10.1V (disc)/218ohm	
Input loading	32kohm/210pF 49kohm/180pF	
DC offset, left/right	-0.7mV/-0.3mV	
Retail Price	£130	





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Dick Olsher, Stereophile. Vol.14 No.11 November 1991

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Pioneer A-229

Pioneer High Fidelity (GB) Ltd, 1-6 Field Way, Greenford, Middlesex UB6 8UZ. Tel: (081) 575 5757



Having broken the mould with superb, fuss-free amplifiers like the A-400 and A-300, Pioneer's engineers must have suffered a relapse when they conceived the A-229. This is one of two very conventional budget amps that are clearly aimed at a wider audience than their illustrious companions.

Nothing wrong with that of course, but the budgeting of this product has been spread thin to accommodate niceties like balance and tone controls, A/B speaker switching and a second tape monitor loop for connection to a graphic or surround-sound processor.

A rotary selector hops between the remaining three line inputs and a MM disc stage, while a 'Direct' facility allows you to bypass much of the frippery. For some unknown reason, however, Pioneer's loudness control remains in-circuit. Still, the slim profile and uncluttered fascia of the A-229 gives it a graceful appearance even if, round the back, you're faced with a set of truly ghastly spring-clip speaker terminals.

Inside we have a classic example of - how can I put it - cost-effective engineering. Disc equalisation is based around a cheap and cheerful op-amp while the entire power amp assembly is condensed into a hybridised block from STK. Electronic speaker protection is provided and Pioneer has even attempted to shorten signal runs by using a remotely-controlled selector switch.

Lab report

Unfortunately Pioneer's 'nice touch' is stomped on by the lengths of ribbon cabling that run from the integrated power amp to the A/B speaker selector and back out to the spring-clip terminals. Hence the high 0.24ohm output impedance, sufficient in my view to degrade bass performance while making the amp more susceptible to non-linearities in the speaker's crossover.

To make matters worse, Pioneer has

also loomed this cabling up with the mains and power supply wiring! It's a wonder the residual noise is as low as -74.4dBV. Feedback keeps distortion in the 0.0025-0.005 per cent range though, outside of the audio band, reduced levels of compensation see second, third and fourth order intermodulation products creeping into the picture (3D plot).

Power is up on Pioneer's specification at 60W but I'd not fancy its chances into difficult or multiple speaker loads - the 8A current and +1.1dB rise into a 4ohm load indicate it's beginning to struggle.

Sound quality

Somewhat predictably, this amplifier proved to be very consistent from input to input, offering a decidedly even-handed if not exactly thrilling sound. All our listeners thought it lacked 'drama and spirit', though its warm balance and polite presentation did not interfere with the natural 'bounce' or rhythm of the music.

Warm and unmuddled, certainly, but fighting shy of grandiose dynamics meant the tumultuous opening of Rachmaninov's *Symphony* simply, in the view of the panel, 'just failed to happen'. It was clean, quiet, smooth and pleasantly detailed yet soft of focus and lacking bite and impact.

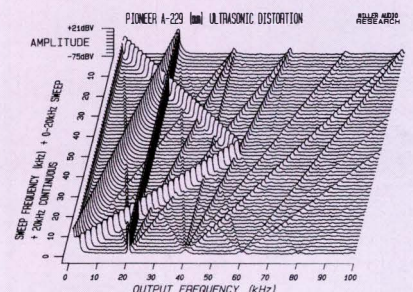
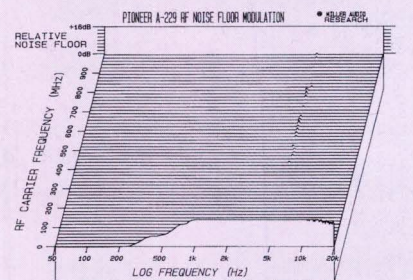
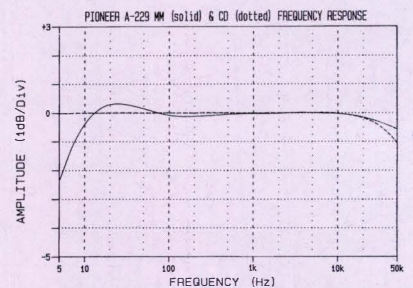
Its imaging of individual performers was just as good throughout the Julia Fordham CD, a stable sound with no exaggeration of her natural sibilance. Nevertheless there was still this all-pervading civility, a softly-softly approach that failed to reflect the 'true grit' of real-life music.

Conclusion

Here is an easy-going and thoroughly unflagging amplifier that, while harbouring no unpleasant foibles, is equally unlikely to kindle sparks of passion. It has its virtues, to be sure, but prefers to cruise rather than stride its way through the music.

TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output,			
8ohms	54.5W	60.3W	50.4W
4ohms	71.5W	77.5W	64.2W
Dynamic Headroom (IHF)+1.17dB (78.9W)			
Peak Current (5msec, 1% THD)	8.1A		
Output Impedance	0.235ohm		
Damping Factor	34.1		
	CD/Aux	MM	
Stereo Separation			
(1kHz)	70.0dB	69.1dB	
(20kHz)	47.5dB	44.9dB	
Channel Balance			
(1kHz, -20dBV)	0.05dB	0.07dB	
(-60dBV)	0.73dB	0.75dB	
Total Harmonic Dist.			
(0dBW)	-87.4dB	-86.4dB	
(2/3 power)	-90.2dB	-92.4dB	
CCIR Intermod. Dist.			
(0dBW)	-95.9dB	-88.5dB	
(2/3 power)	-96.1dB	-85.9dB	
A-wtd Noise			
(0dBW)	-82.2dB	-75.8dB	
(2/3 power)	-93.0dB	-77.6dB	
Residual noise			
(unwtd)	-74.4dBV	-74.5dBV	
Input Sensitivity			
(for 0dBW)	25.1mV	406µV	
(for full output)	197mV	3.11mV	
Disc Overload			
(1kHz)		163.2mV	
(20kHz)		142.2mV	
(50kHz)		245.0mV	
Tape Output/Impedance	10.1V (disc)/2.6kohm		
Input loading	77kohm/800pF 55kohm/400pF		
DC offset, left/right	-4.3mV/-6.4mV		
Retail Price	£130		

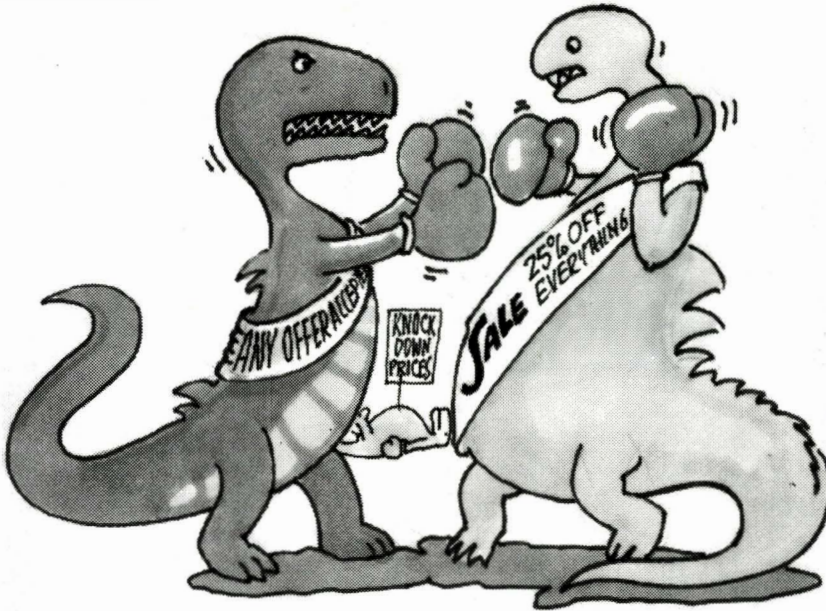


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Rotel RA-930AX

Gamepath, 25 Heathfield, Stacey Bushes, Milton Keynes
MK12 6HR. Tel: (0908) 317 707



If you had an award-winning budget amp on your books and the time came to update the range, would you junk a successful design? Of course not and neither has Rotel. So when the popular RA-820AX had run its course it simply re-arranged the fascia and tinkered with the circuit layout before re-launching it as the RA-930AX!

The style of this amp compliments Rotel's other 900 Series separates with its centralised volume control and new, luxurious finish. Yet like the RA-820AX it caters for MM disc, CD, tuner, aux and tape inputs with both switchable tone controls and a second set of speaker outlets. Nothing ostentatious, then, but perfectly adequate for the keen listener.

Inside there is the same series-feedback RIAA stage with its Signetics op-amp and traditional Sanyo-based power amp. However the layout of the PCB is now wholly symmetrical, a change known to improve upon the breadth and depth of stereo soundstaging, while star-earthing and Rhoderstein signal-path resistors complete the evolution. All this with an increase of just £10 since we reviewed the RA-820AX in issue 80. Not bad, huh?

Lab report

By way of recompense the power output has edged up from 47W to 53W (8ohm) and 69W to 77W (4ohm) though the headroom and peak current are quite unchanged. Stereo separation, channel balance and the low 0.006ohm output impedance have all taken a turn for the better while the DC offset is still too high!

Rotel has obviously changed the feedback operating about the power amp, for the overall sensitivity is reduced while distortion has increased from 0.0013 to 0.007 per cent at two-thirds output - just compare the 3D plot with that in issue 80. The disc response is identical, by the way.

Sound quality

This was one of just two or three amps that gave us the distinct impression of playing louder than usual, despite the outputs of all contenders being matched at precisely the same level. Both vinyl and CD inputs were similarly influenced, pulling up low-level detail from a deathly silent background - detail that was often masked elsewhere.

This prompted a slight split in opinion. Some were mildly aggravated by the immediacy and 'loudness' of its presentation yet were bound to acknowledge its biting clarity and insight. Larger than life, the panel suggested - a truly surrealistic performance! Ordinarily, of course, they would have reduced the volume a notch or two.

Meanwhile the remainder of the panel were captivated by the clean, even-handed and thoroughly involving sound. The sort of sound that enhanced the femininity of Julia Fordham's voice while exposing percussive and string detail from both pop and classical discs with exquisite clarity. Notes grew and faded with realistic presence, a trait, along with the sheer vibrancy and tension of the music, that prompted one listener to correctly identify this as a Rotel amp. Not once, I might add, but in two consecutive blind listening sessions.

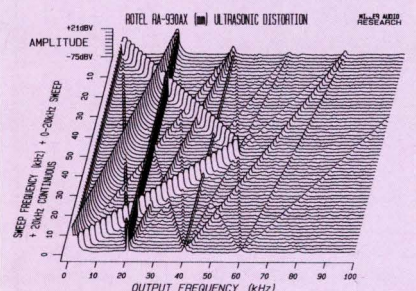
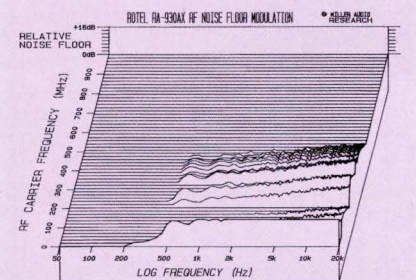
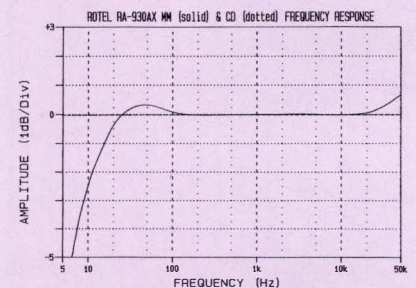
Conclusion

'A real scorcher' was the overwhelming response of the *Choice* listening panel. But so it should have been. After all these were the same people that voted its predecessor - the RA-820AX - a Best Buy exactly two years ago! In common with this classic, the RA-930AX bundles across a wealth of busy, intriguing musical detail with bags of enthusiasm.

Indeed, it was voted second only to the Lecson for its ability to invoke powerful, emotive music. This, plus its technical competence and reliability, maintains the family tradition for Best Buys.

TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output,			
8ohms	47.5W	52.5W	50.4W
4ohms	66.6W	76.7W	74.9W
Dynamic Headroom (IHF)+1.36dB (72.0W)			
Peak Current (5msec, 1% THD)+12.5A			
Output Impedance 0.0058ohm			
Damping Factor 1391.3			
	CD/Aux	MM	
Stereo Separation			
(1kHz)	81.8dB	80.5dB	
(20kHz)	56.8dB	54.5dB	
Channel Balance			
(1kHz, -20dBV)	0.21dB	0.27dB	
(-60dBV)	0.31dB	0.42dB	
Total Harmonic Dist.			
(0dBW)	-82.3dB	-85.7dB	
(2/3 power)	-83.3dB	-83.4dB	
CCIR Intermod. Dist.			
(0dBW)	-87.8dB	-76.7dB	
(2/3 power)	-90.7dB	-77.5dB	
A-wtd Noise			
(0dBW)	-86.3dB	-79.8dB	
(2/3 power)	-98.1dB	-80.7dB	
Residual noise			
(unwtd)	-72.0dBV	-72.0dBV	
Input Sensitivity			
(for 0dBW)	27.6mV	450µV	
(for full output)	201.6mV	3.29mV	
Disc Overload			
(1kHz)		181.1mV	
(20kHz)		166.0mV	
(50kHz)		317.5mV	
Tape Output/Impedance	11.2V (disc) / 2.0kohm		
Input loading	30kohm/125pF 47kohm/180pF		
DC offset, left/right	+75.5mV/+78.5mV		
Retail Price			£160



Rotel RC-960/RB-960BX

Gamepath, 25 Heathfield, Stacey Bushes, Milton Keynes
MK12 6HR. Tel: (0908) 317 707



Changing from a conventional integrated amplifier to a pre/power combo represents a classic upgrade for most enthusiasts. And now, with the introduction of Rotel's new '960BX combination, this particular avenue is made all the more accessible. An 80W power amp, bridgeable to over 200W, plus a MM and MC preamp for the grand total of just £330.

What you won't find in the promotional literature is the fact that Rotel's new RB-960BX power amp is actually an older RB-850 with a new set of clothes. Ok, so Rotel has opted for trendy Rhoderstein resistors and BGF coupling caps but the circuit itself remains unchanged. This is not meant as criticism: after all, why try to fix something when it's not broken?

So the power amp remains a heavy-weight dual-mono design, featuring separate L/R mains transformers, squat HPS reservoir caps and the traditional RA-820/850/870 power amp circuit using Rotel's favourite Sanyo devices. Once again, bridging is accomplished at the flick of a switch, feeding the output of one channel (suitably attenuated) into the inverting input of the other. All you need is another RB-960BX for high-power stereo operation.

By contrast the partnering RC-960BX preamp is an entirely new design - inside and out. It's an elegant unit featuring a simple friction-locked volume control, defeatable tone controls and separate input and rec-out selectors for up to six different sources. These include two tape decks, aux, tuner and CD line sources plus both MM and MC cartridges.

Lift the lid and you'll see a new phono stage, employing a discrete differential input together with TL071 op-amps which form the MM/MC headamp. Polystyrene caps are visible in the passive HF equalisation section while popular Signetics NE5534AN op-amps make up the active LF stage. BGF decoupling electrolytics are used again but, unusually, these are also shunted using 0.1µF mylar caps.

Both the line and tone amplifiers are based around dual-channel 5532ANs with a nasty little JRC op-amp included as a token gesture for the headphone amp! A neat design overall, well executed and superbly finished for the price.

Lab report

For a £150 preamplifier, the RC-960BX turns in a very respectable set of figures! It's certainly a very linear amp with distortion typically in the 0.001 per cent ballpark regardless of input or frequency. The 3D plot betrays not a hint of intermodulation or harmonic distortion above the noise of the MC disc input. Impressive stuff. Rotel's new disc stage is also more extended than in past designs, maintaining a flat response from 20Hz-50kHz with a -3dB point of just 2.6Hz via both MM and MC.

The 2.8dB channel balance error is within the 3dB specification of the ALPs volume control though the S/N ratio obtained via MM disc is less impressive thanks to a high 50Hz component. By contrast the -75dB A-wtd figure yielded by the MC input is controlled less by hum and more by white noise which peaks from 800Hz-6kHz.

The RB-960BX power amp comfortably exceeds its 60W rating with an 8ohm dynamic headroom of 129W and hearty peak current of +20A. Following in the tradition of earlier Rotel amps, the output impedance is usefully low at 0.01ohm (20Hz) though, compared to the preamp, distortion is slightly higher. This is obvious enough from the 3D plot which shows a smattering of low-level intermodulation products.

I'm more concerned about its sensitivity to RF noise, however, as the plot highlights major problems in the 200, 400 and 800MHz regions. It's interesting to note that both pre and power amp (and RA-930AX integrated) have spaces left on their PCBs to accommodate the RC filters necessary to pass tough European FTZ regulations on interference. So this same pre/power combo bought in Germany, say, would be less susceptible to RF garbage even if, as a consequence of the ghastly ceramic caps, they would sound much worse! Whatever happened to the harmonisation of 1992?

Sound quality

None of this had transpired before the listening tests so the mixed reaction prompted by differences between the MM and CD inputs were quite unexpected. In the first instance the panel thought it dramatic, equipped with a solid foundation yet without the breadth and depth of the very best.

We discovered that despite its rather fuzzy sense of stereo there was still a good 'detachment' of individual sounds. Single instruments or performers were simply not as sharply focussed as they might have

TEST RESULTS

been. Yet this did little to dampen the genuine ring and sparkle of percussion from our Marty Paich jazz selection, and the vibes sounded quick, involving and sonorous.

Rachmaninov's *Symphony* lacked the impressive weight of the Heybrook, for instance, but nonetheless confidently sustained a great deal of the drama of the performance. So the only real criticism of the disc stage concerned its conservative sense of space and focus. By contrast the CD input sounded loud, stark and unfriendly - classic symptoms of the RF interference encountered during the measurement program.

In this instance the electronic ambience accompanying Julia Fordham's voice was intrusively 'fizzy', 'rather like a UV fly-zapper' suggested one listener in graphic terms. Another found it laboured, not slow exactly but rather mechanical and lacking in fluidity, as if it were struggling to make sense of the music's direction. He, at least, was underwhelmed.

Conclusion

Make no mistake, this pre/power combination is potentially more flexible than a competing integrated model but, as it stands, will not necessarily reward you with great gains in sound quality. Rotel's *RB-960BX* power amp seems very susceptible to RF interference, a factor that may well have undermined its performance in our listening. But with other CD players, well, who knows...

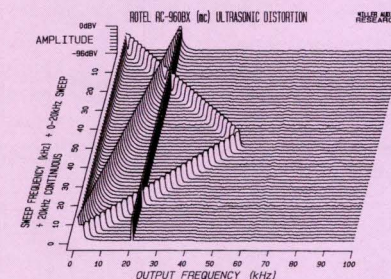
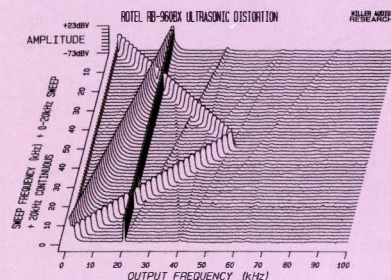
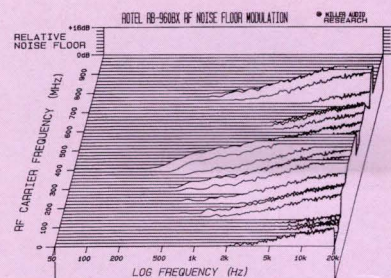
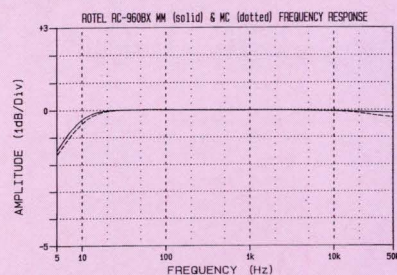
So, as it stands the *RC/RB-960BX* was pipped at the post by budget favourites from Pioneer, Marantz and, naturally enough, Rotel. Nevertheless with the potential for long pre/power runs, remote power amp siting and bridging all in tow it would be churlish not to recommend the duo at this extraordinarily low price. Once the listening panel clapped eyes on this combination, they wholeheartedly agreed, and voted it 'exceptional value'.

Preamplifier: Rotel RC-960BX

	Aux/CD	MM	MC
Stereo separation:			
(20Hz)	105.8dB	101.5dB	95.9dB
(1kHz)	82.0dB	81.9dB	81.3dB
(20kHz)	56.4dB	55.9dB	55.7dB
Channel Balance @ 1kHz:			
(0dBV)	0.03dB	0.01dB	0.05dB
(-20dBV)	0.16dB	0.15dB	0.22dB
(-60dBV)	2.84dB	2.22dB	2.30dB
Total Harmonic Dist @ 0dBV:			
(1kHz)	-96.1dB	-99.8dB	-99.1dB
(20kHz)	-100.4dB	-100.9dB	-101.9dB
CCIR Intermod. Dist.			
(-102.7dB)	-102.7dB	-95.7dB	-97.6dB
A-wtd Noise			
(20Hz-20kHz)	-97.6dB	-79.2dB	-75.0dB
Residual noise			
(unwtd)	-101.2dBV-101.1dBV-101.1dBV		
Input Sensitivity			
(for 0dBV)	156.3mV	2.39mV	221µV
Disc overload:			
(1kHz)	168.8mV	15.3mV	
(20kHz)	1565mV	143.5mV	
(50kHz)	1740mV	167.9mV	
Input Loading	47kohm/100pF	47kohm/160pF	100ohm
Preamp Output/Impedance		11.0V (disc) / 104ohm	
DC Offset, L/R		-16µV/-45µV	
Retail Price			£150

Power amplifier: Rotel RB-960BX

	20Hz	1kHz	20kHz
Maximum Continuous Power Output,			
8ohms	77.4W	79.9W	77.1W
4ohms	106.1W	114.4W	111.2W
Dynamic Headroom			
(IHF)		+2.08dB (128.9W)	
Peak Current			
(5msec, 1% THD)		+20.2A	
Output Impedance	0.01ohm	0.014ohm	0.012ohm
Damping Factor	802.4	557.2	682.8
Stereo Separation			
(0dBV)	89.3dB	87.3dB	87.6dB
Total Harmonic Dist.			
(0dBV)	-86.8dB	-96.1dB	-81.3dB
(2/3 power)	-83.9dB	-89.8dB	-79.2dB
CCIR Intermod. Distortion			
(0dBV)			-88.5dB
(2/3 power)			-80.3dB
A-wtd Noise			
(20Hz-20kHz) 0dBV			-103.3dB
(20Hz-20kHz) 2/3 power			-118.8dB
Residual noise			
(unwtd)			-82.9dBV
Input Sensitivity			
(for 0dBV)			119.4mV
(for full output)			1079mV
Input loading		+8.2mV/+15.1mV	
DC offset, left/right		28kohm/160pF	
Retail Price			£180



Sony TA-F440E

Sony UK Ltd, Sony House, South Street, Staines, Middlesex. Tel: (0784) 467000



Reeling from the success of recent 'UK-oriented' amplifiers, Sony has decided that it, too, can produce an amp without tone or balance controls. So the TA-F440E is just as big and bold in appearance as its predecessors but its hefty alloy fascia is simply less cluttered. Independent rec-out and input selection for two tape, three line and MM disc sources will just have to suffice.

But let's not get carried away by hype. It's important to realise that the basic topology of the TA-F440E is little different from previous Sony amplifiers. So the disc, power amp and protection stages are similar to those found in the older TA-F530, '630 and '730 amps for example. There is no implication of inadequacy here, but neither will you find the 'tweaky' components popularised by the likes of Rotel.

Instead Sony has added to the basic design by placing both input and volume circuits hard up against the rear of the amp, shortening the signal path. Extras like gold-plated speaker-selection relays also help to optimise its performance.

Lab report

Power a-plenty in this instance with 8 and 4ohm ratings of 109W and 169W supported by a very generous +21A peak current. Like a kick from a mule, the TA-F440 will slam any recalcitrant speaker into touch! Distortion and overload margins are also taken from the company textbook. However, bearing in mind Sony's obsession with improving the S/N ratio of its CD players, it's worth pondering on the fact that the 91dB (A-wtd) offered by this amp lags some 15dB behind.

In common with earlier Sony amps (see issues 74 and 80) the MM disc response extends well into the subsonic region with a -3dB point of just 0.35Hz. Just watch those bass cones flap in the wind! More important, perhaps, is the amp's broad susceptibility to RF noise in the 50, 150, 290, 425 and

550MHz bands. This suggests its subjective quality might vary unpredictably with different CD players.

Sound quality

As if on cue the fresh, up-beat sound of this amp seemed best suited to our vinyl rather than digital sources, capturing our listeners' attention from the word go. It was both detailed, open and, above all, very quiet. 'Bags of detail' they ventured, tempering this reaction with the thought that it was marginally better suited to pop than the weight of our classical selection.

Ok, so it was a little cool but its bass remained very clean and articulate, drawing out Marty Paich's double bass as clearly and cleanly as the kettle drum from Rachmaninov's *Symphony*. Both were reassuringly solid and weighty, without ever overwhelming any of the accompanying instruments.

Unfortunately this sense of balance did not extend to CD where the presentation was both lighter in weight and oddly superficial. In fact it was quite obviously coloured, lacking harmonic richness yet possessed of an invasive warmth that smeared sharp detail.

Conclusion

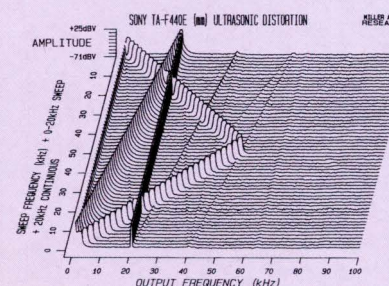
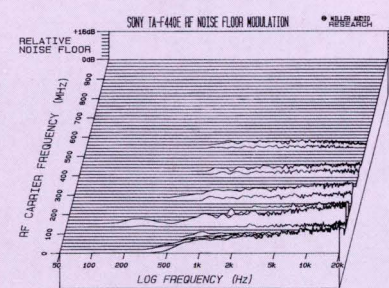
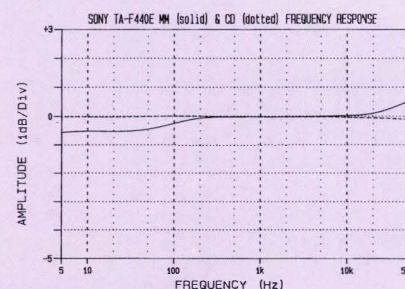
Pitched at just £180, Sony is offering an extremely powerful, no-nonsense amp that would seem hard to beat - on paper at least. However the clear disparity between inputs worried our listeners who were markedly more involved in its sound via MM disc than Compact Disc.

Here there is a detached coolness that contrasts with the more detailed and embracing quality of the disc stage. Recommended, then, for its prodigious reserves of power and fine showing with vinyl, but remember, there is a lot more to a good 'audiophile' amp than simply abandoning tone controls.

TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output,			
8ohms	106.5W	108.7W	102.9W
4ohms	159.7W	168.6W	152.2W
Dynamic Headroom (IHF)+1.16dB(142.1W)			
Peak Current (5msec, 1% THD)+20.8A			
Output Impedance 0.114ohm			
Damping Factor 70.1			

	CD/Aux	MM
Stereo Separation		
(1kHz)	63.6dB	62.8dB
(20kHz)	39.3dB	38.0dB
Channel Balance		
(1kHz, -20dBV)	0.97dB	1.00dB
(-60dBV)	0.02dB	0.05dB
Total Harmonic Dist.		
(0dBW)	-94.6dB	-96.9dB
(2/3 power)	-90.4dB	-94.8dB
CCIR Intermod. Dist.		
(0dBW)	-97.0dB	-81.9dB
(2/3 power)	-96.2dB	-81.3dB
A-wtd Noise		
(0dBW)	-81.1dB	-79.8dB
(2/3 power)	-91.4dB	-88.2dB
Residual noise		
(unwtd)	-72.6dBV	-72.5dBV
Input Sensitivity		
(for 0dBW)	13.7mV	221µV
(for full output)	144mV	2.34mV
Disc Overload		
(1kHz)		152.5mV
(20kHz)		131.1mV
(50kHz)		167.0mV
Tape Output/Impedance	9.39V (disc) / 1.25kohm	
Input loading	94kohm/130pF	46kohm/320pF
DC offset, left/right		-5.5mV/-2.5mV
Retail Price		£180



Sony TA-F540E

Sony UK Ltd, Sony House, South Street, Staines, Middlesex. Tel: (0784) 467000



So the *TA-F540E* is a more powerful, 'higher performance' and generally more refined version of the *TA-F440E*. Well, not entirely. The only visible difference between the two models is an MM/MC selector and, of course, an extra £50 slapped on the retail price. Otherwise you get the same casework, heatsinking, circuit boards and speaker selection facility. They even share the same service manual.

According to this manual the *TA-F540* uses an alternative mains toroid and power supply caps, even though their basic specification is the same. The analogy here, of course, is with Marantz's *PM-40* and its *SE* relative (see issue 97). The output devices have been changed too, for higher-current Sanken transistors first seen in Sony's *TA-F530ES* amplifier (issue 74).

Nevertheless the driver and supply rails remain unchanged, as does the disc network which simply switches gain to accommodate low-output MC cartridges (there are minor revisions to the phono power supply too). Both amps use the same discrete two-transistor headamp for either MM or MC followed by a '4560 op-amp for RIAA equalisation. All good, tried-and-tested stuff with new, no-frills packaging.

Lab report

Sony distinguishes between the *TA-F440* and *TA-F540* by specifying an increase in power from 80W to 90W even though, in reality, their respective outputs are virtually identical. This is legal because, in practice, both amps are capable of delivering at least 108W into 8ohm with a dynamic headroom of 142W and a peak current of +21A! They even suffer the same channel balance error at -20dB while the frequency responses, distortion, noise and sensitivity, well, look for yourself . . .

I cannot imagine two *TA-F440s* clocking-up measurements as close as this, let alone two different models. Either way it pays

testimony to Sony's quality control if not the spirit of its literature. Real differences? Well, the *TA-F540* has a slightly higher output impedance due to the thinner wire used between power amp and selection relays while the RF IMD spectrum picks up subtle changes in its layout and zobel network. Subtle changes that can certainly have an impact on sound quality.

Sound quality

Compared with the *TA-F440*, this 'upgraded' version offered a more consistent sound between inputs, even if there was some dissension over the merit of its performance. The majority liked it, saying that it had a slightly recessed upper bass that tended to throw mid and treble detail forward, adding a little extra sparkle. Nevertheless in 'real terms' they thought it less 'genuine', precise or detailed as the best in our survey.

Certainly there were listeners who found its quick and lean balance fairly attractive, especially as it was free of cloying colorations. Yet others disagreed, finding it consistent but also rather dark, slow and, well, boring. The vibes sounded as if they were 'covered in moss' said one, while another suggested its sound was 'the audio equivalent of a hyped-up Sony Trinitron'. The irony of that statement had to be left to the conclusion of the 'blind' listening!

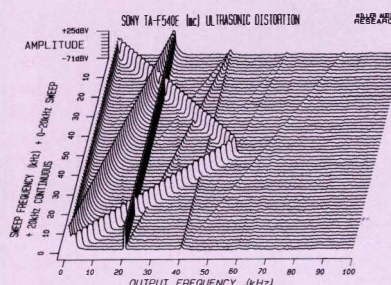
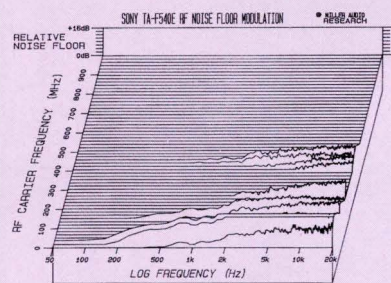
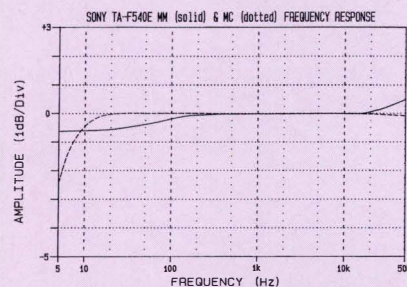
Conclusion

So the extra £50 buys you an MC disc input plus a fancier power supply and chunkier output transistors. Yet this confers absolutely no advantage over the *TA-F440* in terms of power output, tolerance of awkward speakers, noise or distortion. Both amps are equally impressive in all these respects even if their subjective performance is rather less thrilling.

Neither amplifier is a new 'budget wonder' but the cheaper version surely represents the better value.

TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output			
8ohms	106.5W	108.0W	105.1W
4ohms	162.2W	175.8W	160.9W
Dynamic Headroom (IHF)+1.20dB (142.3W)			
Peak Current (5msec, 1% THD)+20.7A			
Output Impedance 0.133ohm			
Damping Factor 60.1			
	CD/Aux	MM	MC
Stereo Separation			
(1kHz)	49.1dB	48.9dB	48.8dB
(20kHz)	39.3dB	36.4dB	36.4dB
Channel Balance			
(1kHz, -20dBV)	1.10dB	1.11dB	1.11dB
(-60dBV)	0.70dB	0.72dB	0.73dB
Total Harmonic Dist.			
(0dBW)	-94.2dB	-96.5dB	-97.6dB
(2/3 power)	-95.9dB	-97.3dB	-98.4dB
CCIR Intermod. Dist.			
(0dBW)	-95.9dB	-80.3dB	-80.7dB
(2/3 power)	-95.5dB	-80.5dB	-80.7dB
A-wtd Noise			
(0dBW)	-80.6dB	-79.7dB	-76.1dB
(2/3 power)	-90.4dB	-87.1dB	-77.4dB
Residual noise (unwtd)	-73.1dBV	-73.1dBV	-73.1dBV
Input Sensitivity (for 0dBW)	13.7mV	223µV	14.4µV
(for full output)	145mV	2.35mV	152µV
Disc Overload (1kHz)		149.0mV	9.8mV
(20kHz)		1305mV	88.9mV
(50kHz)		1650mV	122.5mV
Tape Output/Impedance	9.25V (disc) / 1.25kohm		
Input loading	97kohm/130pF 45kohm/140pF 99ohm		
DC offset, left/right	-2.5mV/-3.6mV		
Retail Price	£230		



Technics SU-VX600

Panasonic UK, Willoughby Road, Bracknell, Berks, RG12 4FP. Tel: (0344) 862 444



Yet another mass-market offering from Technics? It's prejudice like this that causes many of us to overlook a genuinely new and potentially great-sounding amp. But if you glance at the fascia with its large volume control, separate input and rec-out selectors, rows of tone, balance, loudness and speaker selectors, then it's difficult to appreciate the difference between the *SU-VX600* and - for instance - the *SU-VX800*.

In reality the *SU-VX600* is something of an experiment, though Technics is not advertising the fact. You see this amp incorporates a newly-designed power amplifier 'block', an encapsulated module that's bolted to a generous alloy heatsink. Back in Japan this, and the new driver stage, received special treatment with engineering towards 'high sound quality' in addition to the customary pursuit of high specs.

Technics has included a failsafe system but, crucially, its traditionally invasive protection circuitry has been abandoned. At the same time Technics beefed-up the power supply with an OFC mains transformer and specialised 12000uF reservoir caps. Then it up-rated the emitter resistors and power transistors to cope with the abuse normally evaded by this meddlesome protection circuit.

The result is like no other Technics amp you've heard before.

Lab report

Plenty of juice on tap, with a healthy 17.6A current rating to help things along. Noise is very low too, though the -98.5dB figure recorded via CD improves to an amazing 112.5dB (A-wtd) via 'Power Amp Direct' (see Sound Quality). Distortion is low too, typically 0.0018 per cent, though intermodulation picks-up via the MM and MC disc inputs to around 0.014 per cent. Slewing is the cause here and this, plus the added stress of driving a low impedance,

gives rise to the extended odd-order products visible on the 3D plot. The MC disc response is oddly tailored too, falling by 1dB at 20kHz.

Sound quality

A row of appreciate nods, bobbing from side-to-side in time with the music, suggested this amp was getting through to our listeners. But while there was no disagreement over its performance via CD, not everyone so convinced when the LPs were set spinning. Vinyl noise was extremely low or, at least very innocuous, while the music itself seemed smooth rather than etched in detail.

One listener was very drawn to its sound whereas others were less satisfied, voicing reservations over its ability to project solid, focussed images. Nevertheless, once the 'Power Amp Direct' facility was engaged another listener likened it to 'throwing a switch, plunging the subjective noise floor far lower than we've heard before'. A remarkable and quite unprompted correlation with the improvements in S/N demonstrated during the lab tests!

The balance was lighter and vocals just a little sibilant but the music was still very clear, distinct and expressive. This, plus bags of subtle low-level detail made for a very emotive performance.

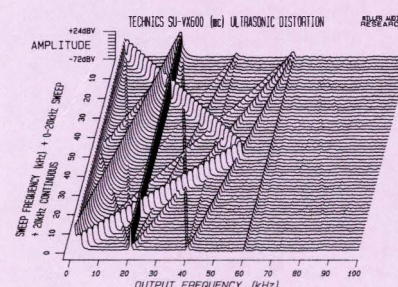
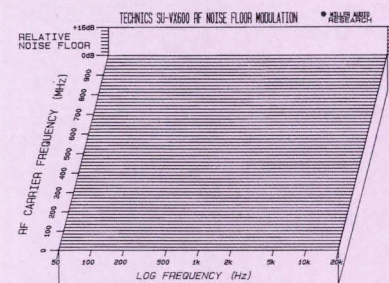
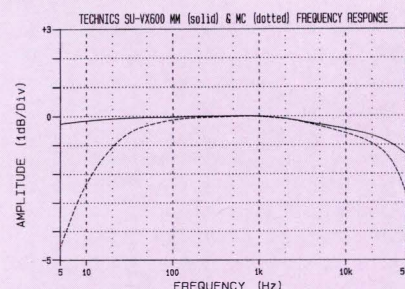
Conclusion

What a turn up! Here's an amplifier with absolutely no pretence of being 'UK-oriented' or even remotely minimalist. Yet, via CD at least, the potential of its integral power amp is revealed - unleashed by its freedom from over-bearing protection circuits.

All Technics has to do now is spend a little less on the remaining gadgets and a little more on, say, the MM/MC disc input and it will have its own entry for the 'Pioneer A-400 club'. A definite Recommendation.

TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output			
8ohms	87.3W	89.9W	86.6W
4ohms	125.3W	134.4W	128.7W
Dynamic Headroom (IHF)+1.17dB (117.8W)			
Peak Current (5msec, 1% THD)17.6A			
Output Impedance 0.123ohm			
Damping Factor 65.1			
	CD/Aux	MM	MC
Stereo Separation			
(1kHz)	63.8dB	63.4dB	63.1dB
(20kHz)	39.9dB	38.4dB	38.3dB
Channel Balance			
(1kHz, -20dBV)	0.17dB	0.22dB	0.23dB
(-60dBV)	1.09dB	0.77dB	0.78dB
Total Harmonic Dist.			
(0dBW)	-95.2dB	-99.5dB	-99.0dB
(2/3 power)	-94.0dB	-97.3dB	-96.2dB
CCIR Intermod. Dist.			
(0dBW)	-97.9dB	-89.9dB	-73.1dB
(2/3 power)	-96.6dB	-88.5dB	-71.1dB
A-wtd Noise			
(0dBW)	-91.1dB	-87.4dB	-74.0dB
(2/3 power)	-98.5dB	-90.8dB	-74.2dB
Residual noise (unwtd)			
	-87.4dBV	-87.3dBV	-87.3dBV
Input Sensitivity (for 0dBW)			
	21.5mV	343µV	24.4µV
(for full output)			
	206mV	3.28mV	231µV
Disc Overload (1kHz)		196.9mV	14.0mV
(20kHz)		1414mV	98.6mV
(50kHz)		1020mV	97.3mV
Tape Output/Impedance		11.6V (disc) / 1.05kohm	
Input loading		32kohm/450pF 250kohm/550pF	240ohm
DC offset, left/right			-1.5mV/+2.0mV
Retail Price			£200



Technics SU-VX800

Panasonic UK, Willoughby Road, Bracknell, Berks, RG12 4FP. Tel: (0344) 862 444



Something of a beast, this amp. Conceived by Technics and foisted on the rest of the world, the *SU-VX800* is a traditional high-tech design from input to output. It's damned complicated too, with a maze of controls decorating the bronze fascia and matched by an equally busy interior.

A vast volume control is flanked by separate rec-out and input selectors that cater for phono and five different line sources. You must differentiate between MM and MC cartridges using a second selector which also includes an option for subsonic filtering. Then there's A/B speaker switching, tone and balance controls, loudness, mono and muting facilities plus an 'adaptor' input which serves as a third tape monitor loop for graphics and the like.

Amps of this ilk always have a special widget in tow and, in this instance, it's called 'Extended Direct Drive'. Armed with both balanced (XLR) and unbalanced (phono) inputs this seventh line stage bypasses all the peripheral features and feeds directly to an 'active volume control'. Nestled within a feedback loop, the volume knob directly alters the gain of the amp rather than attenuating the audio signal between two stages. As a result the amplifier's signal to noise ratio remains constant, regardless of its position.

Lab report

And if proof were needed, the *SU-VX800* achieved a S/N ratio of 112dB via this direct input, contrasting with the 90dB to 100dB range offered by the other line stages. A great result. Most of the other specs are pretty great too, including the vanishingly low 0.001-0.003 per cent distortion, 0.0005-0.0009 per cent intermodulation, worse-case 0.5dB channel balance error and incredibly low -100dBV residual sum.

Meanwhile the MM disc response extends to 1.4Hz and its MM/MC headroom is boosted to +31.4dB and +31.6dB respec-

tively. Power seems abundant too, especially with its +2dB leg-up from 148W to 232W into 4ohm. But look a little closer and you'll see Technics' protection circuitry crippling any output current beyond 10.8A. Not one for difficult speakers then.

Sound quality

Our listeners gained a favourable impression of this amp, but this was a transitory reaction to the MM disc input - a reaction that was not to last as we changed from input to input. Here, at least, it seemed to deliver a big, three-dimensional and very 'euphonic' sound with bags of power skulking in the background.

It could become a little raw or congested when the going got tough, particularly with our classical selection, but it really got behind the Marty Paich LP, pounding out its rhythm in a positive but very safe and 'reliable' fashion.

Switching to CD brought wincing all round. Extended Direct Drive or not, this was voted 'the most vicious and offensive line stage in the test'. Not everyone was quite so dismissive but they all felt the Julia Fordham CD sounded very hard, spitty and sibilant. A very loud and raucous presentation, they concluded.

Conclusion

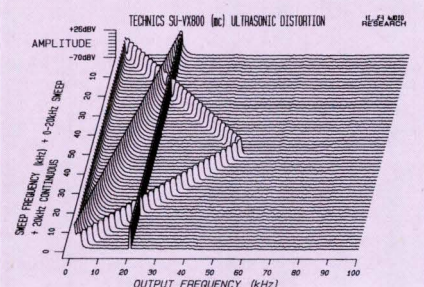
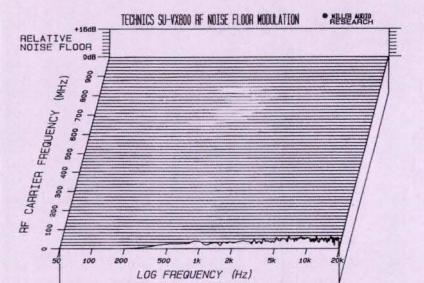
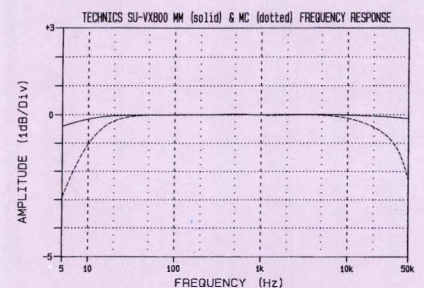
Something of a contrast then from input to input and hardly the most convincing advert for the benefits of 'Extended Direct Drive'. Technically it's straight out of the Technics Book of Amplifier Design - good reliable stuff that'll bring joy to any lonesome spectrum analyser.

Sonically, however, there's a good chance its invasive protection circuitry is making a dogs dinner of what should be a fundamentally solid amplifier.

As a consequence it's the cheaper *SU-VX600*, rather than the *SU-VX800*, that seems to point the way ahead.

TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output,			
8ohms	144.0W	148.2W	145.3W
4ohms	225.8W	231.8W	224.3W
Dynamic Headroom (IHF)+1.16dB (193.6W)			
Peak Current (5msec, 1% THD)+10.8A			
Output Impedance 0.086ohm			
Damping Factor 93.4			
	CD/Aux	MM	MC
Stereo Separation			
(1kHz)	88.0dB	81.9dB	75.1dB
(20kHz)	65.1dB	62.0dB	59.6dB
Channel Balance			
(1kHz, -20dBV)	0.11dB	0.26dB	0.36dB
(-60dBV)	0.25dB	0.41dB	0.52dB
Total Harmonic Dist.			
(0dBW)	-96.1dB	-100.8dB	-100.2dB
(2/3 power)	-89.8dB	-94.9dB	-94.5dB
CCIR Intermod. Dist.			
(0dBW)	-95.5dB	-99.9dB	-99.7dB
(2/3 power)	-96.2dB	-97.9dB	-97.7dB
A-wtd Noise			
(0dBW)	-90.4dB	-86.7dB	-72.7dB
(2/3 power)	-100.9dB	-91.4dB	
Residual noise (umwt)	-100.2dBV	-100.0dBV	-100.0dBV
Input Sensitivity			
(for 0dBW)	13.9mV	230µV	23.4µV
(for full output)	171.5mV	2.82mV	287µV
Disc Overload			
(1kHz)		185.8mV	19.0mV
(20kHz)		132.3mV	13.5mV
(50kHz)		1165mV	153mV
Tape Output/Impedance		11.2V (disc) / 969ohm	
Input loading		105kohm/500pF 45kohm/420pF	273ohm
DC offset, left/right			-0.2mV/+6.3mV
Retail Price			£450





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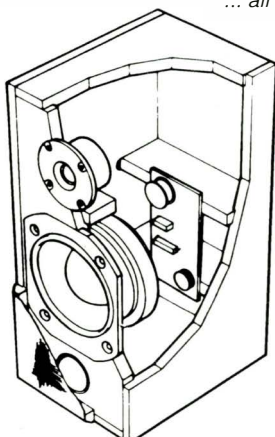
Designed specifically for studio use, this design also gives excellent results when used for conventional HiFi reproduction. The HSM kit is remarkable value - you would have to spend many times its cost to achieve comparable results from a ready-made speaker. The HSM will produce high undistorted sound pressure levels & has massive power handling capability (full unclipped output of 200 watts). Split circuitry crossover is used to enable biwiring to be employed without any modifications.

"... all in all, highly recommended"

Paul White, Home & Studio Recording magazine.

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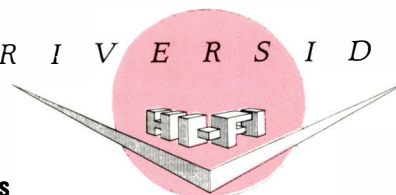


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Yamaha AX-750

Yamaha Electronics UK Ltd, Yamaha House, 200 Rickmansworth Road, Watford, Herts WD1 7JS. Tel: (0923) 33166



Yet another beast stalks the pages of *Choice*, this time courtesy of Yamaha. Indeed, the AX-750 is as voluminous as Technics' *SU-VX800* but with less substantial heatsinking and only one bulky mains transformer it is neither as heavy nor as expensive. On the face of it Yamaha's amp offers the better value, after all it matches the Technics for power while offering the convenience of full remote control.

In common with other hi-tech amplifiers, including the Dual and Kenwood models reviewed here, this establishes the AX-750 as a nerve centre for matching separates. Both the volume control and rotary input selector are motorised, so both come under the command of the system handset. It's even possible to mute the output by 20dB - a feature that's not duplicated on the amp itself.

Drag yourself from the armchair and you'll discover extra goodies like a variable loudness contour, tone controls, rec-out selection plus subsonic and mono facilities. Then you can opt for 'Pure Direct' which bypasses the lot of them! All very macho but, frankly, the AX-750's casework is unnecessarily vast. A concession, I was informed, to the US market where 'big equals beautiful'.

Lab report

So the AX-750 contains rather more fresh air than Technics' *SU-VX800* but its 149W output is equally substantial. Moreover the AX-750 is not hamstrung by over-zealous protection circuitry so it squeezes out a higher 256W (+2.4dB) into 4ohm while bludgeoning errant speakers with a club-like 22.6A of current. Which makes one wonder why 3A speaker selection relays are being used...

Meanwhile distortion is kept within 0.00098-0.0017 per cent limits regardless of input even if the stress of lower impedance loads does precipitate a mild increase in 2nd-order high frequency products (see

3D plot). Otherwise the input sensitivities, channel balance, overload margins and S/N ratios are all just great.

Oddities? Well, the MM disc input extends all the way to 0.55Hz and, despite Yamaha's free-for-all with nasty little ceramic capacitors, it's still sensitive to RF in the 600MHz region.

Sound quality

Not to put too fine a point on it, our listeners were somewhat bemused by this amp. One panellist suggested it be buried in a shallow grave while another was reduced to counting the bricks in the far wall of the listening room. Their minds were really not on the music.

Regardless of input this amp had a decidedly restricted concept of dynamics while its balance was distinctly jangly, lending a dull but metallic tinge to strings and percussion alike. Ambient detail was compressed, suppressing the natural life and vibrancy of different instruments.

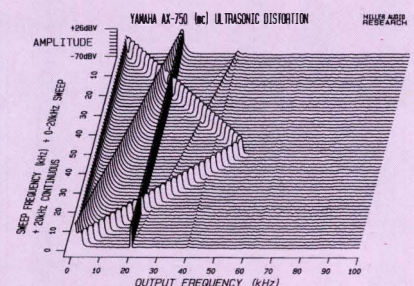
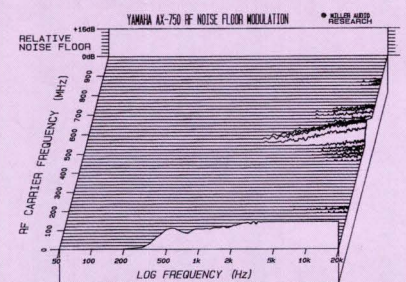
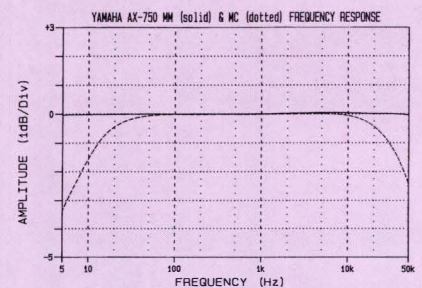
A secondsample was auditioned, prompting a less dismissive reaction. They thought it a little lean but fast and articulate, good at revealing spatial information and holding individual images well apart. It was crisp and fresh too, a little sensitive to vocal sibilance but rarely gritty or hard. Bass could have been fuller, the panel suggested, though Christy Moore's voice was still characteristically dark and melancholy. Good but not great.

Conclusion

For £400 this amp clearly offers a combination of brute strength and flexibility that's lost to most specialist designs. Perceived value is high, certainly, but it's a promise undermined by an uncertain subjective performance. If the unnecessary circuitry could be stripped out, (and I'm not simply referring to tone controls), the AX-750 would have a greater chance of success.

TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output,			
8ohms	149.9W	149.0W	141.5W
4ohms	230.3W	245.6W	227.3W
Dynamic Headroom (IHF)+0.97dB (186.4W)			
Peak Current (5msec, 1% THD)+22.6A			
Output Impedance 0.029ohm			
Damping Factor 279.7			
	CD/Aux	MM	MC
Stereo Separation			
(1kHz)	86.7dB	82.6dB	78.5dB
(20kHz)	61.2dB	59.1dB	56.7dB
Channel Balance			
(1kHz, -20dBV)	0.30dB	0.34dB	0.38dB
(-60dBV)	0.17dB	0.10dB	0.08dB
Total Harmonic Dist.			
(0dBW)	-97.0dB	-100.2dB	-97.6dB
(2/3 power)	-95.6dB	-97.9dB	-96.0dB
CCIF Intermod. Dist.			
(0dBW)	-99.5dB	-91.6dB	-94.6dB
(2/3 power)	-98.7dB	-90.5dB	-92.8dB
A-wtd Noise			
(0dBW)	-88.4dB	-85.0dB	-72.4dB
(2/3 power)	-96.8dB	-85.2dB	-72.8dB
Residual noise			
(unwtd)	-87.8dBV	-87.8dBV	-87.8dBV
Input Sensitivity			
(for 0dBW)	13.3mV	224uV	16.8uV
(for full output)	163.2mV	2.74mV	206uV
Disc Overload			
(1kHz)		159.2mV	11.6mV
(20kHz)		137mV	104mV
(50kHz)		1865mV	162mV
Tape Output/Impedance		9.34V (disc) / 706ohm	
Input loading		48kohm/380pF 42kohm/500pF	
		251ohm	
DC offset, left/right		+13.0mV/+17.5mV	
Retail Price			£399



Tech Talk

In keeping with the *Choice* rationale, each of the amplifiers was auditioned under blind conditions at precisely matched listening levels, consistent between CD and phono inputs from amp to amp. Therefore any apparent change in 'loudness' is a direct consequence of changes in balance or presentation peculiar to the amplifier itself. Audio Note *AN-J* speakers were pressed into service for the group listening sessions together with lengths of Gore-Tex *Black Sixteen* cable (manufacturer's own-brand cables were used if so instructed).

Measurement programme

The test program includes both standard IHF A202 measurements together with more advanced techniques made available by the IEEE-controlled digital test equipment currently employed in my laboratory.

Wondering about the technical criteria and assessment methods used in our reviews? Paul Miller gets testy.

Power Output, Dynamic Headroom and Peak Current

Quoted in good old fashioned Watts this refers to the maximum output voltage of the amplifier into eight and 40ohm loads, one channel driven to one per cent THD. The IHF-A-202 dynamic headroom test employs a gated 1kHz signal, 20-cycles on/480 cycles off, and refers to a maximum of one per cent THD into 8ohms relative to the continuous power available into that same load.

For the first time the peak current available from an amplifier has been measured using a 5msec gated 1kHz signal into 1ohm, up to a limit of one per cent THD. Previous peak current measurements have not taken account of distortion, as evidenced by the asymmetric +/- values quoted. The use of a fixed THD benchmark enables all peak current values to be compared directly.

Separation, THD, IMD, noise and sensitivity

All input sensitivities are measured with respect to an

output of 0dBW (=1W) and full power at 1kHz for the integrated and power amplifiers, or 0dBV(=1V) out (6dB higher than IHF) in the case of the preamplifiers. Noise was measured with respect to the IHF input levels of 500 μ V (mc), 5mV (mm) and 0.5V (line), input shorted, A-wtd and assessed as the true root mean square (RMS) figure of 20 third octave averages.

Disc overload is quoted in mV in the table so that this may easily be related to the peak output of a cartridge, while headroom is discussed in the text as a dB figure relative to these same IHF levels. Separation was measured some +20dB above the nominal sensitivity as is the THD of each amp. For CCIR IMD the respective peak composite (19kHz + 20kHz) levels were 10mV (mc), 100mV (mm) and 2V (line).

Broad Band Radio Frequency Intermodulation Test

In general terms this revolutionary test — presented at an AES lecture — reveals just how sensitive an amplifier is to spurious radio frequency noise, whether introduced directly or indirectly.

Conventional measurements examine the performance of the amplifier under closed-loop conditions where many of the inherent circuit non-linearities are compensated for by the feedback network. By contrast the RF test probes the linearity of the amplifier under open-loop conditions where it is both non-linear and uncompensated.

A precision RF signal generator is employed to produce an RF carrier signal at 20mVp-p, modulated to a depth of 100 per cent using an external pseudo-random noise source. The resulting non-correlated Δ M/RF signal is then ramped between 1MHz-1GHz (1000MHz — now covering TV and satellite baseband transmissions) by controlling the generator through an IEEE interface BUS and using a dedicated program developed in this laboratory.

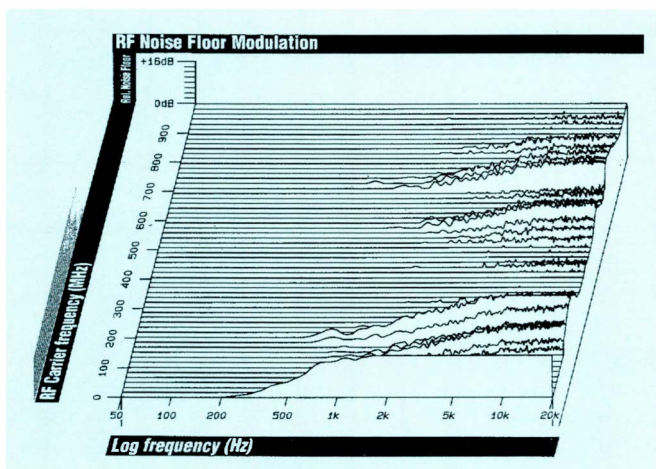
Once connected to the amplifier (via the line or CD-direct input) any subsequent demodulation/intermodulation between the sweeping carrier and its pseudo-random sidebands results in a non-correlated noise appearing at audio frequencies at the output of the amplifier.

This therefore represents a change in the noise floor of the amplifier over a discrete portion of its frequency range. Such a random fluctuation may not necessarily be heard directly but simply makes it more difficult for the ear/brain to distinguish subtle dynamic inflections in the music signal itself.

By comparing the steady state noise floor of the amplifier with its noise floor under the influence of RF IMD, a measure of the difference and therefore the actual effect of RF IMD can be deduced. It is this change or difference in the noise floor that is depicted on the 3D plots.

The depth or z-axis is calibrated in steps of 100MHz and denotes the changing frequency of the RF carrier. By contrast the x-axis is restricted solely to the audio band (in this case 50Hz-20kHz) and is calibrated across a log, rather than linear, scale. The vertical or y-axis gives an indication of relative amplitude and is scaled in steps of 2dB over a maximum range of +16dB.

Clearly, any demodulated RF noise that causes a



change in the noise floor greater than 16dB will give rise to a plateau effect on the plot. This situation is clear enough on the example plot which demonstrates an amplifier's undue sensitivity to RF noise centred on bands at 140, 200, 575, 730 and 850MHz.

If an amplifier were singularly insensitive to RF noise then this plot of relative change would appear as a series of straight, unperturbed lines.

Ultrasonic Distortion Test

Revised some 18 months ago, this is a particularly revealing test that highlights the interaction of high and moderate level signals in the context of harmonic and intermodulation distortions (called 'routes' in the text) caused by such mechanisms as slew-limiting or the progressive reduction of feedback, the latter revealing an increase in open-loop non-linearities. It is not a knitting pattern, as one irreverent member of *Choice* would have you believe!

Three driving signals are employed, first a 0 to 20kHz sweep, F_{0-20k} , represented by line (1), second a continuous 20kHz tone, F_{20k} (line (2)) and third a 0 to 50kHz and then back to 0 reversed sweep, $F_{0-50k-0}$, shown as line (3). The first and second test signals raise the amplifier to 2/3 voltage output into a 4ohm load while the 0-50kHz-0Hz reversed sweep tracks at a level some -24dB below this. For integrated amps a pre-equalised composite signal was used for either the MC or MM vinyl disc inputs (ref 20mV and 2mV @ 1kHz respectively). Strictly speaking an amplifier should be treated as a voltage source so each plot is individually calibrated in dBV (0dBV = 1V at 4ohms).

These sweeps were chosen to represent the kind of HF and ultrasonic signals likely to be handled by an amplifier in normal use. The ultrasonic spurious generated by CD players is a well documented example, but it is less widely appreciated that the 20-50kHz band noise from a vinyl disc or FM tuner can persist at levels only 10-20dB lower than peak signals in the audio band.

This is one reason why I place such store in disc overload margins (which generally fall relative to the excess gain required with increasing frequency) and why such measurements are now taken as high as 50kHz. That aside, certain of these ultrasonic distortions will introduce IM products within the audio band of the amplifier — a point of particular interest with disc stages whereupon the IM routes will actually increase in level with decreasing frequency as a function of the RIAA characteristic.

The most obvious harmonic products are determined by multiples of the F_{0-20k} sweep (1) (given by 4,5) and the F_{20k} tone (2) (given by 6,7). The remaining distortions shown on the 3D plot are produced by intermodulation between either or all of (1), (2) and (3) and (1) together with the harmonics of (2), ie (6) and (7).

Directly audible IM distortions include the difference products $F_{20k} - yF_{0-20k}$ [$y = 1,2$] given by (8) and (9) and $2F_{20k} - 2F_{0-20k}$ given by (10). Higher-order difference IM distortions associated with multiples of (2) and (1) will also wend their way directly into the audio band.

This example plot shows a variety of basic summation IM routes such $F_{20k} + yF_{0-20k}$ [$y = 1,2,3$] given by (11,12 and 13) together with higher-order secondary summation IMD such as $2F_{20k} + yF_{0-20k}$ [$y = 1,2,3$] and $3F_{20k} + yF_{0-20k}$ [$y = 1,2,3,4$]. These are marked as (14)-(16) and (17)-(20) respectively. Extremely high-order routes such as $4F_{20k} + yF_{0-20k}$ [$y = 1,2,3$], (21)-(23) are

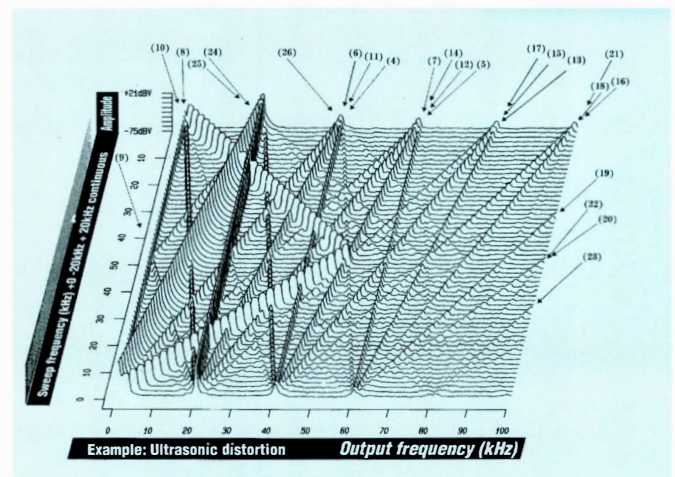
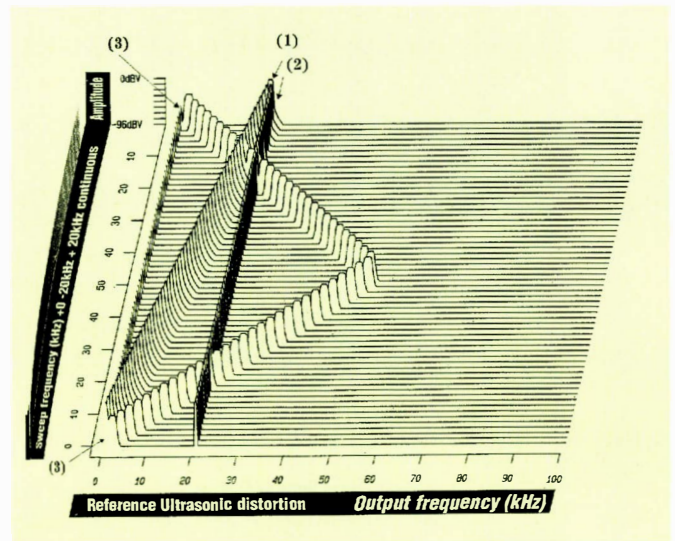
also visible. Of course there are the interactions between (3) and (1) and (2) to consider. Three summation IM routes are clearly visible: $F_{0-50k-0} + F_{0-20k}$ (24), $F_{0-50k-0} + F_{20k}$ (25) and $F_{0-50k-0} + F_{0-20k} + F_{20k}$ (26)!

In general the presence of second order in-band IMD products seems to encourage a warmer though softer and richer sound quality, particularly if these distortions arise in the disc stage. The equivalent third and higher order IMD mechanisms introduce a harder and less beguiling character.

A word of warning. Do not use these plots as some sort of guide to the absolute quality of the amplifiers because this is simply not the case. Any distortion mechanism represented on the plot will have some subjective consequence. Conversely, just because a peculiar coloration or distortion is heard, this does not mean it will necessarily be manifest on the 3D plot. This test remains but one piece in a very complex jigsaw and the results must be viewed in the light of those obtained via the RF IMD test.

The combination of Ultrasonic Distortion and RF IMD plots can provide a valuable indication both of the amplifier's subjective performance and its likely compatibility with other audio equipment, particularly CD players. An amplifier that gives rise to a 'clean' Ultrasonic plot but suffers RF demodulation may well sound coarse or muddled as a result. Conversely, a relatively constant carpet of innocuous closed-loop distortions can effectively mask the fatiguing effects of RF IMD.

Taken together, the two plots give more insight than ever before into the potential sound quality of an amplifier.



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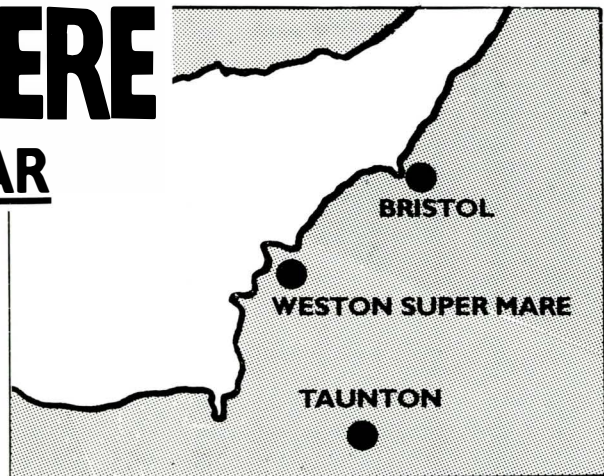
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Conclusions, Best Buys & Recommendations

By the time this printed page hits the streets I very much doubt whether the general gloom and doom that's descended on this, and other industries, will have abated. But there's no point sitting on our backsides and complaining. The Japanese have been doing their utmost to tempt us back into the hi-fi shops, with 'UK-oriented' amplifiers spreading from the likes of Rotel, Marantz and Pioneer to Sony and even Technics. By making their amps more attractive to UK ears they generate fresh enthusiasm for the individual brand and for audio in general. And fresh enthusiasm invariably means fresh sales.

Nothing is ever that simple, however, and manufacturers now have to bear in mind not only UK likes

Which ones made the grade? Paul Miller collects his thoughts and sums up the outcome of this month's amplitude.

and dislikes, but also those of the rest of Europe. This gathering showed a greater awareness of EMI (electromagnetic interference) in line with recent European missives. Yet instead of designing amplifiers that are fundamentally less susceptible to RF IMD, we are simply being provided with the 'same' amplifiers equipped with a token RF filter or two.

However, this didn't mean that there wasn't a few gems amongst the multitude of metal boxes.

Recommendations and Best Buys

Companies such as Dual and Akai have acknowledge the superior buying power of the German market. As a result there's nothing particularly specialised or 'tweaky' about the CV600RC and AM-47, yet they still succeeded in earning the admiration of our listeners. The Akai, especially, is a surprisingly light, fresh and bubbly sounding amp whose subjective performance is something of a mass market paradox. Listen to it, but don't look at it. Much the same can be said of Technics' SU-VX600, a knobby creation which successfully camouflages a new, and rather special, power amp within. Teamed up with a CD player like Technics' SL-PG200A, this amp seems guaranteed to send a chill through the specialist ranks.

By contrast the very simple, elegant disposition of both the TA-F440 and TA-F540 will have enthusiasts crooning. Sony is not daft; it knows that ripping out tone, balance and other widgets has as strong an influence on the psyche of your average hi-fi nut as it does on its sound. And, truth be told, neither amp is a real departure from Sony's designs of old. They just 'look' different and that, for the unwary, will always be enough. Nevertheless this exercise has served to expose something of the underlying potential of previous Sony amplifiers — solid pieces of engineering, highly compatible and equipped with generous reserves of power. If you've no interest in MC phono cartridges then the cheaper, but equally lusty, TA-

F440E is the one to choose.

Of course, if flexibility and an effective route for upgrading are priorities then there's little better choice than Rotel's budget RC/RB-960BX combination. Strictly speaking, its sound is neither as articulate or emotive as the cheaper RA-930AX but with the possibility of bridging and the extra MC input in tow, they represent excellent value at just £330 for the pair. At just £150, the RC-960BX preamp would appear the stronger of the duo and well worth seeking out to partner an alternative power amp.

But when sound quality is the key there's no mistaking the superb performance of both Marantz's PM-30 and the RA-930AX from Rotel. The former loses little to its SE stablemate and even seems more consistent from input to input, providing a very fresh and see-through sound that's underpinned by a surprisingly robust bass. There's nothing fancy about the PM-30, but then that's part and parcel of its success, earning it the Best Buy that eluded the PM-30SE. Of course the RA-820AX, the building block for today's RA-930AX, was awarded a Best Buy in its day and so, by simply refining this design, Rotel has ensured that the trend continues.

Auditioned at precisely controlled listening levels, the RA-930AX nonetheless succeeded in playing 'louder' than its competition, captivating our listeners by pulling out subtleties of string tone, percussion and vocals. At just £160 it will find few other amps to compete with it, but then Rotel has had plenty of practice.

To conclude, I should like to thank those companies who submitted amplifiers for inclusion in this gruelling test, and gratefully acknowledge the help provided by Alan Ainslee (Technics), John Bamford (Pioneer), Mike Martindale (Arcam), Tony Mills (Rotel), Terry Murphy (Yamaha), and Guy Sargeant (Audio Innovations) during the listening tests.





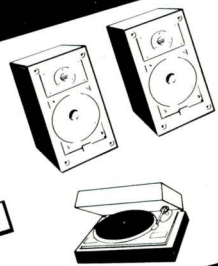
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SUGGESTED SYSTEMS

The suggested systems priced below all include the popular Dual CS503/2 turntable but an alternative turntable or CD player is available at extra cost. Please see "OPTIONS" list below for further details.

SPEAKERS All system prices include the Dual CS503/2	Widale Delta 30.2 JPW Minim Gale GS210 JPW Sonata (vinyl) Mission 760	Celestion 3 JPW Sonata M/Short MS 3.10 W/Dale Diamond 4 Royd A7 Tannoy 603	Celestion DL4 II Tannoy E11 JPW Sonata+ M/Short MS3.20 Mission 761	Nad 8225e Celestion 5 B&W DM600 Kef K120 Tannoy 605	Monitor Audio R7 Celestion DL6 II Tannoy M15 Wharfedale 505.2	Mission 762 Castle Warwick Celestion DL8 II Celestion Audio P9 Monitor MS 3.30 M/Short DM610 B&W DM620 Tannoy 607	Castle Durham Heybrook HB1/3 Tannoy 609 Rogers LSAA-2 (Add £30) B & W DM620 (Add £50)
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Rotel RA820BX4	299.95	312.95	332.95	344.95	364.95	379.95	419.95
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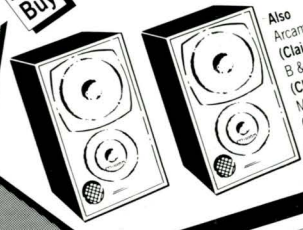
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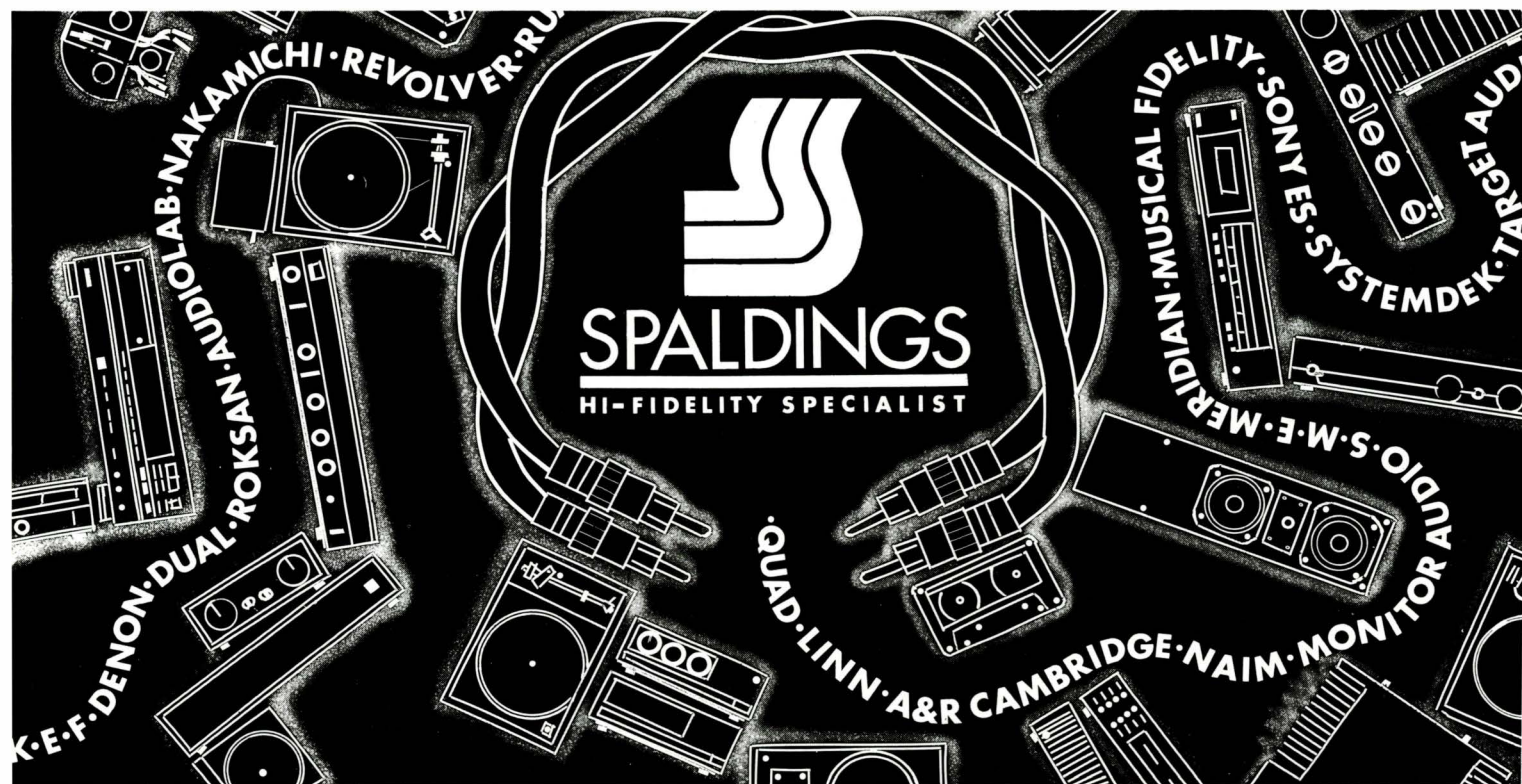
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Choosing and Using . . . Satellites & Subwoofers

In a perfect world, hi-fi loudspeakers should be heard but not seen. No one wants to look at them, or sacrifice the room space they occupy, so designers go to all manner of lengths in attempting to shrink the package and make it as unobtrusive as possible.

The real problem is that decent bass reproduction, especially in terms of absolute extension, requires a decent size box.

There's no way of bending the laws of physics on this point. If you settle for small and visually discreet speakers, such as the seven to ten litre miniatures that would seem to dominate the under £150 market, you won't get anything serious in terms of welly, power, authority and extension, even though many examples will make a decent fist of reproducing reasonable (albeit rather resonant) relative output down to around 50Hz in-room.

Satellites of love or just substitutes for hi-fi? If you're thinking of buying a three box speaker system let Paul Messenger be your guide.

Whether an LF bandwidth restricted to 50Hz constitutes real hi-fi must be a debatable point. There are undoubtedly serious and worthwhile sonic advantages to be had from achieving significant low frequency output, at least over the extra octave and a half that takes us down into the subsonic region — and there's even some evidence that it's worth going lower still.

But in the practical real world of the marketplace, small speakers dominate, and there's no denying that they represent a highly cost effective overall compromise, since the low frequency and loudness limitations are often compensated by the superior performance up in the midrange and presence bands that small boxes and main drivers usually confer.

Have your cake and beat it

In order to try and have one's cake and eat it too, the subwoofer concept was born. The first examples were specialist devices, designed to be added onto existing hi-fi systems. These have been more successful in the US than here in Britain, perhaps because of the US enthusiasm for panel type speakers, which often need a little helping hand down in the bass.

But they remain a viable option for assisting little British speakers too. Indeed, I've recently been trying out the £1,000 active-drive *Stentor* from REL Acoustics, with most encouraging results (see *Personal Messages*, page 152).

The subwoofer didn't stay a specialist/universal item for long, and it soon became integrated into complete speaker systems. Early examples which are

still available a decade later include the highly regarded KEF *R105* and B&W *Matrix 801* variations at the luxury end of the market, commode-shaped subwoofers supporting compact wide dispersion mid and treble head units.

Discretion is the better part of woofer

However, the units gathered together for this group test represent a rather different — and altogether more recent — realisation of the concept. Call them three-box speakers, or sub/satellite systems, whichever you prefer, the prime objective is to create a complete stereo speaker system that is first and foremost as physically discrete as possible.

To this end, the bass sections of both left and right stereo channels are combined together in a single subwoofer enclosure, typically 10-25 litres in volume. Midrange and treble signals are routed to the two 'satellite' units, which are often only a litre or so in volume since they no longer have to make even an attempt at reproducing the bass.

The whole approach relies on the fact that human hearing is relatively insensitive to the direction from which low frequency sounds emanate, so proper stereo imaging is established via the tiny satellite units, and the larger bass unit can be virtually hidden away — or act as a dumping ground for all manner of household junk, under the guise of coffee table styling.

Boxing clever

However, in loudspeaker design, all is compromise, and the three box approach is no exception. Purists can rightly point to the difficulties of successfully integrating the acoustic outputs of three separate boxes, and the inherent impossibility of maintaining mechanical, phase and wavefront coherence between them.

But those with small rooms and larger ambitions may find the invisibility and practicality of these systems — bettered only by flush mounting speakers into cavity walls — well worth the sacrifice of a few principles.

Conventional (two box) stereo speaker systems provide the performance yardsticks against which the satellite/subs should try and measure up. Then it's down to deciding whether one of these alternative packages provides the best solution to your particular room and decor.

This small group test assembles seven of the 3-box systems currently available, and subjects them to more or less the same test programme as used in our regular thrice-a-year large speaker group test.

However, in view of the extra complexity and siting flexibility, 'blind' listening was not attempted. Greater emphasis instead was placed on exploring the various siting options for the units, objectively and subjectively, a decision which turned out to be amply vindicated by events.



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Allison MS205

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East Coast US manufacturer Allison has created a three box speaker that's a little different from the others, revealing rather more obviously its hi-fi heritage and aspirations, even though a few peculiarities managed to come out in the wash.

All packed together in a single and distinctly heavy carton, the £420 MS205 bundles the £200 Mini 2 SVV subwoofer with a pair of £220 MS200 satellites. The former is an elegant cube, about half the volume of most of the others assembled for this test, while the latter look like real hi-fi speakers, albeit scaled down to subminiature size.

The M2SW is in fact based closely on Allison's CD6, an interesting wall mount speaker reviewed and Recommended back in issue 71, though just one cabinet is used here of course. There's also just a single driver, which is rather unusual for a common bass system, though it's really a form of twin driver, having two separate voice coil windings, one fed from the left and the other from the right channel of the driving amplifier.

Again in contrast to the other subwoofers in this test, the M2SW is a sealed box system, as are the MS200 satellite units, all of which will minimise the number of resonances the amplifier has to drive. But regrettably, the sub (though not the sats) is fitted with a row of spring clip terminals. They're bigger and tougher than most, but still don't do much to encourage the use of decent cabling.

Looking not unlike a scaled down LS3/5A, the MS200s are intended to have an independent life of their own, as extension or A/V speakers (though there's no magnetic shielding). Assessing them in this context is beyond the scope of this review,

though I was sufficiently impressed to hold them back for a full formal review in their own right in the next major group test.

Test report

Although the measurement technique has changed somewhat since issue 71, the room measurement for the CD6 showed a pronounced midbass lift, and the M2SW finding only serves to confirm this weakness. Even accepting a 3dB allowance for the fully in-phase stereo drive, and despite trying a number of alternative sites, 100Hz output is clearly too strong.

In other respects the overall bass level is well judged, especially when the sub is lifted clear of the ground, though there's little in-room extension below 50Hz. Depending somewhat on siting, the upper bass/lower mid is a little lean, while the upper mid is a shade strong and treble rolls off slowly but surely above 6kHz. Sensitivity is a shade below average, and the impedance will make quite heavy current demands on the driving amplifier. Although sub-to-satellite integration is pretty good, there's quite a wide overlap, and the sub continues to make a contribution around and above 500Hz.

Sound quality

Allison's satellite/subwoofer combo suffers the sort of problems that seem endemic among small subwoofers, namely a lack of both real extension and midbass control, though the M2SW is by no means the worst offender here, and actually manages to create a measure of coherence with the satellites, which is rare indeed. However, there's still a 'heavy' quality, a thickening of textures and some lack of agility, sonic freedom and musical tension.

The mid and treble seem very well inte-

grated and coherent, if by no means free from colorations, at least partly due to wall reflection effects. The sound has the freedom from boxiness that is usually associated with tiny enclosures, but is also a little nasal and slightly shut in.

My initial notes also describe a lack of true transparency and an aggressive, 'shouty' quality when driven loud. However, having heard the satellites on their own, I finally forced the sub's spring terminals to accept decent cabling, and have to acknowledge that the speakers' inherently good coherence had been compromised by the patch links used in the first place. But it still doesn't go all that loud, all that gracefully.

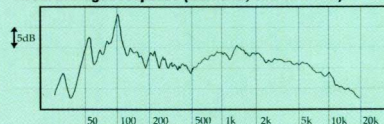
Conclusion

Stupid spring terminals apart, the MS205 looks — and sounds — more of a genuine hi-fi loudspeaker system than the rest of the models assembled for this test. It still shows low frequency limitations that are typical of the three box breed, and I couldn't help wondering whether using the satellites alone wasn't often the better bet, but it certainly justifies its premium in the price hierarchy, and therefore deserves Recommendation in context.

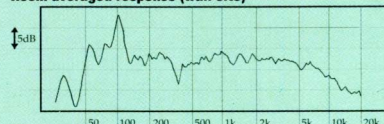
TEST RESULTS

Size (hwxwd)	2x(25.5x14.5x15)cm + 29x29x29cm
Weight	7kg + 2x3kg
Recommended amplifier power	20-150W
Recommended placement	uncritical
In room averaged response limits	50Hz-10kHz ±8dB
LF rolloff (-6dB ref midband)	30Hz
Large room output at 20Hz (ref midband)	below -15dB
Estimated midrange sensitivity (ref 2.83V, 1m)	86dB
Impedance characteristic (ease of drive)	quite demanding
Typical price per pair (inc VAT)	£419.90 (£200 + £219.90)

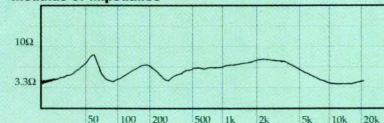
Room averaged response (wall site, sub on stand)



Room averaged response (wall site)

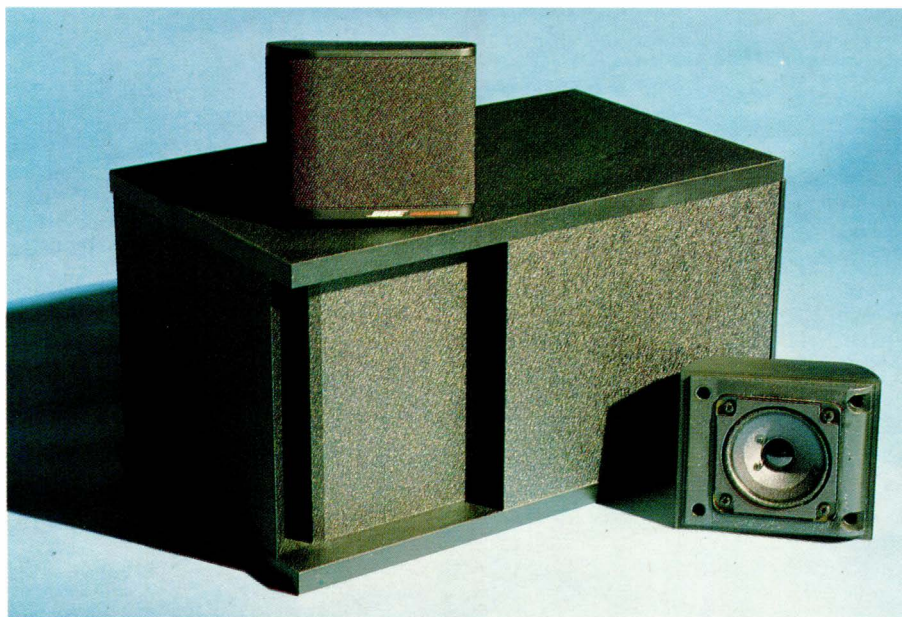


Modulus of impedance



Bose Acoustimass AM3 II

Bose UK Ltd, Trinity Trading Estate, Milton Regis, Sittingbourne, Kent. Tel: (0795) 475 341



The original Bose *AM5* did much to inspire the current generation of three box speakers, but the *AM3* — recently updated, with its price cut to £289 — breaks fresh ground in minimalism, with the tiniest imaginable satellite units and a ‘bass module’ (the term is used advisedly) no larger than a small bookshelf size speaker.

It’s clearly what the Americans would call a downsizing of the original concept, with the satellites in particular using just a single two inch paper cone driver in place of the *5*’s pair, albeit in a rather differently (and to my eyes less attractively) shaped enclosure.

With rather less depth and greater frontal area, the Bose *AM3 II* is just a bit reminiscent of the world of portables and in-car entertainment, somehow lacking the designer flair of big brother’s twin module satellites.

Connection is made via nasty spring clip terminals, and wall mounting brackets are available. The bass module takes up only a third of the volume of big brother.

Each side of the single concealed twin voice coil driver energises a differently tuned coupled cavity resonator, the box panels cunningly folded to produce the two small output slots. Eight nasty spring clip terminals feed a complex crossover with rather small components.

One distinction between the Bose systems and most others is that the systems are complete integrated packages: neither satellites nor bass modules are intended for any separate application. Which is why the satellites can be kept so small, and why the term bass module is more precise than subwoofer, which implies low frequency supplementation of an existing ‘full range’ system.

Test report

Placed against the wall, the *AM3* base module produces just the right amount of bass output to match the satellites nicely, though low frequency extension is no greater than that offered by a typical pair of conventional miniature speakers. System sensitivity, however, is rather below average, and the impedance is fairly low around and above the crossover point, so serious loudness is not on the agenda.

Although the crossover is precisely executed at a rather high 250Hz (middle C, more or less), the bass module actually produces some unwanted distortion at around 1kHz, so hiding it behind furniture could be a positive benefit. For those that like such things, a corner site will create a little extra boom, albeit of a subjectively rather asymmetric nature.

While the overall room balance is exceptionally good, there’s a rather obvious peak at 2kHz, highlighted by a trough at 3.5kHz. Closer examination revealed that the (recently redesigned) grille was the culprit, its removal revealing a much smoother trace, albeit one that’s a little too strong 1.5-5kHz.

Sound quality

Any hope that the Bose *AM3* might prove just a slightly less capable version of the *AM5* was quickly dispelled by playing music through it.

With grilles in place a quacky coloration dominates the presentation, and although their removal brings some relief, the presence and lower treble remains uncomfortably ‘hot’ and somewhat aggressive, partly because of the need to listen directly on axis in order to pick up on the very directional extreme treble.

The bass is at least free of obvious boom,

which helps maintain the disappearing illusion, though it’s also distinctly lacking in muscle, warmth and welly, not to mention much fine detail and precise timing. However, it burbles along satisfactorily enough for undemanding applications.

Dissatisfied with the sound of these little single unit satellites, I decided to substitute them with the twins from the *AM5*, and was well impressed by the improvement that resulted. Even without the slight equalisation normally applied to these satellites, this hybrid was rather better balanced than the *AM3*, and avoided much of its aggressiveness.

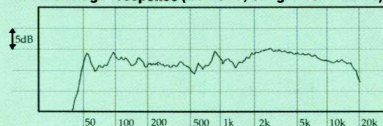
Conclusion

This may be the least expensive three box speaker system in the test group, but that doesn’t ensure it offers good value for money. Despite — and indeed because of — its tiny dimensions, the bass module is a rather clever device. But the satellites are altogether less impressive than those used by the *AM5*, leaving the *AM3* sounding disappointingly thin and rather aggressive, with or without its silly grilles. It’s not for me to suggest that Bose might consider a ‘hybrid’ *AM4*.

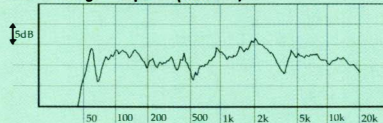
TEST RESULTS

Size (hwxwd)	20x37x9cm + 2x(9x11x11)cm
Weight	2x0.5kg+5kg
Recommended amplifier power	20-80W
Recommended placement	close to wall
In room averaged response limits	
50Hz-10kHz	±5dB
LF rolloff (-6dB ref midband)	48Hz
Large room output at 20Hz (ref midband)	below -15dB
Estimated midrange sensitivity (ref 2.83V, 1m)	85dB
Impedance characteristic (ease of drive)	current hungry
Typical price per pair (inc VAT)	£289

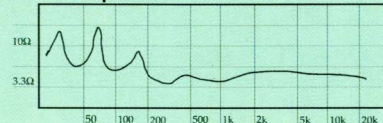
Room averaged response (wall site, sat grilles removed)



Room averaged response (wall site)



Modulus of impedance





Bose Acoustimass AM5 II

Bose UK Ltd, Trinity Trading Estate, Milton Regis, Sittingbourne, Kent. Tel: (0795) 475 341



If there's one thing certain in the world of loudspeakers, it's that Bose will do it differently from everyone else. Every model the company introduces has this hallmark of individuality, a factor that helps to justify prices that are also somewhat above the norm.

That said, the £569 *AM5 II* doesn't look all that different from the mostly significantly less expensive six other models assembled for this group test. The point is that Bose was there first, long before the others woke up and sensed a profit opportunity. The initial *Acoustimass* was a genuine trailblazer that established the whole genre of sub/satellite speakers, and the *5* is the latest refinement of that original theme.

The package is very professionally presented and finished, with all the extra class and investment that one expects in a second generation update of a successful original. The bass module uses an elaborate variation of the coupled cavity principle, omitting the sealed box and coupling the two drivers to three separate and differently tuned resonators whose outputs combine at a generous gas flowed port. It feels very solidly built, though there's no provision for floor coupling and connections are made using nasty little spring clip terminals, which is rather a shame.

Although the bass module can be tucked well out of the way, you can't use it to support the telly, since the driver magnets aren't shielded. Which is downright stupid — especially since the satellites do have magnetic shielding (should you be silly enough to want to site them the width of a television screen apart).

The satellites are unusual — nay, unique — with two tiny paper cone drivers per channel, each mounted in its own dinky little

cube-like moulded enclosure, the two being stacked and hinged so that they can be pointed in different directions. The shapes offer fine midband dispersion (perhaps a little too much for a wall mount); the reasonable depth and curved back are good for dissipating internal energy, while the swivellability will help compensate for the inevitable high frequency beaming of the 55mm drivers.

Test report

There's no avoiding some 50Hz boom, and there's nothing much in the way of extension below that point, but the overall room balance of this system is most impressively flat, albeit with some midband unevenness and gentle treble rolloff above 6kHz.

Part of the reason is that Bose's triple resonator bass module covers a much wider bandwidth and is worked up to a much higher frequency than rival subwoofers. Integration between sub and satellites is very good, thanks to steep and precise crossover slopes with virtually no overlap, through the crossover point, though one might question the desirability of losing all stereo information below middle C.

The below average sensitivity is a shade disappointing in view of the limited extension, even taking the comparatively mild amplifier load into account. Some idea of the complexity of the porting may be seen in the multiple LF resonances revealed by the impedance.

Sound quality

Though the effect of wall reflections on midband coloration is obvious, the *AM5* is undoubtedly very well balanced overall, and satisfyingly self-effacing in consequence. There's negligible boxiness, and an attrac-

tively open and airy quality that makes it quite easy to forget the speakers are there at all, at least on relatively undemanding material such as film soundtracks.

Fed audiophile quality signals, a lack of genuine transparency and high frequency delicacy becomes apparent. The bass too is somewhat lacking in real drive or authority, being short of both extension and upper bass power, but it's also surprisingly discrete and tolerably well timed, helping the music along without allowing over-exuberance to get in the way.

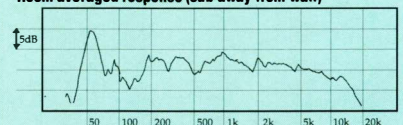
Conclusion

Although *AM5 II* can't offer serious competition to the better (and comparably priced) conventional speakers, it's certainly as good as any of the three way systems we've assembled, and comfortably better than most. Given its high scores for invisibility and cuteness, it's easy to see why this model is already an established commercial success amongst those happy to sacrifice a few hi-fi ideals in the interests of vanishing their loudspeakers. It's no great bargain, but nevertheless deserves Recommendation in this context.

TEST RESULTS

Size(hxwxwd)	36x19x48cm+2x(16x7.7x12)cm
Weight	9kg+2x0.9kg
Recommended amplifier power	20-150W
Recommended placement	sats at wall, sub 2ft out
In room averaged response limits	
50Hz-10kHz	±7dB
LF rolloff (-6dB ref midband)	40Hz
Large room output at 20Hz (ref midband)	below -15dB
Estimated midrange sensitivity (ref 2.83V, 1m)	85dB
Impedance characteristic (ease of drive)	fairly good
Typical price per pair (inc VAT)	£569

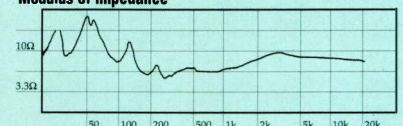
Room averaged response (sub away from wall)



Room averaged response (wall site)



Modulus of impedance



Heco Libero

Heco UK Ltd, Fourbury House, 36 Victoria Road, Mortimer, Reading, Berkshire RG7 3SE. Tel: (0734) 333 636



The brand name *Libero* is Euromarketing speak for 'freedom', implying a design concept that takes pride in its flexibility and convenience in fitting into the living environment.

I was (quite pleasantly) surprised to find each of the three units of this West German variation on the three box speaker theme finished in a glossy white finish, through which you can see and feel the simulated woodgrain of the subwoofer cabinet (don't pick at the edges).

The Germans have something of a tradition for tiny metal minispeakers, so it's no surprise to find these little satellites have metal jackets, and feel nice and substantial in consequence.

The backs are angled, so they can be tilted upwards from a flat surface if set on their sides, while screw thread inserts allow a whole variety of camera/lighting type accessories to be used — tripod, G-clamp, ground spike, suction clamp, and so on and so forth.

The current *Libero* satellites are not actually intended to be used without the sub unit, though Heco has produced a very similar *Legato* model which is, and which is slated to succeed the existing sats in the near future.

The subwoofer combines two direct radiating drivers, each in its own small, independent and identical reflex-ported enclosure.

Foam plugs are apparently provided to allow the ports to be blocked if preferred — I couldn't find them, and in the end had to roll my own. Proper 4mm combination socket/binders are designed to accept the amplifier connection, but small spring clip terminals link the satellites to the sub, a regrettable economy that Heco is reportedly

planning to change in the not too distant future.

The sub's baffle is due to be changed for a plastic moulding soon, which will almost certainly be an improvement, as the present chipboard affair is pretty flimsy.

Test report

Previously tested conventional Hecos have shown distinctly above average low frequency room matching, but that certainly isn't the case with *Libero*, which for all its claimed freedom from specified siting shows altogether too much enthusiasm at 100Hz, and very little below 50Hz, which makes it difficult to regard it as anything other than a boom box. Blocking up the ports helped, but only marginally.

Setting aside the distinctly heavy midbass output, sensitivity is actually a rather modest 85dB, despite the very demanding amplifier load and comparatively limited genuine low frequency extension.

The propaganda provided with the system stresses that the sub should hand over to the satellites at 120Hz, a point with which I would tend to agree and which is supported by the latter's respectably low (120Hz) fundamental resonance. However, on my measurements the in-room acoustic crossover is just above 200Hz, and the sub continues to make a significant contribution up to 500Hz.

The satellite units are much more impressive, showing a particularly even and flat balance above 800Hz, though there's significant energy loss around 500Hz, and some treble peaking.

Sound quality

The distinctly midbass dominated balance creates a good initial impression of weight

and scale, but in reality substitutes resonant thickening for genuine extension, with all that implies in terms of loss of tension and detail, and a heavy chestiness at the bottom end. The attendant time-smear means that voices don't integrate properly, and this makes colorations, including some nasality, all the more obvious.

In contrast, the midband and treble are very well balanced and integrated, the flat response and good dispersion ensuring an attractive openness and general lack of boxiness. However, the tweeter does seem a shade hot, regularly reminding one of its presence by mild spit and splatter on sibilants.

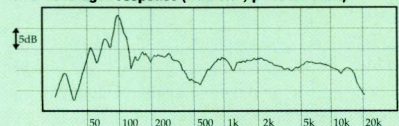
Conclusion

Nice satellites; shame about the subwoofer. Heco's white finish and useful mounting accessories make a quite persuasive case for this attractively presented combo, but subwoofer is too grandiose a term for what in this case amounts to a 100Hz boom box, and which clearly needs retuning to give a respectable net in-room response.

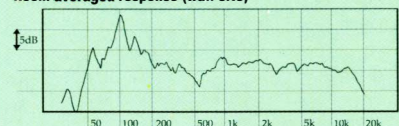
TEST RESULTS

Size (hwxwd)	21x55x31.5cm+2x(18x11x12)cm
Weight	11kg+2x2kg
Recommended amplifier power	20-100W
Recommended placement	uncritical
In room averaged response limits	
50Hz-10kHz	±10dB
LF rolloff (-6dB ref midband)	45Hz
Large room output at 20Hz (ref midband)	below -15dB
Estimated midrange sensitivity (ref 2.83V, 1m)	85dB
Impedance characteristic (ease of drive)	current hungry
Typical price per pair (inc VAT)	£375

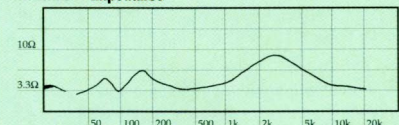
Room averaged response (wall site, ports blocked)



Room averaged response (wall site)



Modulus of impedance





Jamo SW/SAT300

Jamo UK Ltd, Jamo House, Heyford Lane, Stowe Hill, Weedon, Northamptonshire NN7 4SF. Tel: (0327) 349 449



This £300 combination is the more expensive of two satellite/subwoofer packages from Danish brand Jamo.

The package under consideration here consists of a subwoofer with twin bass drivers that takes up the same volume as a large bookshelf size speaker, and which may be tucked out of sight and mind, plus two tiny little satellites which can be wall or shelf mounted.

The Jamo is particularly nicely styled and finished. The satellites are based on plastics mouldings and have elegant curved baffle edges for smooth lateral distribution, though the depth available to absorb rear radiation is in my estimate rather limited, and the mass is low too, from the point of view of mechanical stability.

The subwoofer has a glossy laminate top surface in a slightly desperate attempt to pass it off as a coffee table, but then gives the game away by nicely radiusing all the edges and corners so you won't suffer the traditional humiliating shin injuries.

The bottom surface comes complete with the requisite double set of proper combination 4mm socket/binders, plus diagrams that illustrate the wiring arrangement clearly and also explain the 'ABR' feature.

To anybody involved in loudspeaker design, ABR is the acronym for auxiliary bass radiator. Also known as a flapping baffle or drone cone, this usually consists of a mass-loaded unpowered passive cone, and acts like a modified reflex port.

However, in Jamospeak 'ABR' is apparently intended to mean 'adjusted bass reflex', to publicise a feature of the system which would actually be more properly described as 'variable bass reflex' (VBR), in that it allows some adjustment of the reflex port that tunes the output of this coupled

cavity subwoofer.

Anonymous BS apart, it actually works rather well!

Test report

Sensitivity and absolute bass extension are both rather disappointing here, but at least the impedance won't tax the current delivery of the accompanying amplifier, and the performance envelope is pretty typical of these sub/sat systems.

You can turn this subwoofer into a boom box by adjusting the variable bass reflex up to setting four, but on position one or two the bass balance is pretty good.

Output at 50Hz remains a bit too strong, and extension below that point is practically nonexistent, but this Jamo sub can give a pretty even output 50-200Hz when properly adjusted, and with little unwanted output up in the midband.

The satellites are rather less impressive, being distinctly lean 250-700Hz, leaving the upper mid (800Hz-2.5kHz) rather exposed. The mid-to-treble crossover is slightly sucked out, while the treble itself peaks up at around 14kHz.

Wall mounting tends to reinforce unwanted satellite output at and below 200Hz, though in other respects sat-to-sub integration is pretty good, with little overlap.

Sound quality

With the majority of these three box systems suffering from bass boom, it came as a welcome relief to discover one that sounds reasonably well balanced overall — relatively speaking at least, and with the VBR set at its lowest position.

The bass still isn't anything too special, being short on absolute extension and a bit thickened above that, but at least it doesn't

groan on continually, irrespective of what the music is trying to do at the time.

This fundamentally good overall balance is a major plus, though it's not particularly even, and this unevenness introduces its fair share of colorations.

The upper mid is slightly cuppy, projected and shouty, the system beginning to exhibit some hard and aggressive qualities if driven hard. The treble is qualitatively disappointing, with what amounts to a decidedly smeary and lispy effect that inhibits transparency.

Conclusion

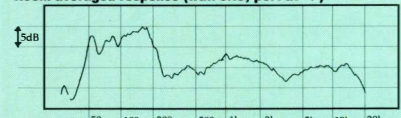
This Jamo sub/sat system is a bit of a mixed bag, the sub performing rather better than the sats, thanks in no small part to the variable tuning feature that helps avoid the boom box syndrome.

Sound quality isn't particularly special, but it's fundamentally well balanced, and the package is very nicely presented and competitively priced, so Recommendation would seem appropriate.

TEST RESULTS

Size (hwxwd)	21x48x34.5cm + 2x(21x15x8)cm
Weight	10kg+2x1.2kg
Recommended amplifier power	20-80W
Recommended placement	uncritical
In room averaged response limits	
50Hz-10kHz	±5dB
LF rolloff (-6dB ref midband)	40Hz
Large room output at 20Hz (ref midband)	below -15dB
Estimated midrange sensitivity (ref 2.83V, 1m)	85dB
Impedance characteristic (ease of drive)	good
Typical price per pair (inc VAT)	£300

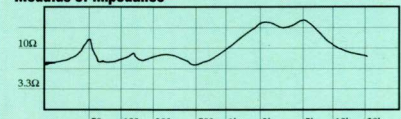
Room averaged response (wall site, port at '4')



Room averaged response (wall site, port at '1')



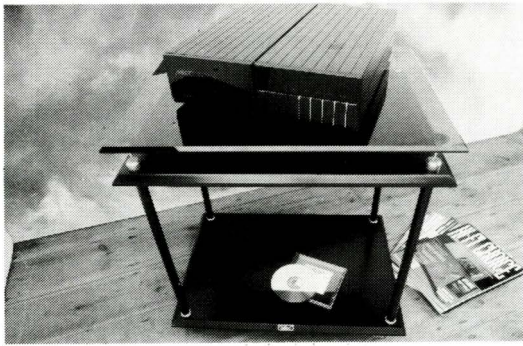
Modulus of impedance



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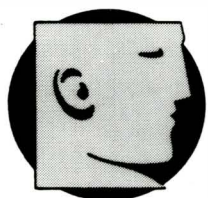
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Rock Solid Sounds Inc is a division of B&W Loudspeakers, or so it says in the accompanying propaganda. Following the modern principles of niche marketing, this is a sub-brand, clearly created to appeal to a much younger customer than B&W's traditional cardigan-and-carpet-slippers constituency.

RSS Inc's first product, a miniature speaker euphemistically named *Solid*, is already a notable success, thanks in no small part to the widely praised Morten V Warren designed plastic enclosure and trim, and clever integral stand/bracket.

Reviewed and recommended in these pages back in issue 90, the £200 *Solid* is (just about) big enough to be regarded as a full range speaker, though those young enough to appreciate its striking appearance are also likely to have an interest in music with serious bass content, which is the one area where its performance is significantly lacking.

RSS Inc's solution is to provide a subwoofer to partner a pair of *Solids*. Dubbed the *Bass Station*, it's as stylish as its stablemate, though distinctly macho instead of mildly effete.

Combining no fewer than eight small drivers around a carefully flared port, this 18kg of textured MDF feels incomparably more solid than its partner. The baffle is necessarily large to accommodate all those drivers, but the unit is only 20cm deep and can be stood on edge against the wall, taking up very little room space. The £350 asking price seems not unreasonable.

Test report

The fundamental problem with this system is that the *Bass Station* is more of a boom box than a genuine subwoofer, providing

rather too much output over the two octaves 50-200Hz, but little genuine LF extension below that band.

With both satellites and subwoofer against the wall, the balance is decidedly lumpy and too strong between 90 and 250Hz.

The same characteristics are still present when the satellites are moved well out into the room, but the midbass lift is smaller, over a narrower band and much less obvious. The treble, however, remains somewhat detached, and rather low in level relative to the midband, never mind the bass.

The c200Hz crossover between sub and sats is well handled, acoustically at least. Sensitivity is a high 91dB, though at least 3dB of that is due to an electrical load which stays well below 4ohms for much of the spectrum; the subwoofer should not be used without the satellites connected (or some form of damping resistors in their place).

Sound quality

Starting off with sub and satellites sitting snugly up against the wall at the end of the room, results were very disappointing.

The balance was dominated by far too much midbass output — altogether too much in quantity, and nothing much in the way of quality in terms of precision and clarity either.

Bringing the satellites out into the room, and looking a trifle silly perched on top of 24inch stands, the room balance became much more acceptable, allowing some assessment of the underlying qualities. There's still a measure of thickening, and the broad bass still sounds rather slow and time-smearing, confusing textures and rhyth-

mic subtleties.

But there's no denying that the multiple driver array can boogie. System sensitivity is high, and there's plenty of midbass slam and drive to give a passable imitation of a home disco, even though limited real extension keeps the system somewhat shut in and lacking genuine freedom.

The mid and treble remain those of the *Solid*, which means a little uneven and coloured with somewhat detached sibilants, but improved all round by free space siting, and pretty well balanced and lively with it.

Conclusion

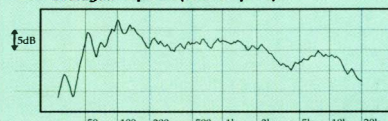
Adding a *Bass Station* to a pair of *Solids* does indeed improve system power handling and hence loudness capability, though the partnering amplifier will need plenty of current reserves to do it justice.

However, there's no denying that the end result lacks genuine LF extension and is inescapably midbass heavy, delivering the sort of balance that some may consider not inappropriate to modern dance music reproduction, but which has little to do with genuine fidelity.

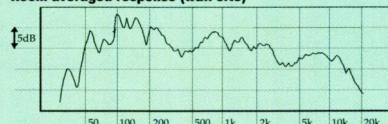
TEST RESULTS

Size (hwxwd)	2x(24x12x12)cm+47x47x20cm
Weight	18kg+2x2kg
Recommended amplifier power	20-250W
Placement	sub against wall, sats in free space
In room averaged response limits	
50Hz-10kHz	±7dB
Large room/space LF rolloff (-6dB ref midband)	70Hz
Large room/wall LF rolloff (-6dB ref midband)	45Hz
Large room output at 20Hz (ref midband)	below -20dB
Estimated midrange sensitivity (ref 2.83V, 1m)	91dB
Impedance (ease of drive)	exceptionally demanding
Typical price (inc VAT)	£550 (£200 + £350)

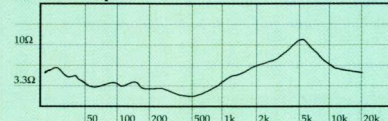
Room averaged response (sats in space)



Room averaged response (wall site)



Modulus of impedance



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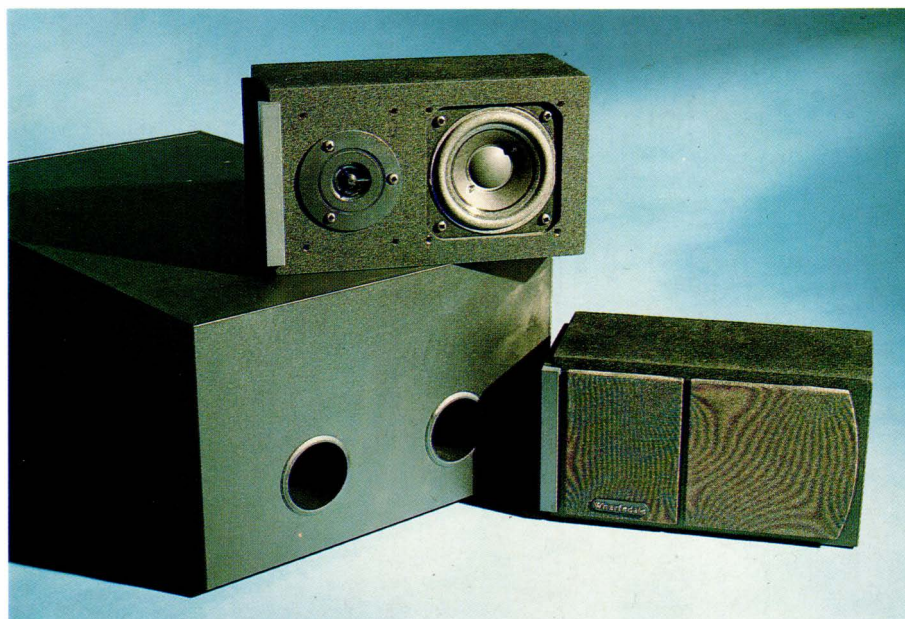
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Wharfedale 2130

Wharfedale Loudspeakers Ltd, Sandreas Way, Crossgates, Leeds LS15 8AL. Tel: (0532) 601 222



At first glance you might be forgiven for thinking that Wharfedale's £299 three box speaker system looks remarkably like most of the others gathered together for this group test.

The satellite units in the Wharfedale system are clearly too small for serious full range use, while the subwoofer is a rather nondescript device in undecorated black textured laminate, about the size of a large bookshelf loudspeaker.

Closer examination shows that Wharfedale has worked hard to add its own touch of individuality. The satellites use no less than three drivers each, an extra tweeter firing out sideways to further enhance the already good dispersion.

Ironically, this is all rather reminiscent of a scaled down Bose 301/305. And while one would hesitate to call them pretty, they certainly are commendably discreet, solidly built and tolerably well fastened together with their screws, showing good attention to detail.

The bass unit is rather less original, entirely enclosing the two drivers and employing the coupled cavity/port resonance principle to create a bandpass low frequency output, along with the stability of sealed box control.

However, the bass drivers are rather large, and the enclosure and twin identical ports rather small, so the prospects for decent extension and bandwidth are remote. Although the satellites have 4mm socket/binders, the sub uses nasty little spring terminals.

Test report

Sensitivity is a shade below average, despite the lowish impedance and distinctly limited LF extension. With all three compo-

nents close to a wall, the bass output (70-200Hz) is clearly too strong, while the octave and a half above that (250-700Hz) is correspondingly weak. The two compensate for each other to a degree, but the imbalance remains clearly audible.

Moving the subwoofer away from the wall keeps the bass lift under reasonable control, and moving the satellites out too helps smooth the transition between the three, and the midband generally, though satellites this size do look pretty daft perched on top of speaker stands.

There's quite a wide overlap between satellites and sub, the latter showing a small peak at around 400Hz, and generating a couple of rather obvious resonances under sinewave drive.

But whatever the ups and downs at the low frequency end of things, the mid-to-treble balance looks very promising, even if the extreme HF has to be judged a shade ragged.

Sound quality

Over and above any limitations elsewhere, the 2130 has a most attractively open and unboxy quality that I found very beguiling.

Additionally, the unusual disposition of the tweeters seems to expand the total soundstage and, more importantly, makes the soundfield relatively consistent irrespective of listener position.

It could also be said that the treble is a bit splashy and short on subtlety, smearing over the fine textures to a degree, but this is a relatively minor shortcoming in the context of a sound which somehow comes significantly closer to reality than the majority.

Sadly, the bass is altogether less exceptional. Even to describe it as downright

ordinary is being a little kind, since the subwoofer offers little in the way of extension or analysis and rather too much in the way of midbass boom.

Pulled well clear of walls and with its sily little ports pointing upwards and clear from the ground, the overall balance becomes acceptable enough, and the total effect is what I would describe as pleasantly inoffensive, though distinctly lacking in scale, drive and authority.

Conclusion

Although the subwoofer is distinctly uninspiring, the satellites used in this system are a definite cut above the average.

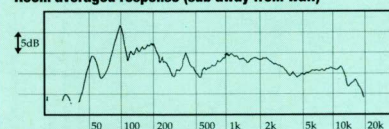
With the subwoofer carefully positioned for maximum damage limitation, the end result may lack drive and incisiveness, but is nevertheless one of the more entertaining and enjoyable three box packages around, thanks to the openness of the semi-omni satellites.

As it's also one of the less expensive, formal Recommendation in this context is entirely appropriate.

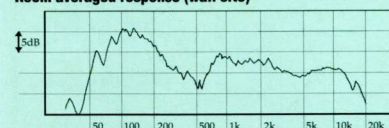
TEST RESULTS

Size (hwxwd)	2x(14x24x11cm)+19x32x50cm
Weight	2x2kg+10kg
Recommended amplifier power	20-100W
Recommended placement	sub away from wall
In room averaged response limits	
50Hz-10kHz	±7dB
LF rolloff (-6dB ref midband)	48Hz
Large room output at 20Hz (ref midband)	below -15dB
Estimated midrange sensitivity (ref 2.83V, 1m)	86dB
Impedance characteristic (ease of drive)	a bit tricky
Typical price per pair (inc VAT)	£300

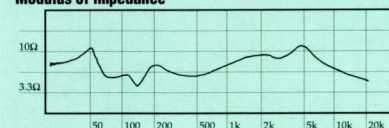
Room averaged response (sub away from wall)



Room averaged response (wall site)



Modulus of impedance



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Conclusions, Best Buys & Recommendations

The fact that all but two of the seven satellite/subwoofer three box speaker systems assembled here use spring clip connecting terminals says a great deal about where they, as a group, are coming from.

It's not that spring terminals are automatically bad (though they certainly discourage the use of top quality cabling); rather they simply lack serious hi-fi credibility. Instead, these are first and foremost convenience products, their prime design objective being to disappear into the home environment. It's something that they accomplish rather successfully for the most part, but there's no denying that the modus operandum involves significant compromise, and sheer performance isn't going to match the better two box competitors.

Jason Kennedy's appraisal in issue 70 found that the three box systems fell comfortably short of comparable conventional stereo loudspeakers subjectively, a conclusion that is echoed in my own findings. But on this occasion a full set of measurements pro-

Looking for a speaker system that should be heard and not seen? Paul Messenger explores the satellite state.

vides ample confirmation, and there's no avoiding the fact that the basic measured performances of these systems are generally rather unimpressive.

The majority combine limited LF bandwidth with below average sensitivity and/or a current hungry impedance characteristic, creating the sort of performance envelope that most conventional bookshelf speakers easily better, even without adding in the compromises inherent in the common bass approach.

Indeed, the term subwoofer seems decidedly misleading for something which offers little if any extension below 50Hz, and usually rather too much output between 50 and 200Hz. Often the problem lies in using satellites that can also double as minispeakers, and which continue to give plenty of output as low as 150Hz, then coupling them to sub units that are effectively single resonators at around 100Hz. Bose avoids these difficulties more effectively than most, by using more than one bass resonator tuned to different frequencies, steep crossover slopes and tiny satellites.

But there are other contradictions too. One obvious theoretical advantage of the three box array is that the bass can be sited for optimum room match/drive, while the satellites can be placed well clear from the unwanted colorations induced by nearby wall reflections.

However, unless you happen to have a well placed room divide, this is unlikely to be a practical proposition, as the satellites are simply too small and light for sensible free space siting. (Hanging them from the ceiling is arguably the most tempting option.)

Recommended models

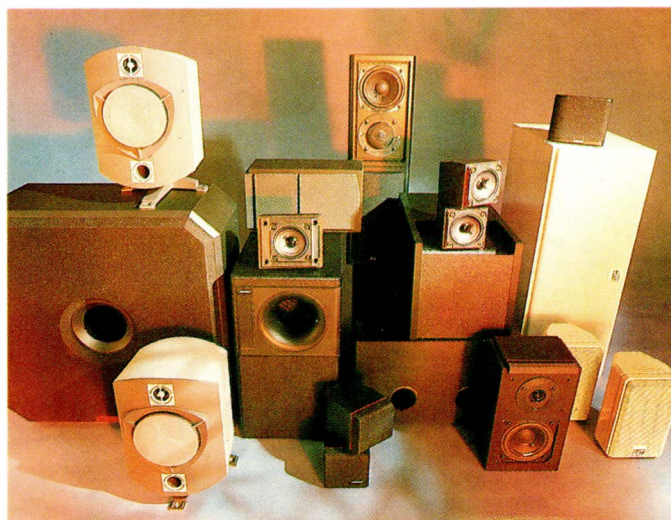
These systems should be purchased for appearance and concealability, not performance. There's no way that any is going to rate a Best Buy, but for those prepared to accept the compromises, some are clearly a little more equal than others, so four are selected for formal Recommendation.

The £299 **Wharfedale 2130** is amongst the least expensive, and has a couple of the better sounding satellites, thanks I suspect to the mutually perpendicular tweeter arrangement, which confers a delightful openness and lack of boxiness, if rather less in the way of transparency. The sub unit is altogether less impressive.

For the same price, the **Jamo SW300** offers rather classier overall finish and a sub unit that's distinctly better than the average, thanks to a variable port tuning capability that helps adjust the boom factor to suit the room and site therein. The satellites are less impressive, the treble in particular being rather unforgiving, though the overall balance is pretty satisfactory, despite a few ups and downs.

The system that offers the most hi-fi credibility is the £420 **Allison MS205**, though it's a moot point whether the sub offers much net advantage over the rather nice satellites alone, and a pain that it uses spring clip terminals. The midbass is a bit boomy, but a measure of genuine coherence that borders on transparency provides delicacy and detail beyond the herd, thanks in no small part to the good low frequency control of the satellites.

Best balanced of all the systems is the latest version of the one that started it all, the **Bose Acoustimass 5 II**. It's pricey at £569, and doesn't offer any really deep bass, but the triple resonator bass module gives a relatively even output from 50-200Hz, before handing over to the cute twin module satellites. These can be arranged to give wide dispersion without too much of the hot spot effect a single 50mm driver can create at high frequencies. Not the most analytical speaker system, but certainly one of the most self-effacing, and that is the *raison d'être* of the design.



Choice Offers

Our Mail Order Section this month features, amongst the old favourites such as Furakawa interconnects, some great new accessories to help improve the performance of your system. We've been reviewing some new and interesting products and have selected some that we thought you should know about.

Golding Magic Record Cleaner

This is a kit consisting of a double sided velvet brush and spray on Goldring Magic record rejuvenating fluid. Unlike some other record cleaning potions this one makes old grubby records sound smoother and less gritty, reducing surface noise quite significantly. For best results use with the mk10 brush.

£11.95 ref: **A13**

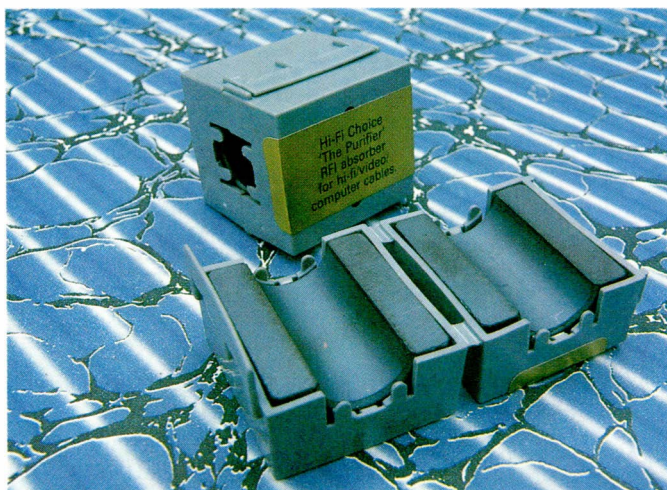
The Purifier

The Purifier is a ferrite cable clamp designed to reduce RF induced noise in audio, video and computer systems. The clamps will accept single or multiple cables of up to half an inch in diameter and can be used on both signal and mains cables. The main benefit is a general cleansing of a system's sound allowing finer resolution of low level detail. They can be particularly beneficial for digital interconnections.

Price £16.90 per pair ref: **A14**

Nagaoka Anti-Static Record Sleeves no.102

Packs of 50 plastic record sleeves that can be used on their own or inserted into an existing card or paper sleeve. They keep records dust free and eliminate static, but are of course hampered if the record isn't cleaned before it's stored. No great



sound quality claims but in these days of disappearing vinyl it pays to take care of what precious vinyl you've got, after all there may never be a format to beat it!

£6.99 ref: **A15**

Mk 10 Carbon Fibre Brush with Velvet Pad

The carbon fibres efficiently remove dirt from the record grooves, which is then collected by an integral felt pad. This can be easily cleaned with the supplied tool after use.

£9.99 ref: **A8**

Monotrack Support Cones

Supplied in packs of four, these

turned steel support cones are ideal for supporting just about any item of hi-fi, from subwoofers through to amplifiers. The cones provide effective isolation and de-coupling at a bargain price.

£8.00 ref: **A12**

System Cleaning Kit 1

Everything needed for maintaining a hi-fi system, all contained in one handsome wallet pack. Stylus cleaner, auto reverse wet tape head cleaner and cleaning fluid, manual CD cleaner and cleaning fluid and a carbon fibre record cleaning brush.

£15.99 ref: **A9**



Interconnects

We have a variety of interconnects on offer, all sourced from the respected Japanese specialist Furakawa.

The FA21 Series balanced analogue interconnect cables

The *FA21 Series* of analogue interconnects is supplied in matched pairs employing the Furakawa all PCOCC RCA plug with a flying earth or ground lead which is designed to be terminated to the ground tag of the source component for the purpose of transmitting a balanced signal with a totally separate ground path.

These interconnect cables are recommended for the connection of analogue devices where RCA sockets are provided, such as power amplifier to preamp and tape deck, turntable, step-up transformer etc to a preamp or integrated amplifier. They can introduce a wide stereo image with good depth and height.

Furakawa FA11S Series balanced analogue interconnect cables

The *FA11S Series* of analogue interconnects is supplied in matched pairs employing the Furakawa hermetically sealed all PCOCC RCA phono plug with a flying earth or ground lead.

These interconnect cables are recommended for the connection of high quality analogue devices.

The cable's ability to transmit a vast amount of information has the effect of creating an awe inspiring bass, transparent mid range and simply superb unfettered treble.

Improve the sound of your system for a mere £15

Ever wondered why some people get taken seriously in hi-fi shops while others are given the run around? Wonder no more. The answer to all your hi-fi problems is the *Hi-Fi Choice* sweatshirt. Tastefully printed in red and black on grey, as well as being this year's most crucial fashion accessory, it will also readily identify you as a reader of Britain's fastest growing hi-fi magazine. You'll almost certainly be taken more seriously and end up with a better system – and all for a mere £15. We can supply the shirts in two different sizes – Large and Extra Large.



Order Form

Speaker Cables

Furukawa FS-2T14 PCOCC speaker cable

FS-2T14 PCOCC speaker cable is Furukawa's entry level speaker cable consisting of two 1.4mm square drawn PCOCC concentric strands.

Furukawa FS-2F09 PCOCC speaker cable

Two 0.09mm square drawn PCOCC strands are contained in a neat, flat, flexible PVC insulation.

The FS-2F09 is highly regarded by audiophiles around the world.

Furukawa FS-2T30F Evencap speaker cable

PCOCC speaker cable consisting of two 3mm square drawn PCOCC rope lay strands. FS-2T30F speaker cable, by virtue of its low resistance and 3mm section, increases the audible bandwidth, most particularly in the low frequencies.

FS-2T20P PCOCC speaker cable

PCOCC cable consisting of two twisted 2mm² drawn PCOCC strands laid in a concentric pattern.

The two conductors are insulated in polypropylene and contained in a circular outer sleeve of soft PVC.



Furukawa FS-2T35P PCOCC speaker cable

Produced from six concentric laid conductors in a rope lay this large cable has a low DC resistance and a larger occupation area for the skin effect, therefore bass is larger and treble is even sweeter.

Furukawa FS2T55F Evencap speaker cable

FS2T55F is a 5.5mm 2 rope lay cable of similar construction to the FS2T30F.

Furukawa Price Table

Please circle the cables you require.

Interconnects

	0.5m	1.0m	1.5m	2.0m
FV11 (each) RCA-RCA	42.50	45.50	52.50	57.50
FD11 (pair) RCA - RCA	75.00	85.00	95.00	NA
FA21 (pair) RCA-RCA	NA	95.00	105.00	NA
FD11S (pair) RCA-RCA	NA	220.00	NA	NA

Fibre optics

FO11 (each) TOSLINK	NA	37.50	42.50	NA
FO12 (each) TOSLINK	NA	90.00	100.00	NA
FO13 (each) TOSLINK	NA	105.00	120.00	NA

Speaker cables

Please state termination required, solderless, gold plated banana plugs, spades or pins or any combination. All prices are per pair.

	FS2T14	FS2F09	FS2T20P	FS2T30F	FS2T35P	FS2T55P	FS2T15
1.0m	38.00	37.00	44.00	53.00	56.00	74.00	129.00
1.5m	42.50	41.00	51.50	65.00	69.50	96.50	179.00
2.0m	47.00	45.00	59.00	77.00	83.00	119.00	229.00
2.5m	51.50	49.00	66.50	89.00	96.50	141.50	279.00
3.0m	56.00	53.00	74.00	101.00	110.00	164.00	329.00
3.5m	60.50	57.00	81.50	113.00	123.50	186.50	379.00
4.0m	65.00	61.00	89.00	125.00	137.00	209.00	429.00
4.5m	69.50	65.00	96.50	137.00	150.50	231.50	479.00
5.0m	74.00	69.00	104.00	149.00	164.00	254.00	529.00
6.0m	83.00	77.00	119.00	173.00	191.00	299.00	629.00
7.0m	92.00	85.00	134.00	197.00	218.00	344.00	729.00
8.0m	101.00	93.00	149.00	221.00	245.00	389.00	829.00
9.0m	110.00	101.00	164.00	245.00	272.00	434.00	929.00
10.0m	119.00	109.00	179.00	269.00	299.00	479.00	1029.00

Cleaning Accessories

Please indicate which items you require by ticking the appropriate box.

- | | |
|--|---|
| <input type="checkbox"/> A8 Mk 10 Carbon Fibre Brush with Velvet Pad £9.99 | <input type="checkbox"/> A13 Goldring Magic Record Cleaner £11.95 |
| <input type="checkbox"/> A9 System Hi-Fi Cleaning Kit 1 £15.99 | <input type="checkbox"/> A14 The Purifier £16.90 |
| <input type="checkbox"/> A12 Monotrac Support Cones £8.00 | <input type="checkbox"/> A15 Anti-Static Record Sleeves £6.99 |

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Audiophile Recordings

We are pleased to be able to offer a selection of records from the world famous Reference label. Guaranteed to get the very best from your system these recordings have been selected for the merits of the performance as well as their outstanding sound quality.

Prof Johnson's Astounding

Sound Show: Sampler. Orchestral Fanfare - Red Norvo Quintet - Cal Arts Ensemble - Richard Morris - Organ - Susan Mc Donald, Harp - Kronos Quartet - David Rosenthal, Tubulung.

A perennial audiophile favourite, this sampler of Prof Johnson's early work shows what Reference can do with a wide variety of musical and sonic experiences.

Includes the only known recording of an unusual tuned mallet instrument, the Tubulung. Guaranteed to give your playback system a royal wringing out!

Kronos Quartet: In Formation. *The funky chicken - Remember - Blues - When - Enantiodynamia - Joan's Blue - Wind on my back - The Junk food blues - Dark razz*

Ever heard a quartet play the blues? Kronos, celebrated exponents of 20th Century masterpieces have another side, represented by this collection of lighthearted tuneful scores, all written specially for the group.

Recorded in St Mary's Cathedral, San Francisco, for an unusual, highly effective soundstage.

Copland: Appalachian Spring Suite, Eight poems by Emily Dickinson. Keith Clark/Pacific Symphony Orchestra, Marni Nixon, Soprano (in the poems).

Music by America's best loved composer, *The Appalachian Spring Suite* is presented in its original version for 13 instruments. Also included is the world premiere recording of Copland's orchestration of eight of his Emily Dickinson songs.

This recording was a Grammy Award nominee in 1987. The CD version also contains *An Outdoor Overture*.

Walker & Garson: Reflections. *Portrait of a friend - Love - First song - Ethereal - Yearnings - Pied piper - The park - Magic spell - You're one of a kind - Reflections - Reason.*

Jim Walker on flute and Mike Garson on piano from the jazz group 'Free Flight' offer something peaceful and soothing for those quiet moments. Surpassing natural sound.

Helicon Ensemble: Vivaldi/Bach Vivaldi: Sinfonia in C-Trio Sonata in G minor - Double Concerto in E-Flat. Bach: Trio Sonata in C - Double Concerto in D minor. (Compact Disc also contains *Prelude in C*)

Albert Fuller conducts from the harpsichord a varied original instrument ensemble in works featuring two solo violins, including the great *Double Concerto* by Bach and three rare, ingratiating works by Vivaldi.

Featured solo artists are Japp Schroeder, Stanley Richie and Linda Quan.

Recorded at the John Harnes Centre for the Performing Arts in Englewood, New Jersey. CD also has Bach's *Prelude in C*.

Walton: Facade Suite. Walton: Facade Suite - Strauss/Hasnohl: Till Eulenspiegel - Scriabin/Elliott: Waltz in A-Flat - Nielsen: Serenata in Vano. Chicago Pro Musica.

An instrumental from Walton's whimsical *Facade* in the composer's original scoring makes a perfect vehicle for these brilliant musicians. A chamber version of *Till Eulenspiegel* and the seldom heard pieces of Scriabin and Nielsen complete this engaging programme.

Tafel Music: Popular Masterworks of the Baroque Pachelbel: Canon & Gigue Handel: suite from 'Water Music' Purcell: air from Suite no. 3 in D and Suite from 'The Moor's Revenge'. Vivaldi: Concerto op. 10-2, 'La Notte'.

Canada's finest original-instrument Baroque ensemble plays familiar favourites with outstanding scholarship and musical panache. Note the Pachelbel *Canon* with its seldom-heard companion piece, both to the composer's instrumentation. Strings, oboes, recorder and harpsichord offer delightful music recorded in a vaulted ceiling stone church.

Stravinsky: L'Histoire. Stravinsky: L'Histoire du soldat suite. Blackwood: Capriccio Espagnol. Chicago Pro Musica.

Stravinsky's landmark composition for a mixed ensemble of seven. Grammy winning performances.

Catingub & Rivers: Your Friendly Neighbourhood Big Band. Don't be that way - Honeysuckle rose - Bloozball - Work song - Easy living - You leave me breathless.

Current concert jazz with vocalist Mavis Rivers and her son Matt Catingub's cooking 20 piece ensemble.

Dancehall ambience, realistic balances, and Prof Johnson's patented punch give big band lovers the thrill of the real thing. CD contains two extra tracks.

Respighi: Church Windows. Keith Clark, Pacific Symphony Orchestra.

This grandiose work, scored for full symphony orchestra, pipe organ and tam-tam, has at last been given its due, musically and sonically, in this celebrated recording. *Church Windows* quite literally pushes to the theoretical limit the dynamic range it is possible to reproduce at home.

The CD also contains Respighi's rare mini concerto *Poema Autunnale* with the violinist Ruggiero Ricci.

Marni Nixon: Marni Nixon sings Gershwin. Summertime - Let's call the whole thing off - Someone to watch over me - I've got a crush on you - But not for me - The real American folk song - Nice work if you can get it - Embraceable you.

Marni Nixon's impeccable intonation and diction bring a welcome elegance to these songs which are perhaps too often jazzed up. By beautifully singing what Gershwin wrote, stylishly accompanied by Lincoln Mayorga' piano, Miss Nixon brings new insights to these immortal songs.

Eileen Farrell: Torch Songs. Stormy weather - Round Midnight - The end of a love affair - Black coffee - When your lover has gone - Don't explain - Something Cool - and more.

The album Farrell fans have been waiting for. America's great blues diva makes these songs of lost love her own.

Smoky night club arrangements set the stage for some unforgettable singing.

Dick Hyam: Dick Hyam Plays Fats Waller. Ain't misbehavin' - Keepin' out of mischief now - African ripples - Honeysuckle rose - Willow tree - Stealin' apples - I've got a feeling I'm falling - Handful of keys - My fate is in your hands - Jitterbug waltz - Squeeze me.

The world's first direct-to-CD on RR-33DCD. A technological and musical triumph, a true landmark in recording history. RR-33DCD (listed as Ref CD87 on the order form) is available as a deluxe numbered limited edition.

Encoded on the highly sophisticated, computerised Boesendorfer reproducing piano, Hyman's performances were played back for Prof Johnson's microphones, and the digitised signal was transmitted via microwave to the compact disc master as the music was being played.

No recording tape of any kind was used, nor was the digital bitstream corrupted at any stage by copying manipulation or editing.

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Also on ordinary CD and LP.

Michael Garson: Serendipity. Lady - Autumn leaves - I should care - Spirit of play - Trio blues - My romance

With illustrious sidemen Stanley Clarke (bass). Gary Herbig (sax), Peter Sparague (guitar) and fellow Free Flight members Jim Walker and Jim Laceyfield, Michael Garson has put together a tasty program of exciting mainstream acoustic jazz. Recorded by Prof Johnson in a real concert space, *Serendipity* represents an alternative, non-studio approach to jazz recording. A long standing favourite for audio demo, the CD contains two extra tracks.

Star of Wonder. Silent night - Nativity carol - We three kings - We'll Dress the house - Come all ye faithful - Deck the hall -

Festive music for the holiday season by an outstanding professional chorus, recorded in San Francisco's St Ignatius Church.

The spine tingling acoustics are ideal for this program and *Star of Wonder* contains the full range of Christmas music: imaginative arrangements of traditional carols, renaissance motets and dramatic 20th century compositions.

The CD contains three extra tracks.

Berlioz: *Fantastique. Symphonie Fantastique.* Varujan Kojian, The Utah Symphony Orchestra.

This is widely considered to be the recording of this magical work. The Utah Symphony Orchestra, playing in Salt Lake City's Symphonic Hall, gives world class performance, and the excellent recording captures it in its entirety.

The CD contains two versions of the explosive finale, one with standard orchestral bells, and another with digitally recorded church bells.

The 2-disc 45RPM LP set contains two copies of *March To The Scaffold* and *Dreams Of A Witches Sabbath*.

Nojima: *Nojima plays Liszt. Sonata in B minor - Mephisto Waltz - La Campanella - Harmonies du Soir - Feux Follets.*

The recipient of more rave reviews than any piano recording in recent memory, this is truly one for the history books.

Japan's most celebrated concert pianist won the Silver Medal at the Van Cliburn competition.

Connoisseurs of great piano playing will treasure this recording, which has also been acclaimed for its outstanding sonic realism.

Blazing Redheads: *Paradise drive - Sea Level - February song - Get down (and stay down) - Final segment - My Picasso - Santa Fe - Mozambo.*

The Blazing Redheads play their own special blend of Latin flavoured jazz - 'funky with a dash of salsa'. The seven woman combo plays alto and tenor sax, flute, harmonica, keyboards, bass drums and a lot of percussion.

The Blazing Redheads perform live in packed clubs on tour and in San Francisco.

This vivid live-to-two-track studio job was engineered by Paul Stubblebine and Prof Johnson. The CD contains two extra tracks.

Chicago Pro Musica: *Weill, Varese, Bowles and Martinu. Threepenny Opera suite - Octandre - Music for a farce - La Revue de Cuisine.*

Chicago Pro Musica gives brilliant performances of four magnificent 20th Century works. Kurt Weill's pungent suite for wind, brass and percussion is the centrepiece

Featuring the first stereo recording of a rare piece by Paul Bowles, best known as the author of *The Sheltering Sky* but also a distinguished composer for the stage.

Martinu's Parisian ballet from the 1920s contains the steamiest of tangos and a mad Charleston.

Eileen Farrell: *Rogers & Hart. I could write a book - I wish I were in love again - Wait till I see him - I didn't know what time it was - Love me tonight - Nobody's heart - It never entered my mind - Mountain greenery - Sing for your supper - Can't you*

do a friend a favour - Lover - My heart stood still - Little girl blue - You're nearer.

A wide ranging survey including many great standards and more than a few rarities. Farrell's affinity for the songs of this era is undisputed.

Beautifully sung as her earlier pop recordings were, these new performances reveal an added dimension to the Farrell art - total involvement with the lyrics. And what lyrics! A must for admirers of Lorenz Hart.

Nojima: *Nojima Plays Ravel.*

Miroirs: Noctuelles - Oiseaux tristes - Une baroque sur l'océan - Alborada del gracioso - La valse des cloches - Gaspard de la Nuit: Odine - Le gibet - Scarbo.

Here is the eagerly awaited sequel to Nojima's first American recording, featuring some of his most renowned specialities.

Gaspard de la Nuit is the pianist's Everest, attempted by only a few. *The Miroirs* are a distillation of Ravel's impressionist style, requiring a totally different technique.

The Nojima performances are incandescent.

Order Form

Record and CD Price Table

Prof Johnson's Sound Show:

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Ref RR-11 (2x45rpm) (£24.99)

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Tafel Musik: *Baroque*

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Your Friendly Big Band:

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Respighi: *Church Windows*

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Marni Nixon: *Marni sings...*

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Star of wonder:

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Blazing Redheads: *Paradise Drive*

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Chicago Pro Musica: *Weill*

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Eileen Farrell: *Rogers & Hart*

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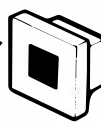
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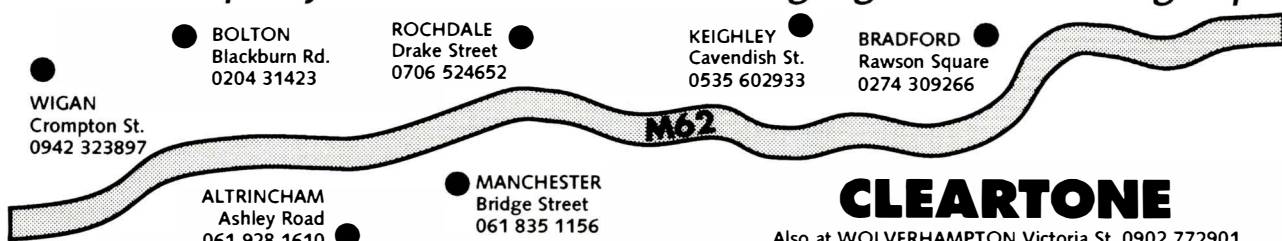
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CD CLUB

NO RECORD CLUB WOULD HAVE ME AS A MEMBER.



Hello! I'm Bill Wilson

... I love music - all kinds of music - classical, popular and jazz. I also love collecting records - especially CD's.

When I first started my collection I soon realised I'd have to be a millionaire to be able to afford all the records I wanted. Record shops were all out because they were too expensive and most of them were teenage meeting places anyhow. So I looked around for a record club that would help me in three ways.

1. Make my money go further by giving me large discounts on the recordings I bought.
2. Keep me fully informed about all I wanted to know about the new recordings being released - and help me sort out what was worth having from what was not.
3. Most important of all - allowing me to try out recordings in my own home without any obligation to buy.

Well, I looked at the various clubs and I didn't care much for any of them. And when I told them I'd only join if they gave me three benefits I wanted, none of them would agree.

So, I formed my own club. More than twenty - five years ago! Now the Wilson Stereo Library has many thousands of members. They enjoy all the benefits I wanted from a good record club.

If you want the kind of service no other CD club can offer you, contact me now for full details of the Wilson Stereo Library CD Service - I'll reply personally and make you a very special offer of membership.

O.K. Bill Wilson! Tell me about the Wilson Stereo Library CD Service and the benefits I can get from it, including the CD index. Without obligation. (I enclose 2 First Class stamps for a speedy reply).

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The Wilson Stereo Library,

Unit 4 Mecatoria Business Centre

100-102 Norman Road

St. Leonard, East Sussex TN38 0EJ

Tel: 0424 - 718254 Fax: 0424 - 718262

Classified

The Choice Dealer Directory

Choosing a good hi-fi dealer is the most vital step in acquiring the system that is right for you. This unique directory gives full information on dealers in your area.

AVON

AUDIO EXCELLENCE, 65 Park Street, Bristol. (0272) 264975. Audio Research, Linn, Arcam, Mission, Quad, Naim, NAD, Yamaha, etc. Closed Mon. **BADA**

PAUL GREEN HI-FI LTD, Kensington Showrooms, London Road, Bath. (0225) 316197. Linn, Musical Fidelity, Krell, A&R, Creek, Rogers, Quad, Cust. car park. Best selection in the West. **BADA**

RADFORD HI-FI, 52-54 Gloucester Rd, Bristol. (0272) 428247. Choose from a huge selection of the world's leading hi-fi manufacturers in one of our 3 modern dem rooms. Expert advice and personal service guarantee your total satisfaction. FREE home trial, FREE installation. Visa, Access credit facilities. 9-5.30 Mon-Sat. **BADA**

RADFORD HI-FI, 4 Merchant St, Broadmead, Bristol. (0272) 294183. One dem lounge. 9.30-6 Mon-Sat. Other details as above. **BADA**

RADFORD HI-FI, 12 James St West, Bath. (0225) 446245. All details as Gloucester Road shop above. **BADA**

V AUDIO, 36 Druid Hill, Stoke Bishop, Bristol B59 1EJ. (0272) 686005 ATC, Acoustic Energy, Ruark, AVI, Exposure, Dahlquist, Threshold, Pink Triangle, Wadia. Demos by appt only, home trial facilities, free installation, service facilities.

BEDFORDSHIRE

WENTWORTH AUDIO, 83 High Street North, Dunstable. (0582) 663383. Pioneer, Marantz, Pink Triangle, Musical Fidelity, Yamaha, Ariston, Linn, Acoustic Energy, Revox, Monitor Audio. 2 large single speaker dem. rooms. 1 general showroom. No appt. nec. Home trial. Free install Service dept. Access & Visa. Tue-Sat 10-6

BERKSHIRE

B&B HI-FI, 11-12 Market Place, Reading, Berkshire, RG1 2EG. (0734) 583730. Aiwa, Denon, Kenwood, Mission, NAD, Panasonic, Pioneer, Rotel, Sony, Technics. Free installation, Service dept. Access, Visa, Credit Facilities including interest free credit subject to status. 9.30-5.30, Sat 9-5.30. Also at: Bracknell, Maidenhead, High Wycombe, Newbury. NEWBURY AUDIO, 2 Weavers Walk, Northbrooke St., Newbury, Berkshire RG13 1A1 (0635) 33929. Linn, Naim, Roksan, Exposure, Creek, Epos, Royd, Denon, Nakamichi. Single speaker dem. Room. Appts. necessary. Home trial facilities. Free installation. Service dept. Late appointments. Access, Visa. Interest free credit subject to status. 6 days 9.30am-6pm. RADFORD HI-FI, 43 King Edward Court, Windsor. (0753) 856931. Choose from a huge selection of the world's leading hi-fi manufacturers in one of our modern dem rooms. Expert advice and personal service guarantee your total satisfaction. FREE home trial, FREE installation. Visa, Access credit facilities. 9-5.30 Tue-Sat. **BADA**

READING HI-FI CENTRE, 4 Queen's Walk, Reading RG1 7QF. (0734) 585463. 'The best equipment, advice and service from Berkshire's premier Hi-Fiemporium'. **BADA**

BUCKINGHAMSHIRE

AUDIO INSIGHT LTD, 53 Wolverton Rd, Stony Stratford, Milton Keynes (0908) 561551. Arcam, Audiobab, Heybrook, Ion, Linn, Meridian, Quad and more. Access, Visa, Finance, Dem. Room etc. TECHNOSOUND, 7 Graville Square, Willen Centre, Milton Keynes (0908) 604949. Bang & Olufson, Denon, Rotel, Technics, Yamaha and enthusiast Hi-Fi. Also at Luton and Dunstable

CAMBRIDGESHIRE

AUDIO FILE, 2 Foundry Walk, Market Hill, St. Ives, Cambridgeshire. (0480) 66123. Linn, Naim, Rega, Quad, Cyrus, Arcam, Musical Fidelity. 9.30am-6pm 6 days. 0% Credit. **BADA**

CAMBRIDGE HI-FI, 1-3 Hawthorn Way, Chesterton, Cambs, CB4 1AT (0223) 67773. Mission-Cyrus, Rotel, Kenwood, Pioneer, Mantecore, Revolver, Ariston, ITL, KEF, Meridian, Technics, Ruark, Monitor Audio Single speaker dem. room. Tues-Sat 9.30-5.30 closed Mon. Free installation. Service Dept. Visa, Access, Credit facilities **BADA**

HI-FI COMPANY, 42 Cowgate, Peterborough, Cambs. PE1 1NA. (0733) 341755. Pioneer, Technics, Yamaha, Rotel, NAD, Denon, Arcam, Audiobab, Mission, Kef. No appts necessary, home trial facilities, free install (if necessary), service dept. Access, Visa, Amex, Switch. Open 6 days 10-5.30.

SAUCIERS. Specialists in Sound, 17 Market Str, Cambs CB2 3PA. (0223) 321686. Albarry, Marantz, Monitor Audio, Meridian (room link), Mission, Musical Fidelity, Pioneer, Pink Triangle, Technics, Sony, and other high quality products. Two demo studios, one single speaker by appt only. Interest free credit on selected products, home install. Open Mon-Sat 9-5.30, Tue 10-5.30

STEVE BOXSHALL AUDIO, 41 Victoria Rd, Cambridge CB4 3BW. (0223) 68305. 10-6 - 6 days. 3 dem rooms, home trial, appts. preferred. Free installation and service dept. Access, Visa & credit. **BADA**

UNIVERSITY AUDIO, 1-2 Peas Hill, Cambridge. (0223) 354237. Roksan, Quads, Meridian, Arcam, Musical Fidelity, Marantz, ATC, Pioneer, Yamaha, Infinity. 2 dems, 1 single speaker. Home trial, free install, Service Dept. Visa, Access, Amex, Credit. 9-5.30.

CHANNEL ISLANDS

BASE HI-FI, 34-35 Hilgrove St, St Helier, Jersey. 0534 58518. Linn, Meridian, Arcam, KEF, Denon, Yamaha, Rotel, Wharfedale, Nakamichi, RCF, etc. Single speaker demo lounge, home trial facilities, free installation, service dept. 10 month or 6month % FREE credit, Access & Visa. 9-5.30 6 days, (multi room installations).

CHESHIRE

ASTON AUDIO, 4 West St, Alderley Edge. (0625) 582704. Wide range of specialist audio, interest free credit. Visa, Access. Home trial. **BADA**

DOUG BRADY HI-FI, Kingsway Studios, Kingsway North, Warrington. (Padgate 0925) 828009. 'Largest choice of specialist Hi-Fi in N.W.' All credit cards. 3 Dem rooms. Open 6 days **BADA**

CHRIS BROOKS HI-FI, 29 Gaskell St, Stockton Heath, Warrington. (0925) 61212/3. Tues-Sat 10-6. 2 dem rooms. Credit facilities. All credit cards. Total absence of bull**** **BADA**

CONGLETON HI-FI, 1/1a Duke St, Congleton, Cheshire, CW12 1AP. (0260) 297544. Arcam, Linn, Naim Audio, Nakamichi, Epos, Audio Innovations, Marantz, Voyd, Royd, Rational Audio. Superbly appointed single speaker demo facilities. No appts nec, home trial facilities, free installation. 2 year guarantee on all equipment. Access, Visa. Mon-Fri 10-6, Sat 9.30-5.30, Other times by appt.

PHILIP DOOLEY, 106 Mill Str, Macclesfield, Cheshire SK11 6NR. (0625) 423158. Marantz, Trio-Kenwood, Pioneer, Aiwa, Cambridge Audio, Teac, B&W Loudspeakers, Celestion, Rogers, Tannoy. No appt necessary, home trial facilities, free install, service dept. Visa, Access, Lombard Tricity. Open 9-6pm, Wed 9-1pm

HI-FI CENTRE, Green Lane, Wilmslow, Cheshire. (0625) 524766. TDL, Quad, Sony, Technics, Nakamichi, Teac, Revox, Bose, Jamo, Phillips, JBL, B&W. Part exchange, shop soiled & ex-demo bargains always available. Best selection of used hi-fi in the north. Workshop on the premises. Knowledgeable & helpful staff. Any combination connected especially. Parking in front of shop for customers. Coffee anytime on request, also free lunch or snack for travellers. Advice & personal service Older equipment also available. TDL direct from factory. Ring for special quotation for your mail order requirements. Closed Wed

PETERS HI-FI, 4 St Michaels Squ., Grosvenor Precinct, Chester. (0244) 322063/319392. Linn, Arcam, Technics, Sony, Marantz, Dual, Denon, Tannoy, Wharfedale, Quad. 2 single spker dem rooms, no appts nec., free installation, service dept. Access, Visa, Amex, Peters credit chargecard Mon-Sat 9-5.30.

SWIFT OF WILMSLOW, 4-8 St Annes Parade, Wilmslow. (0625) 526213 Arcam, Denon, Kenwood, Musical Fidelity, Marantz, NAD, Cambridge. 2 dem rooms. Tues-Sat 9.15-6pm. No pressure! **BADA**

CLEVELAND

ACTION ACOUSTICS, 155-157 High Street, Redcar, Cleveland TS10 3AN. 0642 480723. Audio Innovations, Cambridge, Harman-Kardon, JBL, Michell, Musical Fidelity, Pink Triangle, Revox, Rogers, Thorens, etc. Dem Room. Appts nec. Home trial facilities, free installation, service dept. Access, Visa & H.P. Open 9.15-5.30

GILSON AUDIO LTD, 172 Borough Road, Middlesbrough. (0642) 248793. Linn, Exposure, Arcam, Mission, Cyrus, Denon, Marantz, Rotel, Pioneer, Audiobab, Tannoy. Demonstration facilities in main shop and 1 dem. room, appt nec, home trial facilities, free install. on request, service department. Access, Visa, HP. 10-5 - 6 days.

CORNWALL

ART OF MUSIC, Near Launceston, Cornwall. (0566) 86649. Acoustat, Basis, Cary, Convergrad, Audio Technology, Chessell, Chord, Cogon-Hall, Diamond Acoustics, Forfell, Graham, Lumley Reference, MFA, Magnum Dynalab, Moth, Pentachord, NRG, Ruark, Shinon, Tesserac. Dem studio appointments necessary, home trial facilities, & free installation. Open 7 days

DEFINITIVE AUDIO, St Austell, Cornwall TR16 5NH. (0726) 844039. Voyd, Audio Innovations, Micromega, Helius, Syrius, Audio Note, System Dek, JPW, SME, Goldring etc. Free Home Demo and Install throughout Cornwall. Credit facilities. Open 7 days.

TRURO HI-FI at E.T.S., 25 Kings Street, Truro. 0872 79809. Linn, Quad, Mission-Cyrus, A&R, Denon, Pioneer, Aiwa, Technics, Mordaunt Short, Tannoy. Single speaker demo room. Appts. available if required by customer, free installation on many products, service dept. Access, Visa, instant credit up to £1000 subject to status. Open 9-5.30 Mon-Sat

CUMBRIA

HL ELLIOT, 29 Lowther Str, Whitehaven, Cumbria CA28 7DJ. (0946) 693671. Quad, B&W, Rotel, Aiwa, JVC, Kef, Celestion, Infinity, Marantz, Bose, Canon. Non appts necessary, home trial, free install, service dept. Access & Visa, credit terms arranged. Mon-sat 9.30-5.30pm closed Wed. PETER TYSON, 6 Abbey St, Carlisle, Cumbria CA3 8TX. 'Cumbria's premiere hi-fi-centre', Part exchange welcome (0228) 46756. Linn, Musical Fidelity, Cyrus, Marantz, Denon, Philips, Nakamichi, Technics, Pioneer, Creek & more. Dem room. Demos without obligation. Home trial. Free Install. In-house service dept. Visa, Access, HP. 9-5.30. Closed Thurs.

DERBYSHIRE

ACTIVE AUDIO LTD, 12 Osmaston Rd, The Spot, Derby. (0332) 380385/385185. Arcam, Ariston, Celestion, Denon, Exposure, Kef, Kef Reference, Cyrus, Marantz, Revox, Rotel, Rogers, etc. Account and credit cards. Ring for opening times and free 'Fact Pack'. The only BADA member in Derbyshire. **BADA**

DEVONSHIRE

CHELSTON HI-FI, 38 Walnut Road, Chelston, Torquay, Devon TQ2 6HS. Tel: (0803) 606863. Denon, Marantz, Rotel, Musical Fidelity, Acoustic Energy, NAD, Castle, Heybrook, Celestion, JPW etc. 2 dem rooms. Home trial. Free installation. Access, Visa, Amex, Diners, Hi-Fi Markets Chargecard. Credit facilities. 9.30-7.30 Mon-Fri, 9.30-6 Sat. THE HI-FI ATTIC, 58 New George St, Plymouth, Devon PL1 1PJ. (0752) 669511. One of the South West's oldest hi-fi shops. We stock all leading manufacturers & it out of the ordinary, we'll get it for you. We are about to be completely re-furbished to give a large demo room with free coffee!! (& whiskey to console the big spenders!!) We have a genuine interest in hi-fi & believe the customer always comes first. Single speaker comparators & a (hopefully) relaxed atmosphere. Bring your own equipment/dics etc. along to have a listen. We offer a 7 day 'buy back' period. Home demonstrations & installations & interest free credit over £700. Open 9.30-5.30 & demos can be by appt.

RADFORD HI-FI, 6 Fore St, St Marychurch, Torquay, (0803) 326723. Choose from a huge selection of the world's leading hi-fi manufacturers in one of our 3 modern dem rooms. Expert advice and personal service guarantee your total satisfaction. FREE home trial, FREE installation. Visa, Access credit facilities. 9-5.30 Mon-Sat. **BADA**

RADFORD HI-FI, 107 Cornwall St, Plymouth. (0752) 226011. 2 dem rooms. Other details as above **BADA**

RADFORD HI-FI, 28 Cowick St, St Thomas, Exeter. (0392) 218895. All details as Torquay shop above. **BADA**

STUDIO ACOUSTICS (0626) 67060. OCM Technology, Shahinian Acoustics, Superplan amplifiers, Nobis loudspeakers & amplifiers, Mirror Image Audio, J.A. Michell, plus other fine equipment. home trial, free install, in-house service dept. Mon-Fri 9-4.30, appointments only.

UPTON ELECTRONICS, 31 Torquay Road, Paignton, Devon. (0803) 551329. Pioneer, Denon, NVA, Musical Fidelity, Tannoy, Ruark, Arcam, Cambridge, Linn, Revolver etc. Single speaker dem room. Home dems Appts. pref. for dems. Free install. Own service dept. Access, Visa, inst. credit up to £1000. 9-5.30 Mon-Sat. 9-1 Weds

DORSET

SUTTONS HI-FI, 18 Westover Road, Bournemouth. 0202 555512. Call for details. **BADA**

DORCHESTER HI-FI, 15 High West St, Dorchester, Dorset DT1 1UW. Aiwa, Celestion, Deltec, Heybrook, Infinity, Philips, Pioneer, Rogers, Rotel, Spondor, etc. Single speaker demo lounge. Home trials available. Free installation, Service department, guarantee on all products. Access, Visa. 9-5.30 6 days.

ESSEX

AUDIO T, Gants Hill, 442-444 Cranbrook Rd, Gants Hill, Ilford, Essex IG2 6LL. Tel: 081 518 0915 Fax 081 554 8463. Great Hi-Fi from Linn, Arcam, Denon, Meridian, B&O, Mission/Cyrus, Rotel, Yamaha & many more. Tues-Sat 10-6. Wed till 8pm. 2 single spker dem rooms. Free del. & instal **BADA**

The Choice Dealer Directory

1ST AND FOREMOST HI-FI CENTRE, 49-55 North Station Road, Colchester, Essex CO1 1RQ. Tel: (0206) 549842. Fax: (0206) 762900. Tlx: 987873 SAIDG. Trio Kenwood, JVC, Akai, Aiwa, Sony, Pioneer, Technics, Nakamichi, Panasonic, Revox, etc. Home trial, free installation. Service dept. Instant credit available + all credit cards accepted. Mon to Sat 9am-6pm

AUDIO T, 442/4 Cranbrook Rd, Gants Hill, Ilford, (081) 518 0915. Mon-Sat. 10-6. Two dem rooms. Access, Visa. Sony Hi-Fi News Best Dealer '86 & '88 (National)

BRENTWOOD MUSIC & HI-FI CENTRE, 2 Ingrave Rd, Brentwood. (0277) 221210. Alphason, Denon, Marantz, Quad, DNM, Rock/Glastonbury, E.A.R., Exposure, Kelvin Labs, Rotel, plus many more. Dem facilities, home trial, evening appts, (high end). Home installations. System problem diagnosis. Mon-Sat 9.30-5.30 (Thurs from 10am, Sat from 9am). Credit facilities. Access, Visa, Hi-Fi Markets Chargecard. Service facilities.

LYON AUDIO, 16 Peartree Business Centre, Peartree Road, Stanway, Colchester, Essex CO3 5JN. (0206) 560259. Quad, Rogers, Mission, Denon, Cyrus, Marantz, Audiolab, Rotel, NAD, Wharfedale. Dem facilities. Mon-Sat 9-6. Installations. Access, Visa, Instant credit. Service dept.

RAYLEIGH HI-FI, 44a High Street, Rayleigh, Essex. (0268) 779762/747571. 216 Moulsham St, On-the-Parkway, Chelmsford. (0245) 265245. 132-134 London Road, Southend-on-Sea. (0702) 435255. A&R, Creek, Cyrus, Denon, Epos, Ion, Linn, Mission, Naim, Quad, Rega, Roksan, Rotel, Royd. 0% finance.

THOMSONS, 2 High Street, Great Baddow, Chelmsford, Essex. Tel: (0245) 71465, Fax 0245 77528. JVC, Kenwood, Mitsubishi, Toshiba, Tannoy, Mordaunt-Short, Wharfedale, Philips, Audio-Visual dealer. Home trial. Free installation. Service dept. Access, Visa, HP. Open 9-1, 2-5.30 Mon-Sat. Open 9-1 Wed.

GLOUCESTERSHIRE

AUDIO EXCELLENCE, 58 Bristol Road, Gloucester. (0452) 300046. Audio Research, Arcam, Mission, Quad, Linn, Naim, NAD, Yamaha and lots more. Closed Mon.

AUDIO T, 40-42 Albion St, Cheltenham, Glos. GL52 2RQ. (0242) 583960, Fax (0242) 226435. Great hi-fi from Linn, Arcam, Denon, Meridian, Audiolab, Mission/Cyrus, Rotel, Sony and many more. Mon-Fri 10-6pm Sat 9.30-5.30. Single spkr dem room. Free del. and instal

HUTCHINSONS, 295-297 High Str, Cheltenham, Glos. GL50 3HL. (0242) 573012. Pioneer reference point, Technics, Dual, NAD, jWharfedale, Celestion, Marantz, Aiwa, Kenwood, Sennheiser. No appts necessary, free install, service dept. Instant credit up to £1000. Open Mon-Sat 9.15-5.30 R LEWIS & CO Ltd, 45 High Str, Stroud, Gloucestershire GL5 1AW (0453) 762485/9. Bang & Olufsen, Denon, Dual, Mission, Mordaunt-Short, Pioneer, Sony, Technics, Yamaha, Celestion etc. In store dems, free install, service dept. Access, visa. Open 8.30-5pm 6 days.

HAMPSHIRE

AUDIO T, 4 Feathers Lane, Basingstoke, Hants. RG21 1AS. (0256) 24311, Fax (0256) 24430. Great hi-fi from Linn, Arcam, Denon, Meridian, Mission/Cyrus, Rotel, Sony and many more. Mon-Sat 9.30-5.30pm, closed Wed. Single spkr dem room. Free del. and instal.

FARNBOROUGH HI-FI, 7 Queensmead, Farnborough, Hants GU14 7RG, (0252) 520146. Linn, Exposure, Denon, Thorens, Dual, Ruark, Arcam, Rotel, etc. Single speaker listening room. Appts not always nec, home trial, free install, service dept (not on premises). Access, visa, plus usual credit. Open 9-5.30, 6 days.

HAMPSHIRE AUDIO LTD, 2-12 Hursley Rd, Chandlers Ford. (0703) 252827/265322. Quality CD and analogue agencies. 5 dem studios. Large free car park

JEFFRIES HI-FI (PORTSMOUTH), 29 London Road, Portsmouth PO2 0BH. (0705) 663604. 2 dem rooms. Closed Mon. Latenight Wed. Parking Bus Route. Credit fac.

STANS, 8 The Mall, Bridge Street, Andover, Hampshire. Fax: (0264) 361624. Aiwa, Harman-Kardon, Musical Fidelity, Pioneer, Monitor Audio, Dual Bose, Kef, Celestion, Castle. Next day money back guarantee. Installation and delivery service, service dept. Access, Visa, credit facilities available - interest free on selected items. 9-5.30, late Thurs & Fri to 7pm, 6 days.

TRU-FI SOUND & VISION, 10-12 Grosvenor Road, Aldershot, Hants. Tel/Fax: (0252) 26390/332424. Aiwa, Audio Technica, B&W, Nakamichi, Mission, Mordaunt-Short, Nagaoka, Sony, Technics. Dem fac Free install. Service dept. 0% finance. Access, Visa. Mon-Sat 9.30-6

HEREFORDSHIRE

ENGLISH AUDIO, 95 Whitecross Road, Hereford HR4 0DG. (0432) 355081. Musical Fidelity, Arcam, Pink Triangle, Denon, Marantz, Mission-Cyrus, Audio Innovations, Rotel, NAD, Nakamichi, TDL, and others. Single Speaker Dem room. Home trial. Free install. Service dept. Access, Visa. Credit arranged. Open Mon-Sat 10am-6pm.

GOSPEL MUSIC AUDIO, 32A High St Kingston, Herefordshire. (0544) 230254. Alphason, Alison, Revolver, Luxman, Yamaha, OED, Audio Systemline, Wharfedale, Jamo, Micromega., No appts nec., home trial facilities, service dept. -5.30 (evening dems

HERTFORDSHIRE

ACOUSTIC ARTS LTD, 101 St Albans Rd, Watford, Herts. (0923) 245250. A&R, Audiolab, Audio Research, Apogee, Denon, Krell, Marantz, Meridian, Quad, TDL. Mon-Sat 9.30-5.30

BANG & OLUFSEN CENTRE - HI-WAY HI-FI (MARLOWES) Ltd, Unit 32, Marlowes, Hemel Hempstead. (0442) 235755, Fax: (0442) 231825. Stockist also of Kenwood, Pioneer, Technics, Yamaha, Aiwa, JVC, Bose, Heybrook, Wharfedale, Sony, etc.

STUDIO 99, 82 High Street, Harpenden, (05827) 64246. Linn, Naim, Meridian, Rega, Nakamichi, Mission/Cyrus, Quad, Creek, KEF, Bang & Olufsen, Yamaha etc. Quiet single speaker dem room. Appts nec. Home trial, free install. Service Dept. Visa/c, Access/c & finance terms. 9-5.30pm (Mon/Sat). Closed Weds

THE AUDIO FILE, 27 Hockerill St, Bishops Stortford, Herts CM23 2DW. (0279) 506576. 9.30-5.30 6 days. Dealer Of The Year 1988/89. Linn, Naim, Rega, Quad, Cyrus, Arcam, Musical Fidelity. 0% credit

NORTH HUMBERSIDE

JUST AUDIO, 2A Foston Lane, North Frodingham, Driffield. Tel 0262 488700, call for details

SUPERFI, 4 Dock Str, Queens Gardens Hull, HU1 3DL. (0482) 24051. See main entry under Nottinghamshire for full details.

KENT

JOHN MARLEY HI-FI CENTRES, 2 Station Rd, West Canterbury. (0227) 769329. Also at Dover - (0304) 207562. B&W, Heybrook, Magnum, M.Y.S.T., Nakamichi, Pink Triangle, Rotel, Sansui, Technics, Quad. Dem and home trail fac. Mon-Sat 9-5.30 closed Thurs. Free install. Credit to £1,000. Access, Visa, Credit charge. Service dept

KIMBERLEY HI-FI, 193 Broadway, Bexleyheath, Kent. (081) 304 3272. Pioneer, Technics, Kenwood, Denon, NAD, Aiwa, Tannoy, Mission, Wharfedale, Castle. Separate dem room, no appt nec. Free installation. Service Dept. Instant credit facilities. 9.30-5.30. No early closing.

PANATEC SOUND & VISION CENTRE, 83b High Str, Gillingham. (0634) 5731141. Kenwood, Pioneer, Sony, Technics, Bose, Tannoy, B&W, Goodmans

PANATEC SOUND & VISION, 17 Week Str, Maidstone. (0622) 661488. See above for details.

PHOTOCRAFT HI-FI, 40 High St, Ashford (0233) 624441. No. 1 in Kent for Linn, Naim, Rega, Roksan, Exposure, Onix, Epos, Royd, Creek. But before you choose equipment choose where to buy it. Dem room, appts necessary. Home trial and free installation. Visa, Access, Bada Chargecard. 9-5.30 Mon-Fri (Wed & Sat 5 only). Service Dept.

VOLUME ONE, 41 Upper Wickham Lane, Welling, DA16 3AD. 081 304 4622. Arcam, Creek, Dual, Epos, Exposure, Mordaunt Short, Monitor Audio, Nakamichi, Pink Triangle, Rotel. Large dem room, no appt nec, darts & snooker facilities. Evening dems in shop by appt. Home trial & demo, free delivery & installation. Access & Visa, credit up to £1000. 9.30-5.30 Mon-Sat

V J HI-FI, 29 Guildhall St, Folkestone. (0303) 56860. Mon-Sat 9-6. NAD, Yamaha, Marantz, Cambridge Audio, Denon, Kenwood, Rogers, Dual, Musical Fidelity, Quad, Dem and home trial facilities, free install, credit to £1000. Amex, Diners, Visa, Access. Service dept.

V J HI-FI, 119 High Street Margate (0843) 226977. Mon-Sat 9-6. NAD, Yamaha, Marantz, Cambridge Audio, Denon, Kenwood, Rogers, Dual, Musical Fidelity, Pioneer. Dem and home trial facilities, free installation, credit to £1000. Amex, Diners, Visa, Access. Service dept.

LANCASHIRE

MONITOR SOUND, 54 Chapel St, Chorley. (02572) 71935. A&R, Denon, Dual, Pioneer, Quad, Rogers, Rotel, Spondor, Technics, Thorens, etc. 2 dem rooms. Open Mon-Sat, closed Weds. Free installation. Credit to £1000. Access, Visa. Service dept

NORMAN AUDIO, 216 Church Street, Blackpool FY1 3PT. 0253 295661. For details see Preston branch entry (below). Open 9-5.30, Closed Wed.

NORMAN AUDIO, 131 Friargate, Preston PR1 2EE. (0772) 53057. Fax 562731. Sony Hi-Fi News Area Winner. Aiwa, B&W Loudspeakers, Denon, Marantz, Mission, Cyrus, Monitor Audio, Nakamichi, Quad, Roksan, Rotel & many others! 2 lux. dem. lounge. Home trial by arrangement. Free install. Service dept. Inst. cred. facs with several companies. Most credit cards accepted. 6 days 9-5.30.

LEICESTERSHIRE

ALPHA AUDIO, 1-3 Guildhall Lane, Leicester LE1 5FQ. (0533) 530 330 Allison, AR, Denon, Luxman, Proton, Revox, Teac, Thorens, plus lots more. 3 demo rooms. Jovial, friendly, crazy staff. Relaxed atmosphere. Home trial facilities, free installation, service dept on premises. Credit facilities (sort of interest free). 10-5, closed Thurs afternoons (sometimes)

MJS HI-FI, 80 Stapleton Lane, Barwell, Leicester LE9 8HE. (0455) 846977. The Rock, Audio Innovations, Kelvin Labs, Albany, Ortofon, S.D. Acoustics, Opus, Finestra. etc. Large range of records stocked, free installation, home trial facilities. Please phone for appts open by appt. THE LEICESTER HI-FI CO, 6 Silver Walk, St. Martins Square, Leicester LE1 5EW. Tel: (0533) 539753. Fax: (0533) 626097. Acoustic Energy, Arcam, Marantz, Micromega, Mission/Cyrus, Musical Fidelity, Nakamichi, QED Hi-Fi, Rogers, Roksan, "and oodles more". 2 dem rooms, home trial arranged, free install, service dept. Credit facilities. Access, Visa, Diners, Amex. 6 days 9.30-5.30. Leicester's first Bada member.

SOUND ADVICE, The Factory, Duke St, Loughborough LE11 1ED. (0509) 218254. Mission Cyrus, Rega, Naim, Linn, Meridian, Yamaha, Rotel, Arcam, Nakamichi, JPW. 3 demonstration areas, no appts necessary, free installation, service department. Lombard credit charge, Access, Visa Mon-Fri 9.30-6.00, Sat 9.30-5.30.

SOUNDS AROUND, 146A Clarendon Park Road, Leicester LE2 3AE. (0533) 702442. (Specialists in used Hi-Fi). A.R. Celestion, TEAC, Mordaunt Short, Tannoy, Marantz, Wharfedale, Philips. No appts necessary, free installation. Service dept. Access, Visa. Tue-Sat 10-5

LINCOLNSHIRE

BOSTON HI FI CENTRE, 65a Wide Bargate, John Adams Way, Boston, Lincs PE21 6SG. (0205) 365477. Quad, Nakamichi, Arcam, Marantz, NAD, Castle, JPW, Rogers, etc. Separate demo studio. Home trial. Free installation. Access, Visa. Tues - Sat 9-5 pm.

STAMFORD HI-FI CENTRE, 9 Red Lion Square, Stamford, Lincs PE9 2AJ. (0780) 62128. Pioneer, Technics, Cyrus-Mission, Rotel, NAD, Yamaha, Kenwood, Marantz, Quad, plus all major speaker manufacturers. Expt advice, compositor demonstrations, on two floors, part exchange Hi-Fi purchased for cash. No appointments necessary, home trial facilities, free installation, service department. Mastercard, Visa & credit charge, finance available. Mon-Sat 9-5.30pm, closed Thursdays SUPERFI, 271A High Str, Lincoln LN2 1JG. (0522) 520265. See main entry under Nottinghamshire for full details.

LONDON

ANALOG AUDIO, 849 High Road, London N12. (081) 4453267. Cambridge, Denon, Rotel, Yamaha, Marantz, Wharfedale, Teac, Mordaunt-Short, Cerwin Vega, Nad. Free install. Service dept. Instant credit up to £1000. Visa & Access. 9.30-6.6 days.

AUDIO VENUE, 24 Church Road, Crystal Palace, London SE19 2ET. (081) 771 7787. Linn, Naim, Nakamichi, Marantz, Dual. Credit available. 2 yr warranty, 2 demo rooms. Closed Weds.

AUDIO T, 190 West End Lane, West Hampstead, London NW6 1SQ. (071) 794 7848, Fax (071) 431 3570. Great hi-fi from Linn, Arcam, Denon, Meridian, Mission/Cyrus, Rotel, Proac, Micromega, Yamaha and many more. Tue-Sat 10-6pm. 2 single spkr dem room. Free del. and instal.

BILLY VEE SOUND SYSTEMS, 248 Lee High Road, London SE13. (081) 318 5755. Arcam, Linn, Naim, Quad, etc. 2 dem rooms. Int. free credit. Access, Visa. Closed Thurs

CORNFLAKE SHOP, 37 Windmill St (just off Tottenham Court Rd), London W1. (071) 631 0472. Mon-Sat 10-7. Rega, Roksan, Naim, Monitor Audio, Koetsu, Marantz, Yamaha, SME, DNM, Epos. 3 dem rooms. Del and instal. service. Credit facilities. Access, Visa

COVENT GARDEN RECORDS, 84 Charing Cross Road, London WC2 HOJA. (071) 379 7427, Fax (071) 836 1345. London's premier digital audio centre, single speaker dem rooms, appointments suggested, installation service available, service department. All major credit cards accepted. Mon-Sat 10am-7.30pm

DOUG BRADY HI-FI, 14-18 Monmouth St. London WC2H 9HB. (071) 379 4010. Wide range of top specialist hi-fi from Britain, America and Japan. 3 dem rooms.

DEANS, 283 Edgware Road, London W2 1BB. Tel. (071) 402 666; Fax (071) 724 2135. Aiwa, B&W, Dual, Harman Kardon, JBL, JVC, Kenwood, Marantz, Pioneer, Technics. Mail order, fast efficient delivery, all goods dispatched same day. Service department. Guarantees on all products. All major credit cards accepted. Open 6 days to 6pm, Thurs till 8pm

GALAXY AUDIO VISUAL, 230 Tottenham Court Road, London. (071) 637 2624. Aiwa, Akai, Dual, Hitachi, Philips, Pioneer, Sony, Rotel, Technics, Infinity. Demos available on request. In car audio dept. No appts nec. Service dept. Access, Visa, Amex, Diners, Switch, instant credit subject to status. 9.30-6pm

GRAHAM'S HI-FI, Canonbury Yard, 190a New North Rd, London N1 7BS. (071) 226 5500. Winner Sony/HFN Greater London Dealer Award 1986-1989-1990. Linn, Naim, Rega, etc. £400-£3000-£13,000.

HI-WAY HI-FI LTD, 313-315 Edgware Road, London (071) 402 2441, 287-289 Edgware Road, London, (071) 723 5891, 242 Tottenham Court Road, London, (071) 636 5974. Stockists of Nakamichi, B & W, Yamaha, Denon, Technics, JVC, Pioneer, Teac, Sony, Aiwa etc. Fax No (071) 724 6101

HI-FI EXPERIENCE, 227 Tottenham Court Road, London W1P DHX. 071 580 3535, Fax 071 436 4733. B+W, Acram, Meridian, Cyrus, Musical Fidelity, Rogers, Quad, Rotel, Linn, Marantz, Listening Rooms, no appts necessary, home trial facilities, free installation, service dept. Visa, Access, Amex, Diners. Mon-Fri 10-7, Sat 9-6.

BRITISH AUDIO DEALERS ASSOCIATION

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The Choice Dealer Directory

KJ WEST ONE, 26 New Cavendish St, London W1M 7LH. (071) 486 8262/63. Fax (071) 487 3452. Arcam, Audio Research, Acoustic Research, Apogee, Arcam, Audiolab, Creek, Epos, Linn, Meridian, Musical Fidelity, Pink Triangle. Appts nec. Home trial. Free installation. Service dept. Major credit cards. Mon-Sat 10-6pm. (Late night Thur till 7pm)
THE LISTENING ROOMS, 161 Old Brompton Road, London SW5 0LJ. Tel (071) 244 7750/59, Fax (071) 370 0192. Linn, Epos, Quad, Arcam, Musical Fidelity, Meridian, Rogers, Acoustic Energy, Audiolab, Pink Triangle, etc. -See main advertisement - Two dem rooms, appointments preferred, home trial facilities, free installation, service department. Visa, Access, Amex, Full credit facilities, including interest free. Mon-Sat 10-6

MCQ ENTERTAINMENTS, 218 Walworth Road, London SE17. Telefax: (071) 701 3204. Teac, Technics, Ortofon, Shure, Stanton, Cerwin-Vega, Jamo, Koss, Sennheiser, QED, plus a full range of audio & video accessories. Hire facilities, no appts necessary, service dept. Access, Visa, (all major credit cards) Open 9.30-6, 6 days.

SOUND ORGANISATION LONDON, 4 Pickfords Wharf, Clink St, London, SE1 9DG. (071) 403 2255. Linn, Rega, Roksan, Micromega, Radford, Rotel, Nakamichi, Onix, Creek, Naim, Exposure, Royd, Heybrook, Epos. Interesting new equipment always under evaluation. Single speaker listening room. Credit facilities. Appts. preferred, free install, Service dept. Open Tues-Sat 10-6. Late dem. by appt.

SOUND SENSE, 350 Edgware Road, London W2 1DX. (071) 402 2100. Alphason, B&W, Nakamichi, Celestion, Cambridge Audio, Dual, Denon, Monitor Audio, Marantz, NVA, Sony ES. Appts preferred. Installations available. Access, Visa, Standard credit facilities. Mon-Sat 9.30-6.30.

STUDIO 99, 79-81 Fairfax Road, Swiss Cottage, London NW6. (071) 624 8855. Linn, Naim, Meridian, Rega, Quad, Nakamichi, Mission/Cyrus, KEF, Bang & Olufsen, Yamaha, Creek etc. 2 single speaker dem rooms. Appts. nec. Home trials, free install. Service dept. Visa/c, Access/c & finance terms. 10-7 Mon-Fri, 10-6 Sat

SUPERFI, 2-4 Camden High Street, Camden, NW1 0JH (071) 388 1300. See main entry under Notts for full details
UXBRIDGE AUDIO - CHISWICK, 109 Chiswick High Road, Chiswick, W4 2ED (081) 742 3444 Fax (081) 742 3295. 2 Demo Rooms, Installations, 2 Year Guarantee, 7 day exchange. Major credit cards, Tues - Sat 10 - 6. See Middx entry for brands stocked.

VOLUME ONE, 41 Upper Wickham Lane, Welling, (081) 304 4622. For full details see entry under Kent.
ZEBRA, 18-24 Brighton Road, South Croydon CR2 6AA. 081 688 2093. Rotel, NAD, Technics, Philips, Aiwa, Kenwood, Tannoy, Wharfedale, MA, Infinity, and large range of AV equipment. Single speaker & comparator demo in a more casual environment. Service department. Mon-Sat 9.30-6.00. Access, Visa & instant credit up to £1000 subject to status.

GREATER MANCHESTER

THE AUDIO COUNSEL, 12 Shaw Road, Oldham, Manchester OL1 3LQ. (061) 633 2602. Linn, Naim, Rega, Rotel, Arcam, Micromega, EPOS, Creek, Nakamichi, Denon. 2 dem rooms. Free install. Visa. Access, Licenced credit brokers up to £1000 instant credit. 10.00-5.30 Tues, Weds, Sat; 10.00-7.30 Thurs, Fri. Closed Mon

CENTRAL RADIO, 30-32 Shudehill, Manchester M4 1 EY. Tel: (061) 834 6700. JBL, Mission, B&W, Wharfedale, Grundig, Harman-Kardon, Panasonic, Technics, sony, Bose, Aiwa, Trio Kenwood. Call for details.

CHRIS BROOKS AUDIO, 10-12 Oak Street, Hazel Grove, Stockport SK7 4EJ. (061) 419 9050. Tues-Sat 10-6, 2 dem rooms, credit facilities. All credit cards. Just like the Warrington shop - total absence of bull****

MURRAY HI-FI, 19 Middle Hillgate, Stockport. (061) 429 7666. Linn, Naim, Rega, Arcam, Yamaha, Royd, Epos, Creek, Nakamichi, Rotel. Full demo facilities, free installation & delivery, service dept. Full 2yr guarantee on all products. Access, Visa, Lombard Tricity, licensed credit broker. 10-6 Tue-Sat.

SWIFT HIFIDELITY, 12 Chapel Street, Cheadle. (061) 428 7222. Arcam, Denon, Kenwood, Marantz, Nad, Cyrus, Rotel, Pioneer, Mission, Tannoy. Demo room. 9.30-6. Closed Wed.

MIDDLESEX

AUDIOT, 159a Chase Side, Enfield, Middx EN2 0PW. (081) 367 3132, Fax (081) 367 1638. Great hi-fi from Linn, Arcam, Denon, Linn, Mission/Cyrus, Philips, Rotel, Yamaha, and many more. Tue-Sat 10-6pm. 2 single spker dem rooms. Free del. and instal.

HARROW AUDIO, 27 Springfield Rd, Harrow. (081) 863 0938. Mon-Sat 9.30-5.30. A&R, Audiolab, Cyrus, Denon, Epos, Monitor Audio, Musical Fidelity, Nakamichi, Quad, Rotel, Tannoy, Thorens, Yamaha. etc

RIVERSIDE HI-FI LTD, 422 Richmond Road, East Twickenham, Middlesex TW1 2EB, Tel. (081) 892 7613 Fax (081) 892 7749. A.R., Arcam, Audio Innovations, Castle, Dual, Denon, KEF, Luxman, Michell, Musical Fidelity, Micromega, Marantz, Nakamichi, Rotel, Spenhdor, Systemdek, Tannoy, Yamaha. One demo room, in-car demo for car hi-fi systems. Appts not always necessary. Home trial facilities. Free installation, service dept. Lombard Tricity, Access, Visa, Amex, Diners Club. Mon-Sat 9.30-6, Thurs, Fri 9.30-7

SIGHT N SOUND, The Treaty Centre, Hounslow, Middlesex TW3 1ES. 081 572 5418, fax 081 572 5417, Sony, Kenwood, Finlux, Toshiba, Philips, Sanyo, Grundig, Pioneer, Technics, Akai. No appts nec, free intall, service dept. Access & Visa, financing available. 9-6pm Mon-Sat.

UXBRIDGE AUDIO, 278 High St, Uxbridge, Middx UB8 1LZ. (0895) 230 404, Fax (0895) 273 626. Acoustic Energy, Arcam, Ariston, Audiolab, Castle, Creek, Cyrus, Denon, Epos, Exposure, Heybrook, Ion, JPW, Kef, Linn, Marantz, Meridian, Michell, Mission, MA, NAD, Naim, Nakamichi, QED, Quad, Revolver, Revox, Rotel, Rogers, Royd, Ruark, Stax, Tannoy, Thorens, Wharfedale. 2 dem rooms. Installations: 2 yr guarantee. 7 day exchange. Service dept. Access, Amex, Diners, Visa. Mon-Sat 10-6. Closed Wednesday

MERSEYSIDE

W.A. BRADY & SON, 401 Smithdown Rd, Liverpool L15 3JJ. (051) 733 6859. Largest choice of specialist Hi-Fi in N.W. £100-£20K. All credit cards. 3 dem rooms. Closed Monday

IN CONCERT HI-FI, 144 Seaview Road, Wallasey, Wirral, Merseyside. (051) 630 5055. Denon, Kenwood, QED, G-Alexander, Spica, Shan Acoustics, Systemdek, Musical Fidelity, Audio Dimensions, Voyd. Single speaker dem room. Home trial, free installation. 10-6 - closed Mon. Access, Visa.

P. & A AUDIO (BIRKDALE) LTD 31 Liverpool Road, Birkdale, Southport (0704) 68373. Arcam, Cambridge, Creek, Denon, Michell, Mission/Cyrus, Mordaunt - Short, NAD, Pink Triangle, QED, Revolver, Rogers, Rotel, Royd, Tannoy. 3 Single speaker demo rooms and Nicam surround sound dem room. Free delivery, installation (Merseyside) Service dept. Mon - Sat 9 - 5.30 Half day Tues, Access, Visa, Lombard

PETERS HI-FI, 11 St Werburgh Squ, Grange precinct, Berkenhead. (051) 647 5626. 9-5.30 closed Thurs. See Cheshire branch for full details.

PETERS HI-FI, 8 High St, Bromborough, Wirral. (051) 334 1874/2825, 9-5.30 6 days. See Cheshire branch for full details.

WEST MIDLANDS

AMADAEUS SOUND & VISION, 10 Boldmere Road, Sutton Coldfield, West Midlands. (021) 354 2311. Arcam, Audio Innovations, B&O, Carver, Castle, QED, Wharfedale, Yamaha, Cambridge Audio, Halfer. Single Speaker demo, appts preferred, service available, installations, B&O link install, home trials. Access, Visa, interest free credit available subject to status. 9.30-6pm 6 days

AUDIO BY MAINWAY, Sharing Asda Car Park, High Street, Bloxwich, Walsall, W. Midlands. (0922) 473499, /493499. Meridian, Kef Reference, Albery Arcam, Quad, Rogers, Musical Fidelity, TDL, System Dek, QED Elect. Ariston, Linn, Audio Technica, JPW, Van den hul etc. The Midlands most exclusive Hi-Fi Centre with private listening studio. Open evenings by appt. Home trial. Free install. Own service dept. Inst. credit. Chargecard. Interest free. Access, Barclaycard. Mon-Sat 9-5.30

FRANK HARVEY HI-FI EXCELLENCE, 163 Medveal Spon Street, Coventry (0203) 525200. All major agencies. Free inst. Service dept. Part ex. 3 dem rooms. Mon-Sat 9.30-5.30. Wed till 8pm

GRIFFIN AUDIO LTD, 94 Bristol Street, Birmingham. (021) 692 1359/ (021) 622 2230. Arcam, Castle, Cyrus, Denon, Linn, Marantz, Naim, Quad, Rega, Rotel. Tues-Sat 10-6

HORNTON ELECTRONICS (1987) LTD, 8-9 Lower Temple St, Birmingham B2 4JD. (021) 643 0972. Aiwa, Acoustic Research, Denon, Marantz, Mordaunt Short, JVC, Mission, Sony, Technics, Wharfedale. Credit to £1000. Access, Visa. 9-5.30 Mon-Sat. Service dept

MUSICAL APPROACH, 37 High Street, Aldridge, Walsall, W. Mids (0922) 57926. Linn products, Arcam, Creek, NVA, Revolver, Onix, Epos, Marantz, Rotel, Quad & more. Dem facs. Home trial. Service dept. Credit facs available. Access, Visa. 9.30-5.30 Mon-Sat. 9.30-1 on Thurs

MUSIC MATTERS, 351 Hagley Road, Edgbaston, Birmingham B17 8DL. (021) 429 2811. Roksan, Nakamichi, Arcam, Audiolab, Musical Fidelity, Mission/Cyrus, Meridian, KEF, Monitor Audio, Pink Triangle, 2 single speaker luxury demo rooms. Appts nec, home trial facilities, free installation, service dept. Access, Visa, instant credit up to £1000, interest free credit available. Tue-Thur 10.30-6, Fri 10.30-8, Sat 10-5.30.

NAAM HI-FI VISION, 122-123 New Street, Birmingham. (021) 633 4944. Pioneer, Akai, Aiwa, Panasonic, Toshiba, Hitachi, Bose, Wharfedale, Sony Demo facilities available, appointments preferred. Access, Visa, 10 month interest free credit. Amex, Lombard Tricity Creditcharge. Mon-Sat 9-6.00.

NORMAN H FIELD, 35-37 Hurst Str, Birmingham B5 4BJ. (021) 622 2323/3619. Aiwa, Celestion, Denon, Dual, NAD, Tannoy, Technics, Thorens, Wharfedale, Yamaha & more. Private listening rooms, service dept, Lombard Tricity. Access, Visa, Switch. Mon-Fri 9.15-6pm, Sat 9.00-6pm

NORFOLK

BASICALLY SOUND, The Old School, School Rd, Bracon Ash, Norwich NR14 8HE. (0508) 70829. Arcam, Linn, Naim, Denon, Spenchor, Exposure, Audio Technica, Creek, Rega, Epos, etc. 2 comprehensive dem rooms. Home trial. Free installation. Visa, Access, HP facilities. Tues-Sat 9.30-1, 2-5.30

MARTINS HI-FI, 5 High Street, Kings Lynn. (0553) 761683. Est. 1968

MARTINS HI-FI, 85/91 Ber Street, Norwich. (0603) 627010. Est. 1968.

MUSICAL PREFERENCE, Bunwell, Norfolk NR16 1NA. (0953) 789562. ATC, AVI, Basis turntables, Chord, Cogan Hall, Cables, Deltac, MFA, Pink Triangle, TDL, TEAC CD & more. Reference Imports specialist. Exclusive individual service with professional sound expertise, full warranty & back-up Home demo & trial, free install. Call anytime for appointment. Access & Visa.

NORTHAMPTONSHIRE

CLASSIC HI-FI + VIDEO, School Lane, Kettering, Northants. (0536) 515766. Rotel, Musical Fidelity, Wharfedale, Monitor Audio, Yamaha, JBL, Dual, Marantz, Kenwood, Kef, Celestion, and many more. Home trial, free instal., service dept. Access, Visa, credit facil. 9.30-5.30pm
CLASSICAL SOUNDS, 84E Watling St East, Towcaster NN12 7BS. Tel. 0327 359588, call for details.

NOTTINGHAMSHIRE

CHANTRY AUDIO, Chantry Walk, 18a Eldon Street, Tuxford, Nr Newark, Notts NG22 0LH. (0777) 870372. Pink Triangle, Deltac, Rotel, SD Acoustics, Ruark, NVA, Michell, Art Audio, Croft Acoustics, Kelvin Labs, and much more. 2 dem rooms. Home trial, free installation. Access, Visa & credit facilities and mail order. Mon-Fri 10am-4.30pm, Sat 9.30-5.30. Sun & evenings home dem by appt. Closed Weds.

DEFINITIVE AUDIO, (0602) 813562. For a carefully considered approach to building a true hi-fidelity audio system with componants derived from the following manufacturers; Systemdek, Goldring, Revox, Voyd, Audio Innovations, Snell, Audionote, SME, Helius, Impulse, TEAC, Deltac, Wadia, Ortofon Premier dealer, Pioneer dealer, Huygens loudspeaker stands. Demos by appt., Please phone for further details. Installation free of charge. Mon-Sat 10-7pm, Closed Wed a.m.

NOTTINGHAM HI-FI CENTRE, 120-122 Alfreton Road, Nottingham (0602) 786919. Over 25 years experience, superb demo rooms, extensive range, free parking, Mon-Sat 9-5.30.

SUPERFI, 15 Market Str, Nottingham NG1 6HY. (0602) 412137. Kenwood, Technics, Denon, Aiwa, Rotel, Wharfedale, Mission, Marantz, NAD - Celestion, and many more. 2 single speaker dem rooms. Free install on systems, service dept. Access & Visa, Amex. Open 9-5.30, 6 days.

OXFORDSHIRE

ASTLEY AUDIO LTD, 3 Marketplace, Wallingford, (0491) 39305/34349 Technics, Panasonic, Pioneer, Kenwood, Sony, Yamaha, Denon, Dual, Mission, Tannoy. Home trial, free installation. Service dept. Access, Visa, Amex, Diners. Instant credit. Tue-Fri 9-5.30, Sat 9-5, Records & CDs stocked.

AUDIOT, 19 Old High St, Headington, Oxford OX3 9HS. (0865) 65961, Fax (0865) 60415. Great hi-fi from Linn, Arcam, Denon, Meridian, Mission/Cyrus, Rotel, Yamaha, B&O and many more. Tue-Fri 10-6pm, Sat 9.30-5.30. 2 single spker dem rooms, AV/ dept. free del. & instal.

OXFORD AUDIO CONSULTANTS LTD, Cantay Hse, Park End Place, Oxford OX1 1JE. (0865) 790879. Oxford Acoustics, Audio Research, Krell, Magnephan, Apogee, Aragon, Stax, Marantz, Wharfedale, Cambridge Audio. Home trial and free installation. Instant credit, Access, Amex, Visa. 10-6 Tues-Sat. Service dept

WITNEY AUDIO VISUAL, 28 High St, Witney, Oxford. (0993) 702414. Aiwa, Akai, AR, Bose, B&W, Cambridge, Dual, Mordaunt-Short, NAD, Onkyo, Pioneer, Roberts, Sony & Sony ES, Tannoy, Wharfedale, Yamaha. Reference Point Dealer. Dem facilities. Mon-Sat 9-5.30. Free installation, credit to £1,000. Access, Visa. Service dept.

SHROPSHIRE

AVON HI-FI, 12 Barker Street, Shrewsbury, Shropshire SY1 1QJ. (0743) 55166. NAD, Quad, B&W, Arcam, Kenwood, Aiwa, Bose, Nakamichi, Revolver, Onkyo. Dem room. Home trial. Free install. Service dept. Access, Visa. £1000 instant credit. Mon, Tues, Wed, Fri, Sat 9-5.30
CREATIVE AUDIO, 9 Doggpole, Shrewsbury. (0743) 241924. Linn, Naim, Roksan, Mission, Arcam, Rogers, Denon, Marantz, Rotel, Celestion, etc. Dem room. Home trial and free installation. Credit to £1000. Access, Visa. Tues-Sat 9.30-5.30. Service dept.

MID-SHROPSHIRE AUDIO, 4 Holland Court, Dawley, Telford TF4 2EX (0952) 630172. Audio Innovations, Marantz (inc Music Link), Denon, Tannoy, Ortofon, Pink Triangle, Ion Systems, Systemdek, Ruark, Monitor Audio etc. 2 dem rooms. Home trial, service dept. Instant credit up to £1000. Access, Visa, Amex.

SHROPSHIRE HI-FI, St. Michael's St., Shrewsbury, Shropshire. (0743) 232065. Ariston, Audio Technica, Cambridge Audio, Deltac, Denon, Dual, Infinity, Kenwood, Mordaunt Short, Musical Fidelity, Etc. Demo room, free parking, free installation, repairs.

SOMERSET

MIKE MANNING AUDIO, 110 Middle Street, Yeovil, Somerset BA20 1NE (0935) 79361, Fax (0935) 32923, Mobile(0850) 325965. Linn, Naim, Roksan, Pink Triangle, A+R (Arcam), ION, NAD, Pioneer, Rotel, Denon, etc. Dedicated listening lounge, for relaxed and unpressured demonstrations. Appts not usually nec. but best to phone first. Home trial facilities on request, free installation, service department. Instant credit, Access & Visa, etc 9-5.30 closed Mondays.

WATTS RADIO - the engineers, Jim Badman, 1 West Street, Somerton. (0458) 72440. Aiwa, Castle, Dual, Denon, KEF, Ortofon, Quad, Rogers, Tannoy, Thorens, Yamaha. Dem and home trial facilities. Mon-Sat 9-1, 2-5.30, Wed 9-1. Free installation. Credit to £1,000. Access, Visa. Service dept.

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STAFFORDSHIRE

ACTIVE AUDIO, 29 Market Street, Tamworth, Staffordshire. (0827) 53355. Arcam, Ariston, Celestion, Denon, Exposure, Heybrook, Kef, Cyrus, Musical Fidelity, Marantz, Revox, Rotel, Rogers, etc. etc. The only BADA Member in Staffordshire. Full dem & home trial facts. Account and credit cards. Ring for opening times and free Fact Pack. **BADA**

ACTIVEAUDIO, 95 Stafford Street, Hanley, Stoke-on-Trent. (0782) 214994. Arcam, Ariston, Celestion, Cyrus, Denon, Exposure, Kef, Kef Reference, Marantz, Rogers, Rotel, etc. etc. The only BADA Member in Staffordshire. Full dem & home trial facts. Account and credit cards. Ring for opening times and free Fact Pack. **BADA**

GRANGE HI-FI LTD, 153 Branston Road, Burton-on-Trent, Staffordshire DE14 3DQ. (0283) 33655. Audio Innovations, Arcam, Castle, Denon, Pink Triangle, Rotel, Rogers, Systemdek, SME, Quad, Voyd. Demonstrations facilities available, appointments necessary on Saturdays. Free installation Service department. Access, Visa. 9.00-5.30pm. Closed Wednesday. Closed for lunch 12.00-12.30.

HI-FI STUDIOS, 20-22 Lonsdale Str., Stoke-on-Trent, Staffordshire ST4 4DP. (0782) 47125, Fax (0782) 747331. Sony, Technics, Pioneer, JVC, Panasonic, B&W speakers, Castle speakers, Mitsubishi, Canon, Hitachi Mail order facility available. Free install, service department. Access & Visa. Open 6 days 9.30-6pm.

MUSICAL APPROACH, Unit 7, Woodings Yard, Bailey Str., Stafford (0785) 55154. Linn Products, Arcam, Creek, NVA, Revolver, Audiotec, Onix, Epos, Marantz, Rotel and more. Home trial. Free installation. Service dept. Credit facilities available. Access, Visa. 9.30-5.30 Mon-Sat

SUFFOLK

EASTERN AUDIO, 41 Bramford Rd, Ipswich, (0473) 217217. Quad Audio Lab, Denon, Dual, Marantz, Mission, NAD, Nakamichi, Technics, Arcam Mon-Sat 9.30-6. **BADA**

SURREY

AUDIO SOUTH, 24 (The Woolmead) East Str, Farnham, Surrey GU9 7TT (0252) 714555. Audio Innovations, JPW, Luxman, Marantz, Ortofon, Rotel, Snell, Sugden, Teac, Voyd. Dem room and evening appointments available. Home trial facilities. Free installation. Access, Visa. 10.30-6 Mon-Sat. Closed Tuesday

COSMIC, 244/256 Station Road, Addlestone, Surrey KT15 2PS. (0932) 854522/851753/843769, Fax: (0932) 841615. Most brands stocked, including, Aiwa, Arcam, Denon, Mission, Cyrus, NAD, Nakamichi, Pioneer, Quad, Rotel, Yamaha, etc. Open 7 days 9-6pm. Part exchange, large free car park, service dept, instant credit available. Access, Visa, Switch.

DATASOUND, 23 South Street, Dorking, Surrey RH4 2JZ. (0306) 882897. Arcam, Celestion, Denon, Dual, Marantz, Mission, Musical Fidelity, NAD, Rotel, Tannoy. Dedicated listening room. Free install. Service dept. Up to £1000 instant credit subject to status. 9.30-5.30 6 days.

PJ HI-FI - the Hi-Fi Shop, 3 Bridge Street, Guildford, Surrey GU1 4RY. Tel: (0483) 504801. 9-6 Mon-Sat. Linn, Meridian, Creek, Arcam, Quad, Revox, Musical Fidelity, Rotel, NAD, Nakamichi, Marantz

RIVERSIDE HI-FI, 422 Richmond Road, East Twickenham, TW1 2EB. Tel: (081) 892 7613. Fax: (081) 892 7749. See main entry under Middlesex. ROGERS HI-FI, 13 Bridge Street, Guildford, Surrey (0483) 61049. Aiwa, Denon, Dual, JPW, Marantz, Monitor Audio, Philips, Pioneer, Systemdek, Tannoy. Demonstration facilities available, no appointment necessary. Free installation. Service department. Access/Visa. Instant credit up to £,000 subject to status. Monday-Saturday 9.30-6pm, later by appointment

SOUNDS EXCLUSIVE, 1 Kent House, High Str, Cranleigh GU6 8AU (0483) 268185. Michell (amplification & decks), Marantz, Ariston, Ortofon, AME, Sumo, Proac, Jamo, Origin Live, Kiseki. Demo room, appts preferred, home trial facilities, free install, service dept. Access, Visa. Open 9-5.30 Mon-Sat.

SPALDINGS HI-FI, 352-4 Lower Addiscombe Rd, Croydon, Surrey. (081) 654 1231/2040. 3 dem rooms and home dem. Free installation, credit Mon-Sat 9-6. Tuesto8, Closed Wed. Service dept **BADA**

SURBITON PARK RADIO, 48 Surbiton Rd, Kingston-Upon-Thames, Surrey (081) 546 5459. Quad, Castle, Dual, Denon, Kenwood, Rotel, Pioneer, QED, B&W, Tannoy. Demo facilities. Access, Visa. 9.30-5.00 Tues-Sat Service dept.

SURREY HI-FI, 45 High Street, Godstone, Surrey RH9 8LS. (0883) 744755. Parking, easy access - just 2 mins off junction 6, M25. Quad, TDL, Nakamichi, Kef, Thorens, Musical Fidelity, Rotel, Marantz, Michell, Tannoy. Single speaker demo room. Appts not necessary, home trial facilities, free installation, service dept. Access, Visa, Mastercard. Open 9-6. closed Wed.

TRU-FI SOUND AND VISION, 2 Central Parade, Redhill, Surrey. (0737) 767404/766128. Aiwa, Audio Technica, B&W, Nakamichi, Mission, Mordaunt-Short, Nakoaka, Sony, Technics. Dem. facilities. Free installation. Service dept. 0% finance. Access, Visa. Mon-Sat 9.30-6. TRU-FI SOUND & VISION, 10 Church Street, Leatherhead, Surrey. (0372) 378780. Sony, Technics, Panasonic, Mitsubishi, Ferguson, Aiwa, Pioneer, Sanyo, B&W, Mission. Free installation. Credit facilities. Access, Visa 9.15-5.30 Mon-Sat. Closed Wed. Service dept

UNILET HI-FI, 35 High Street, New Malden, Surrey KT3 4BY. (081) 942 9567. Kef, Mission, Musical Fidelity, NAD, Nakamichi, Quad, Rotel, Tannoy, Demos, Amex, Access, Visa, etc. ZEBRA 18-24 Brighton Road, South Croydon CR2 6AA. 081 688 2093. See main entry under London.

SUSSEX (EAST)

HASTINGS HI-FI, 33-35 Western Road, St. Leonards, E. Sussex TN37 6DJ. (0424) 442975. Linn, Musical Fidelity, Quad, Nakamichi, Arcam, Celestion, NAD, Denon, Yamaha, Tannoy. 2 listening rooms. Home trial. Free installation. Service dept. All credit cards welcome. Instant credit up to £1,000, written details on request. 9-6pm Mon-Sat.

JEFFRIES HI-FI, 69 London Road, Brighton, East Sussex. (0273) 609431. 2 dem rooms, closed Mon, late night Wed. Parking, bus route. Credit facilities. **BADA**

JEFFRIES HI-FI, 4 Albert parade, Green St, Eastbourne, East Sussex. (0323) 31336. 2 dem rooms, closed Mon. Late night Wed. Parking, bus route. Credit facts. **BADA**

THE POWERPLANT, 66 Upper North Street, Brighton BN1 3FL. (0273) 775978. Roksan, Musical Fidelity, Onix, Marantz, Rotel, Yamaha, Briston, Tannoy, Monitor Audio, JPW, etc. Comfortable single speaker demonstration rooms. No appts. nec. Home trial facilities, free install. Service dept. Credit facilities available on request. Mon-Sat 10-1.00, 2.00-6pm

SUSSEX (WEST)

AUDIO DESIGNS, 26 High Street, East Grinstead, W. Sussex RH19 3AS. 0342 314569. Linn, Naim, Alphason, Arcam, Rotel, NAD, B&W, Quad, Tannoy, Thorens, TEAC, etc. Very comfortable listening room. No appts nec., Home trial facilities, free installation, service dept. Access/Visa. 9-5.30 Mon-Sat, late Tue till 8pm.

BOWERS & WILKINS LTD, 1 Becket Buildings, Little Hampton Rd, Worthing, (0903) 64141. B&W, Nakamichi, Castle, Denon, Dual, JVC, Mordaunt Short, Philips, Quad, Sony, Technics. 3 dem rooms. Mon-Sat 9-5.30, Wed 9-1pm. Home trial facilities, free install. Credit to £1000, Access, Visa. Service dept * **BADA**

CHICHESTER HI-FI, 7 St. Pancras, Chichester, W. Sussex PO19 1SJ. Tel: (0243) 776402. Linn, Naim, Rega, Creek, Nakamichi, A&R, Denon, Roksan etc. Tues-Sat, 10-1, 2-5.15 (closed Mon)

TYNE & WEAR

BILL HUTCHINSON LTD, 87A Clayton Street, Newcastle-Upon-Tyne. Tel: (091) 230 3600. A.R., Aiwa, Denon, Dual, JVC, Mission, Mordaunt Short, Omar, Technics, Yamaha, etc. Demonstration facilities. Free installation, service department. Instant credit, Access, Visa. Mon-Sat 10-6

RED RADIO SHOP AND HI-FI CENTRE, 11 Olive Street, (Off Park Lane), Sunderland. (091) 567 2087. Castle, Denon, Bose, JVC, Kenwood, Mordaunt Short, Michell, Teac, Tannoy, Shure. Dem room, large with comparator facility. Free install. Service dept. Interest free credit and no deposit interest free credit. 9am-5.30pm daily.

NEWCASTLE HI-FI, 153 Kenton Road, Gosforth, Newcastle-Upon-Tyne NE3 4NQ. (091) 285 7179. Linn, Arcam, Creek, Marantz, JPW, NAD, Denon, Ruark, Custom Design, Aiwa, etc. 2 single speaker demonstration rooms. Installation, delivery, 2 yr guarantee on all products. Access, Visa. 10-5.30 Tue-Sat

WARWICKSHIRE

NAAM HI-FI VISION, 78 Lower Precinct, Coventry CV1 1DX. (0203) 632086. Technics, Pioneer, Kenwood, AR, Akai, Aiwa, Panasonic, Toshiba, Wharfedale, KEF. Demo facilities. Access, Visa, Amex, Lombard Tricity credit charge. 9.00-6.00 Mon-Sat

WILTSHIRE

AUDIO T, 60 Fleet St, Swindon, Wilts. SN1 1RA. (0793) 538222, Fax (0793) 487260. Great hi-fi from Linn, Denon, Meridian, Mission/Cyrus, Rotel, Sony, Yamaha and many more. Tue-Sat 9.30-5.30. Single spker dem room, free del. and instal **BADA**

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WORCESTERSHIRE

WESTMIDLANDS AUDIO, 158 Ombersley Road, Worcester WR3 7HA (0905) 58046. Linn, Naim, Rega, Absolute Sounds, Meridian, Arcam, Ion Systems, Roksan. 3 dem rooms for budget & high end audio. Appointments necessary. Free installation. Service Dept. Access, Visa, Amex, Diners, Lombard/Hitachi. Mon-Fri 9.30-8.30 by appt Sat 9-5.30.

YORKSHIRE (NORTH)

SCARBOROUGH HI-FI CENTRE, 53 Dean Road, Scarborough, N. Yorks YO12 7SN. (0723) 374547. Aura, B&W, Mission, Quad, NAD, Oxford, Alphason, Rogers, Nakamichi, Ruark, Voyd. Dem room, appointment preferred. Home trial facilities. Free installation. Service dept. Access/Visa/Creditcharge/£1,000 instant credit/Amex/Diners. 10-6 Tues to Sat.

HARROGATE HI-FI CENTRE, 15 Commercial Street, Harrogate, N. Yorks HG1 1UB. (0423) 504274. Aura, B&W, Mission, Quad, NAD, Oxford, Alphason, Rogers, Nakamichi, Ruark, Voyd. Dem room, appointment preferred. Home trial facilities. Free installation. Service Department. Access/Visa/Creditcharge/£1,000 instant credit/Amex/Diners. 10-6 Tuesday to Saturday.

SOUND ORGANISATION YORK, 2b Gillygate, York YO3 7EQ. Tel: (0904) 627108. Linn, Meridian, Micromega, Naim, Rega, Roksan, Sony, Arcam, Mission, Denon, Rotel. 2 single speaker dem rooms. Appts. preferred. Home trial. Free installation. Service dept. Access, Visa. Instant free credit available. 10am-6pm Tues-Sat. Sony dealer. Award nominated '86', '87', '88. **BADA**

TRC HI-FI, 3 Kings Cross St, Halifax HX1 2SH. 0422 366832. Full demonstration facilities at any time, no appts nec, free install, service dept. Access, Visa, Lombards credit charge available. 9-5.30 Mon-Fri, Closed Thur, 9-5 Sat 10-4

VICKERS HI-FI, 24 Gillygate, York. (0904) 629659. Audiolab, Harman-Kardon, Marantz, Musical Fidelity, Pink Triangle, Quad, Systemdek, Tannoy, Technics, & lots more. 3 demonstration studios (2 by appointment) superb showrooms, 2 year guarantee on all hi-fi products. Appts as above, home trial facilities, free installation, service department. Qualified and experienced staff, over 20 years experience. 12 months interest free credit. 10.30-5.30 Mon-Sat.

YORKSHIRE (SOUTH)

BARNLEY HI-FI CENTRE, 40-42 Sheffield Road, Barnsley, S. Yorks S70 1HP. (0226) 205549 Fax (0742) 467207. Arcam, Quad, Audiolab, Mission Cyrus, Technics, Denon, Tannoy, Nakamichi, Dual, Aiwa. Purpose built demo room, no appts necessary, free install, service dept, Access, Visa, varying finance packages. Open 9.30-5.30, 5 days (closed Thurs).

HI-FI STUDIO, Sunnyfields, Doncaster. (0302) 781387. Heybrook, Monitor audio, Art Audio, TDL, Michell, Sugden, Acoustic Energy, Alphason, Teac, Dual. Listening room demos. Home trial. Free installation. Licensed credit broker, 2 yr guarantee on all equipment. Service available. Access, Visa. 10-8pm 6 days. Phone for further info, & FREE fact pack

YORKSHIRE (WEST)

AUDIO PROJECTS, 45 Headingley Lane, Leeds. (0532) 304565. A&R, Audiolab, Creek, Heybrook, Linn, Musical Fidelity, Naim, Quad, Rega, etc. Tues-Fri 9.30-6, Sat 2.30-5.30 **BADA**

AUDIO VISION (BRIGHOUSE) LTD, 5 Bethel St, Brighouse, W. Yorks H D6 1JR. (1 mile from junc. 25, M62). 0484 713996. Largest range of Technics hi-fi in Yorkshire. Stockist of the new Technics digital reference series. Aiwa hi-fi separates, Mordaunt-Short & Castle Acoustic speakers; Panasonic, Dolby & Mitsubishi Naim Stereo TVs & hi-fi video recorders, Technics finlux surround sound systems, reproduction furniture. Excellent CD dems. using comparator facilities from a choice of over 1000 compact discs for sale. Please phone us, free expert install, in-store service dept. Visa, Access, Credit charge. Open Mon-Sat 9-5.30.

CLEARTONE (Formerly Erricks), Rawson Square, Bradford. (Near John St Market), (0274) 309266. A&R, Linn, Quad, Exposure, Nakamichi, Mission, Denon, Kenwood. Private demo rooms, no appt nec, home trial facilities. free installation, service dept. Access, Visa, licenced credit broker. Mon-Sat 9-5.30 (Tue 10-5.30) **BADA**

DOUG BRADY HI-FI, The Forge Cottage, 19 Crossgate, Otley, West Yorkshire LS21 1AA. (0943) 467689. Naim, Arcam, Rotel, Pink Triangle, Meridian, Epos, Castle. Two dem rooms, free install, service. Access/Visa. Open 10-6pm Tues-Sat. **BADA**

EMPIRE HOME ENTERTAINMENT CENTRE, 94 Kirkgate, Wakefield, W. Yorks WF1 1TB. (0924) 361736. Bang & Olufsen, Sony, Kenwood, Marantz, NAD, Pioneer, Panasonic, Toshiba. No appts nec, home trial, free install, service dept, interest free credit usually available. Open 9.30-5.30 6 days.

ERIC WILEY, 85 Beancroft Rd, Castleford. (0977) 553066/556774. Arcam Audio, Cambridge Audio, Celestion, Kenwood, Marantz, NAD, Pioneer Reference Front, Rotel, Technics, Quad. Car audio specialists. Demo facilities. No appts nec. Access, Visa, Lombard tricity credit charge Mon-Sat 9-5.30, closed Wed.

HUDDERSFIELD HI-FI CENTRE, 4 Cross Church St. Huddersfield. (0484) 544668. B&W, Kenwood, Denon, Dual, Arcam, Musical Fidelity, Quad, NVA, Audio Lab, Philips, Mission, etc. Dem facilities - appointment reqd. Mon-Sat 9-5.30. Thurs 9-8. Closed Wed. Free installation, credit facilities. Access, Visa.

IMAGE HI-FI, 17 The Springs, Wakefield, WF1 1QE. (0924) 200272. AR, Audio Lab, Denon, Linn, Marantz, Meridian, Mission, Monitor Audio, NAD, Quad. **BADA**

The Choice Dealer Directory

NORTHERN IRELAND

ARMAGH

LYRIC HI-FI, 84 Bridge Street, Portadown, Armagh, N. Ireland. (0762) 358 059 Linn, Naim, Rega, Arcam, Denon, Rotel, Musical Fidelity, Revox, Mission, Akai, Panasonic, etc. Mon-Sat 10am-6pm **BADA**

BELFAST

LYRIC HI-FI, 163 Stranmills Road, Belfast. (0232) 381 296. Linn, Naim, Rega, Arcam, Denon, Rotel, Musical Fidelity, Revox, Mission etc. Mon-Sat 10-6, Late night Thurs. **BADA**
HI-FI EXPERIENCE, 47-49 Fountain Str, Belfast BT1 5EB. (0232) 249117. Quad, Musical Fidelity, Denon, NAD, Pioneer, Kenwood, Cyrus, Mission, Tannoy, B&W. No appts necessary home trial facilities, free install, service dept. Credit facilities available. Open 9-5.30, late night Thurs 9pm.

COUNTY DOWN

ASTON AUDIO, 17 Hillhead Road, Dundonald, Belfast. 0247 872431. Akai, Technics, JVC, Pioneer, Mitsubishi, Panasonic, Toshiba, Sharp, Sanyo. Demos available. No appts nec, service dept. Please phone for directions. Mon-Fri 2-8, Sat 10-4.

LONDONDERRY

ZEUS AUDIO, 23a Kingsgate Str, Coltraine, BT52 4LB. (0265) 56634. Marantz, Mission Cyrus, Aiwa, Akia, Alphason, Sony, Pink Tri, Celestion, Rotel. Open Mon-Sat 10-5.30, Closed Thurs **BADA**

SCOTLAND

EDINBURGH

BILL HUTCHINSON Ltd, 43 Clarke St, Edinburgh. (031) 667 2877. AR, Aiwa, Denon, Dual, JVC, Mission, Mordaunt-Short, Omar, Technics, Yamaha etc. Dem facilities. Mon-Sat 10-6. Free installation, instant credit. Access, Visa. Service dept.

GLASGOW

BILL HUTCHINSON Ltd, 43 Hope Street, Glasgow. (041) 248 2857. A.R., Aiwa, Denon, Dual, JVC, Mission, Mordaunt-Short, Omar, Technics, Yamaha etc. Dem facilities. Mon-Sat 10-6. Free installation, instant credit. Access, Visa. Service dept
STEREO STEREO, 278 St. Vincent St, Glasgow G2 5RL. (041) 248 4079 Linn, Naim, Rega, Arcam, Creek, Epos, Exposure, Revox, PT, etc. Mon-Sat 10-6. Interest free credit. **BADA**

GRAMPIAN

HOLBURN HI FI Ltd, 441 Holburn St, Aberdeen (0224) 585713. Arcam, Audiolab, B&W, Celestion, Denon, Dual, Epos, Heybrook, ION, Kenwood, Linn, M.A., Marantz, Meridian, Mission Cyrus, M.S., NAD, Nakamichi, Pioneer, QED, Quad, Revox, Rogers, Rotel, Ruark, Tannoy, Technics, Wharfedale, Yamaha. 9.30-5.30 Mon-Sat. **BADA**

ROSS-SHIRE

HIGHLAND ANALOGUE, 'Lismore', Avoch, Ross-shire IV9 8RF. (0381) 20655. Acoustat, Basis, Cary, CAT, Cogan-Hall, Diamond-Acoustics, Ensemble, MFA, NRG, SOLEN. 1 demo room, appts nec, home trial facilities, free installations, owner is trained electronics technician. UK's most northerly high-end dealer. Open 7 days.

TAYSIDE

J.D. BROWN, 28-36 Castle St, Dundee DD1 9NZ. (0382) 26591. Technics, Pioneer, Rotel, QED, Castle, Celestion, Mordaunt Short, Wharfedale, Bose. All equipment ready for demonstration. No appt nec, free installation, service dept. Mon-Sat 9-5.30
W.M. COUPAR, 33 Reform Street, Dundee, Tayside. (0382) 29588. Bang & Olufsen, NAD, Technics, Denon, Kenwood, Dual, Nakamichi, B&W, Acoustic Research, JBL. No appointment necessary, free installation, service department. All demonstration systems wired through a demonstration comparator. Licensed credit broker, Access, Visa. Monday-Saturday 9.00 am-5.30
ROBERT RITCHIE HI-FI, 102 Murray St, Montrose, Angus. (0674) 73765. Linn, Naim, Rega, Quad, A&R, Cambridge, Creek, Epos, Pioneer, Kenwood, Sony & Technics. 2 demo rooms (1 single speaker). Appts nec, home trial fac., free installation, service dept. Access, Visa, credit facilities. 9-5.30, except Wed 9-1pm.

WALES

CLWYD

ACTON GATE AUDIO, 4 Ruabon Road, Wrexham, Clwyd. (0978) 364500 Arcam, Cambridge, Celestion, NAD, Quad, Radford, Rotel, Semilink, Tannoy, Yamaha etc. Dem room, appts nec, free install, service dept. Access/Visa, Amex. 9-5.30 Mon-Sat, closed Wed
ELECTRO TRADER, 19 Colwyn Crescent, Rhos On Sea, Colwyn Bay, Clwyd. (0492) 48932. Ariston, Arcam, B&W, Heco, Infinity, Onkyo, Rotel, Tannoy, TDL, Yamaha etc. Dem room. Appts preferred. Home trial. Free installation. Access, Visa, American Express, Diners. 9.30-1.00, 2.00-5.30 Mon-Sat.

SOUTH GLAMORGAN

AUDIO EXCELLENCE, 134 Crwys Road, Cardiff. (0222) 228565. Audio Research, Krell, Linn, Naim, NAD, Yamaha, Quad, Arcam, Mission + lots more. Closed Mon

WEST GLAMORGAN

AUDIO EXCELLENCE, 9 High St, Swansea. (0792) 474608. Audio Research, Linn, Arcam, Mission, Quad, Naim, NAD, Yamaha, etc. Closed Mon **BADA**

GWENT

HI-FI WESTERN, 52 Canbrian Rd, Newport, Gwent. (0633) 262790. Also at 60 Arcade Cwmbran. Pioneer, Technics, Denon, Yamaha, Rotel, B&W, JPW, Aiwa, Arcam, Rogers etc. Demo room, no appts nec, service dept. Access/Visa, instant credit. Mon-Sat 9.30-5.30

GWYNEDD

I&H GRIFFITHS & SONS, 313 High St, Bangor LL57 1YA. (0248) 370655. Yamaha, Tannoy, Teac, Goodmans, Dual, Sherwood, Wharfedale. Demos available, no appts nec, home trial facilities, free installation, service dept. Access, Visa, Lombard credit charge. Mon-Sat 9-5.30, Wed 9-1.
PETERS HI-FI, Victoria Buildings, Mostyn Ave., Craig-y-don, Llandudno. (0492) 876788. 1 single spker dem room. Open 9-5.30, closed Wed. See Cheshire branch for full details.

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The Directory

The *Hi-Fi Choice Directory* was conceived as a reference guide to all the audio products reviewed by *Choice* that are currently available. The products are split into suitable categories, each with its own introduction containing information about the product type and its applications. They are particularly relevant to the uninitiated first time buyer and help sort out the order of priorities when buying a piece of equipment.

Each product along with its current retail price is placed in its respective category in alphabetical order. The prices of the products are updated on a regular basis, although it should be noted that our value rating are based on the product's price at the time of review.

The next column contains the ratings for the standard achieved in laboratory and listening tests, with the exception of certain product groups where lab tests were not carried out. One important point to remember is that they cannot be used to compare products from different categories — for example, a cassette deck rated 'excellent' in sound quality will not usually offer the same standard of fidelity as a similarly rated turntable or CD player (unless you can get hold of first generation copies of the master tape!).

The Comments column contains a potted summary based on the original review, emphasising the

salient points of a product's character and sonic performance. The space available doesn't allow for great detail but in the 20 or so words we have attempted to put across the essence of the review, in some cases using quotes from the review itself. Obviously, important information on compatibility or auxiliary equipment used in the test cannot be included, and we would advise you to refer to the original review for this, of which more later. Please note that these comments are those of the reviewer and not, as is the case with some magazines, those of the manufacturer.

The next column varies from category to category but is usually either features or specifications, the former being facilities available on a cassette deck or amplifier or the type of drive system on a turntable.

Specifications vary with product type but usually relate to suitability or capability. For instance, in the case of arm matching, figures are given with the cartridges, which tie in with the mass figures for the tonearms themselves, making it easier to avoid compliance/mass mismatches.

Perhaps the most influential letters in the *Directory* are those found in the Value column, the Rs and BBs denoting the Recommended and Best Buy ratings that are appended to products we consider meritworthy. The Best Buy tag

means that a product not only offers good sound quality, but is reasonably priced as well. With source components a price limit of approximately £300 is usually used as a guide.

Recommended means that either the performance of a product is particularly good irrespective of price or, alternatively, that a good value standard is achieved but overall attainment falls short of Best Buy classification. Please note that an expensive Recommended product will nearly always sound better than a cheap Best Buy. An ideal situation would be to choose suitably priced Best Buy or Recommended products from relevant categories and create a Best Buy system, but, due to the variety in tonal balance that exists in much audio equipment, system building is unfortunately not quite that simple.

These ratings make a useful guideline for shortlisting components, but only experiencing the actual combination will tell you whether it works for you.

The final column contains a reference to the issue of *Hi-Fi Choice* which featured the complete review. If you wish to get a better idea of a product by reading the complete review it is possible to order a copy (if still in print) through our back issues department. Every *Choice* issue contains a Back Issues page for this purpose.

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SYSTEM BUILDING

Pre-packaged one-make systems have been commercially very successful, with advantages like cosmetic consistency, competitive pricing, and (assumed) technical compatibility. However, despite the mass market clout of the consumer electronics giants, the hi-fi tradition of specialised separate components seems to be as strong as ever, and certainly represents the route taken by those who place sound quality first.

The first step in putting together a system is to decide which sources you require. There are now three different prerecorded music media competing for the affection of the hi-fi user, and to go for all three will either cost a lot of money or involve substantial compromises in the sound quality of each. For this reason many separate purchasers may start with just one source, adding others or a tuner when funds permit.

Cassette has never really challenged vinyl's superior quality,

but it's a multiple role format, offering 'go anywhere' flexibility, a useful recording capability, plus a broad catalogue of prerecorded music cassette material. As a hi-fi medium cassette suffers from prerecorded material which has been improving but is still patchy in quality and can usually be bettered by a home recording. There is also the worry that a tape made on a specific machine usually plays best on that machine, which may cause aggravation when upgrading a few years hence.

CD is the relative newcomer but in the last decade it has come to dominate the market. The sound quality remains controversial, hailed as near perfect by its fans but derided by vinyl freaks. It is probably fairest to say that CD is fine for the majority of listeners, but may not suit everyone. Certainly the lack of background noise and deterioration are major strengths.

The advent of two box audiophile players has certainly

helped to gain better acceptance for the format and unless you are prepared to spend a substantial sum, CD arguably offers the best performance in terms of sound per pound. Players are now exceptionally cheap, having been reduced dramatically since the format was launched, however, the prices of the discs remains extortionate.

Choosing the components of a system is only part of the task of getting the system as a whole working as well as possible. Both components and loudspeakers benefit to a surprising degree from proper support in the form of stands that enable them to give their best performance, whether floor-standing or wall mounted.

The loudspeakers are most critical of placement, because it is their job to create the stereo image, and it will be impossible to do this if the sound from each is not roughly similar at the listening position. Each loudspeaker should operate in a simi-

lar immediate acoustic environment, unencumbered by other furnishings and structure, and a similar distance from listeners, nearby walls, and corners. Some loudspeakers are designed to operate close to a rear wall, others a metre or so out into the room, but all loudspeakers benefit from rigid support

The key to getting the best results from a separate system lies in finding an experienced and skilled dealer in the first place, one who takes the trouble to find out what you really want and then demonstrates some likely alternatives.

The *Directory* has been compiled as a guide in the sense that you should use the information in it to make a shortlist of equipment and then audition it before taking the plunge. Tastes inevitably differ and it's unwise to buy purely on the basis of our recommendation, as dealers are the most experienced people around when it comes to making systems work as a whole.

The Directory

AMPLIFIERS

The amplifier sits at the heart of the system, processing the outputs from all the various music sources as necessary and then driving the loudspeakers. These two (quite separate) functions are integrated into a single box at the low-to-middle price points; separated pre- and power amplifiers become increasingly common as one moves upmarket. At the upper end of the specialist market, valve amplifiers provide a popular alternative to the transistor types amongst enthusiasts.

There is a substantial difference between specialist (sound quality oriented) amplifiers and the consumer electronics style models. The

former are bleakly simple, avoiding all unnecessary features to provide the most direct signal path in the interests of best sound quality. The latter range from models with just basic tone controls and tape recorder switching, to those with elaborate facilities such as graphic equalisers, remote control (including volume), surround sound options etc. etc.

Lab measurement provides some useful data, particularly in regard to an amplifier's ability to drive a wide range of different types of loudspeakers, but this is only obliquely related to sound quality. We also include our measured power output (RMS, 8ohm load, 1 channel

driven) – but again, paradoxically, this doesn't necessarily correspond to the loudness capability of the amplifier, which has as much to do with the elegance of the overload characteristics within a given system (valve amplifiers invariably sound more powerful than their rating would suggest). The listing of features provides some indication to the complexity of an amplifier: many users prefer to retain the option of tone controls to 'shape' the overall sound according to taste; many others have found living without tone controls surprisingly easy, with additional benefits in terms of transparency.

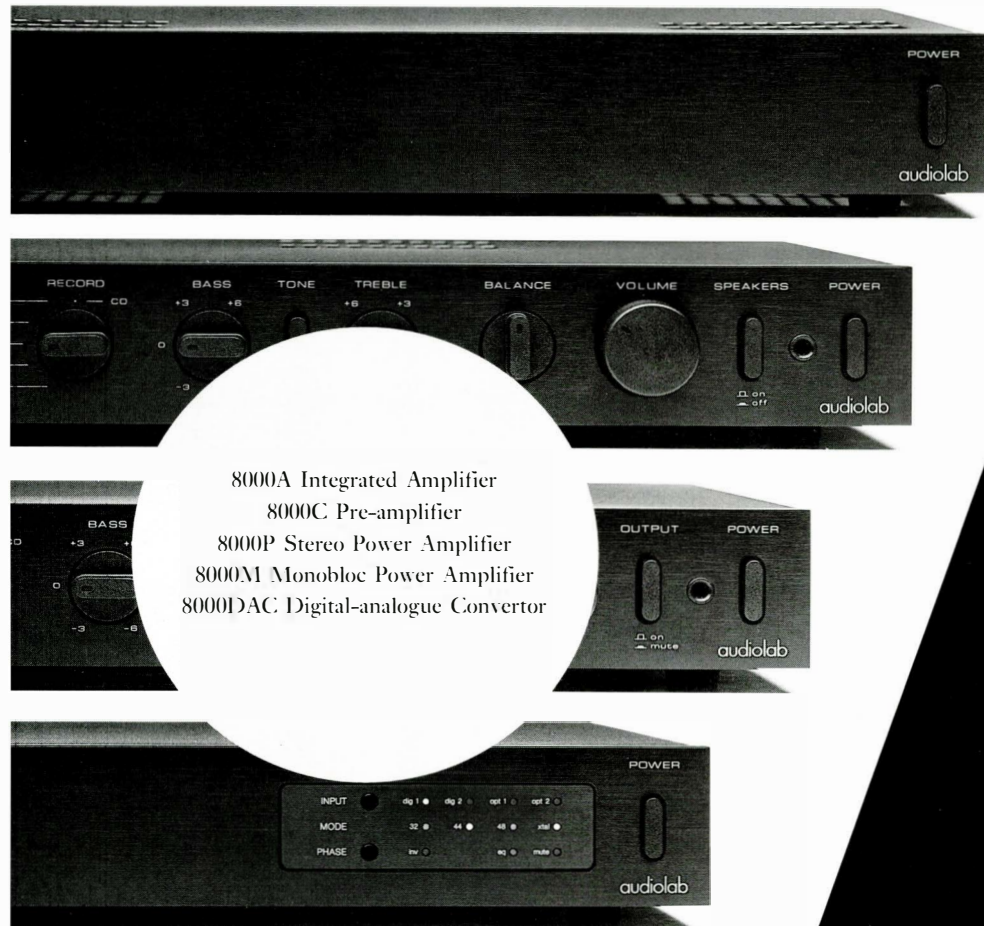
MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Acoustic Research A03 £170	Average + Average	New slimmed down version of the A04 with less power and facilities but also a slightly 'fuzzy' sound	38W, MM disc, CD direct and 3 aux inputs		74
Acoustic Research A05 £200	Good + Good +	Capitalises on the strengths of the A-03 and A-07 but escapes the ignominy of their deficiencies. The amp for all AR-based systems	67W, 2 tape, 3 line and both MM/MC inputs. Tone defeat	R	97
Acoustic Research A07 £300	Very Good Average +	Relatively smooth but ineffectual sound quality that lacks some weight and impetus at very low frequencies	75W, 4 line, 2AV and MM/MC inputs		68
Aiwa XA-006 £135	Good Average	Competent enough performer with plenty of facilities. A gutsy sound though one that's rougher via CD than MM.	67W, MM and 5 line i/p's plus independent rec out.		92
Akai AM-47 £200	Very Good Good +	Something of a surprise from Akai: a made-for-Germany amp with plenty of widgets and an unexpectedly sharp, open and detailed sound. Looks ghastly but sounds strainfree.	104W, 3 tape, 4 line and MM disc inputs. 4mm speaker outlets.	R	104
Akai AM-52 £230	Average + Average -	Basically equipped, this amplifier offers a comfortable but hardly over-detailed sound	95W, MM/MC disc, 5 line inputs, loudness		74
Akai AM-65B £299	Good Average	On-board 18-Bit DAC's actually give better sound than standard CD inputs! Punchy via MM disc	101W, MM, 6 line, digital inputs		80
Akai AM-93 £550	Average Average -	Unfortunately Akai's on-board D/A converters were less successful than its conventional analogue CD input.	112W, coax and optical dig inputs. MM/MC		68
Albarré PP1 £400/£500	Average Good +	Available with or without various MM/MC disc options, the 'basic' PP1 has an attractively warm, earthy sound. The budget MM stage needs some further work, however.	48W, 4 inputs with extra gain available for low-level sources	R	104
Alphason Apollo £300	Average- Average+	Our early production sample was beset with a variety of niggling problems. Laid-back though not unmusical sound.	54W, 5 line, tape and MM/MC inputs. Solid wood fascia		92
Amadeus Gold £360	Average + Good	There is some indication of instability but otherwise sounds very rich, warm and musical. High-ish IMD	56W, MM/MC plug-in cards, 3 line R inputs	R	74
Amadeus Silver £270	Average - Good	Limited headroom via disc but still offers a sweet, lush sound. Limited current delivery	37W, MM/MC, 3 line inputs	R	80
Aragon 4004 £1795	Good Good	Despite its imposing bulk, the Aragon is something of a softy at heart. It can deliver oodles of power but its musical presentation is more laid-back	231W power amp		72
Arcam Alpha 3 £200	Good Average	After the enthusiastic reception earned by the older Alpha 2 the generally lacklustre and bland sound offered on this occasion met with (unexpected) disapproval.	53W, 3 line, tape and MM disc inputs. Direct option.		104
Arcam Delta 110/120 £720/£520	Good+ Good	Overall performance is limited by the power amp - in isolation the PDM-preamp offers a remarkably open and detailed sound, particularly in 'digital' mode.	112W power amp, MM/MC + four line inputs + coax/opt digital inp	R/-	92
Arcam Delta 60 £300	Good Good +	Very refined and highly detailed sound via MM and CD without any of the hardness noted via the MC stage	59W, 4 line, MM/MC inputs, no tone controls	R	68
Arcam Delta 90.2 £410	Average + Average +	Dark but slightly dead or conservative sounding version of the original Delta 90. Improved disc stage	73W, MM/MC, 4 line inputs, tone bypass, bi-wire		74
Art Audio Quintet £725	Average Very Good	Switchable triode/ultralinear output stage. There's 15W and 15W, but in triode mode these are 15 of the sweetest watts around. Surprisingly gutsy	15/25W, variable feedback	R	100
Audio Innovations Series 1000 2nd Audio Amp	Poor Excellent	This valve combination offers awesome dynamic range with superb transparency and power to match. Compatibility with other brands is unpredictable	15W, MM, 6 inputs, monoblocks	R	63
Audio Innovations Series 200 £449	Poor Very Good	Like most 'Innovations valve power amps, compatibility with other brands is unpredictable. Hardly a powerhouse, but nicely 'open', transparent and dynamic sound in small(ish) systems	12W	R	77
Audio Innovations Series 300II £500	Poor Good +	Under-powered and over-distorted yet capable of realising an open and captivatingly expressive sound. Sensitive speakers are a must	9W(!) integrated valve amp with tape, 3 line and MM disc inputs	R	97
Audio Innovations Series 400 £669	Poor Very Good	Superior styling and better build quality than the Series 300 make for a very attractive integrated valve amp. Capable of fine results in the right system, but can sound too 'thin'	12W, MM and 4 line inputs	R	77
Audio Nite Ongaku £34,000	n/a Excellent	An out and out audiophile product, a single ended, zero negative feedback, triode, line level integrated amp. Probably the best amplifier in the world!	6 line inputs, 27W	R	Coll '90
Audiolab 8000A £410	Very Good Very Good	Recent mods have cured the slightly glassy treble, replacing it with a smoother but richer and more solid style of music making	81W, 3 tape, 4 line and both MM/MC inputs. Tone defeat	R	97
Audiolab 8000C/8000P £375/£545	Very Good Good	Audiolab has revamped its pre/power combo though the very distinctive almost stark neutrality that results will not appeal to all listeners. Good value engineering, nevertheless	157W pow amp + bi-wire outputs. 3 Tape, 4 line + MM/MC on preamp		97
Audion CD-1 £399	Average + Very Good	Nicely presented valve (line-only) preamplifier with fine bandwidth and enjoyable, musical sound. Great if you can justify the cost. Well worth hearing	5 line inputs		77
Aura VA-40 £190	Average Average +	Based on ITL's earlier MA80, this amp sounded slightly withdrawn or 'dead' if inoffensive	55W, MM 4 line inputs, MOSFET output		80
Aura VA-50 £200	Good Very Good	Superficially similar to the cheaper VA-40 but with much more of the old MA-80's magic! Great sound from a slimline package	65W, one tape, 4 line and MM only. New tape monitor switch	BB	97
Beard 506 £1195	Good + Good +	A versatile valve preamp - the bass sounded lively if a touch softened, while the treble was detailed but lacked a little sparkle and air.	4 inputs MM/MC		50
Beard Audio CA35/P35mkII £695/£895	Average + Very Good	Good build quality and a very smart finish combine with a characteristic valve sound to make a first class amplifier capable of giving hours of musical enjoyment	35W, MM/MC, 4 inputs	R	63
Beard M70 £1995 pair	Good Good +	A substantial British monoblok power amplifier, but not a great deal more impressive than the P35 at half the price	70W		50
Bryston 0.5B/2B £695/£695	Very Good Good	Very rugged Canadian pre/power combo that sounds cool, confident and punchy. Headamp available to suit MC cartridges	65W, MM and 4 line sources, overload LEDs on power amp	R	74
Bryston 12B/4B £1295/£1395	Good + Good	Bryston's massive 4B power amp stood out as the backbone of this combo, the preamp sounding a trifle unbalanced between MM and MC inputs	272W, bridgeable to 800W, 6 line, 2 disc inputs, subsonic filter		68
Cambridge P25 £180	Good+ Average	Despite clocking-up a solid set of measurements the sound of the P25 proved to be as grey as its appearance.	37W, 4 line and MM/MC inputs + tone defeat.		92

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MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Cambridge P50 £200	Good Average	A pleasant enough sound with full bass yet with a slightly mechanical quality that reduced its sense	56W, 4 line inputs + MM/MC + tone	R	85
Carver CM-1090 £595	Average Average +	Looks very professional with its meters and handles but suffers from a loose and dirty sound that shies away from busy tracks	141W, 2 tape, 4 line and MM disc. Sonic Holography feature	R	97
Cello Audio Suite £1200	Excellent Excellent	Cello's preamp represents a whole new ball game in flexibility and sound quality (or war of attrition on your wallet)	Optional inputs MC etc	R	50
Chord SPM-900 £1850	Average + Good +	Technically very interesting, this mini-powerhouse uses a switched-mode supply to deliver a crisp and refined sound	236W with protection into lower loads	R	85
Concordant Excelsior £856	Very Good Excellent	Cottage industry styling might not inspire confidence, but sonically this preamp is tremendously vivid and detailed. Real high-end performance. We loved it!	MM plus 3 line inputs. External power supply	R	77
Concordant Exultant £700	Average+ Very Good	Individual appearance of this valve pre contrasts with sonic invisibility. An extremely dynamic performer. Recommendation withheld pending more appropriate p.s. plug	3 line, MM, variable gain	R	100
Conrad-Johnson PV-10 £1100	Excellent Excellent	Pricy, yes, but a fabulous preamplifier which confirms C-J's high reputation in the States. Beautiful imaging, superb detail, plenty of gain on the phono stage - classy build quality too.	MM plus 4 line inputs	R	78
Conrad-Johnson Premier 7A £8995	n/a Excellent	Price has increased since we tested it - but at this price who cares? The 'Seven' is designed without compromise, and it's clearly one of the finest (valve) preamplifiers money can buy.	MM, 4 line inputs, sep. Rec Out, versatile cartridge matching	R	Coll.'90
Creek CAS 4040s3 £200	Good Good	Now in mk3 guise the '4040 offers a dry but tidy sound via disc and one that's slightly leaner and better focussed on CD.	41W, 3 line and one MM disc i/p. Tone controls.	R	92
Creek CAS 4140s2 £230	Average Good	Disc headroom still poor but the open and detailed, if slightly bright, sound wins through	40W, MM/MC, 3 line inputs, mono R and mute	R	80
Creek CAS-6060 £470	Good Good	An amp that looks like the '5050 but employs the sort of big, confident and meaty-sounding electronics used in the earlier '4040. Dynamic and impressive.	81W, 3 line, 2 tape and MM/MC disc inputs. Bridge-mono facility	R	104
Croft Series 4S £850	Good Good	The original IV is still available now supplemented by the higher price and power (S); both are fine performers	40(60)W channel	R	57
Croft Series 4SA £1000	Good Very Good	Featuring tuned components chosen for their sound quality, the 'A' variant is an impressive example of Croft's technique in valve design	60W special supply regulation	R	57
Croft Super Micro A £549	Average + Very Good	The looks are somewhat improved, while this 'hot rod' version with tuned components performed very well indeed. There is still no gain on the line inputs. Now in mk II form	4 inputs, MM, straight line	R	57
Croft Super Micro A OT/Series V £689/£555	Average+ Good	Micro is still unashamedly "cottage" but offers good performance. Combo is let down by the very low powered Series V	15W, valve, dual vol.control, 2 line, MM, tape out	R	100
Cyclone Catalyst £1995	Good + Very Good	Exceptionally load tolerant and very refined in delivery. Extra options available in future	74W, external MM or MC stages, 3 R line inputs	R	80
Cyrus I £230	Very Good Very Good	Crisp, meaty and exquisitely detailed, this latest Cyrus amp had us enthralled via CD. MM/MC enjoyed a lesser clarity	34W, 4 line + MM/MC i/p's with dual-conc vol.	R	85
Cyrus II £350	Very Good Very Good	Recently updated this popular favourite captured our attention, once again, with its robust and very convincing sound.	60W, 4 line and both MM/MC disc. R No tone controls	R	92
Cyrus PSX £250	Very Good Very Good	The PSX does make the Cyrus Two sound better; and also improves the PCM II CD player giving more wallop and clarity	Auxiliary power supply	R	62
DNM 3A From £1	Good + Very Good	The DNM3 in its acrylic case is a remarkably revealing and neutral state of the art preamp	5 inputs MM/MC twin vol controls	R	44
Deltec DPA 100S £2200	Very Good Very Good	A top-quality transistor power amp, sounding fast, articulate and well controlled, though maybe a touch clinical for some tastes	80W	R	50
Deltec DSP-50S/DPA-50S £725/£925	Excellent Excellent	Remarkable pre/power combo based around the highly linear DH-OA32 hybrid op-amp. Unmatched detail resolution, control and transparency	63W, external feedback wiring. 3 line, MM/MC no tone controls	R	68
Denon OAP-2500/POA-4400A £550/£600 pr.	Very Good Good	Denon's fully-fledged preamp also incorporates D/A converters that did not improve the sound of our £299 CD player. The power amps are brilliant!	172W, monobloks Opt/Coax dig + 2 tape, 4 line and MM/MC inputs	R	68
Denon PMA-250II £130	Good Good +	Spacious yet tactile and gutsy sound via all inputs. Worthwhile upgrade over original PMA-250	53W, MM 3 line inputs, source-direct	R	80
Denon PMA-350 £160	Average+ Good	Bold claims were made at its launch but the sweet and inoffensive sound, though very pleasant, is not mould-breaking at the price.	88W, 5 line and MM disc inputs + R source direct.	R	92
Denon POA-6600 £1000 p	Excellent Very Good	Delivers abundant high quality sound, solid engineering expertise and content clearly compensating for any compromising of purist audiophile principles - now in revised A form	250W monoblok, remote power	R	60
Dual CV600RC £150	Good + Good	The heart of Dual's latest budget range enjoys a very lively, open and vibrant sound. Slightly sanitised via CD perhaps, but still damn good for a features-first integrated amp!	63W, 3 line, 2 tape and MM inputs. Remote control	R	104
E.A.R. 549 £3628 pair	Very Good Very Good	A valve monoblok that measures like a solid state amp is itself an achievement, but exceptional power delivery and bass 'slam' is not fully matched by delicacy and transparency elsewhere	200W monoblok, bias setting	R	60
E.A.R. 802/509mkII £1098/£1868	Average Very Good	Extremely well made and combining the sonic strengths of both transistors and valves this EAR combo warrants attention	100W, MM, 6 inputs, monobloks	R	63
Entire Sound EX50 £500	Average- Average+	A new and fairly costly Mosfet power amp of limited output. Resolution of detail is pretty good but sound is cold-hearted.	40W Power amp. Internal P/S included for ES preamp.	R	92
Exposure VI/VII*/VIII £1580	Good Very Good	An established company like Exposure could do more to improve the 'look' of these amps which, nevertheless, sounded confident, dry and musical. Dual version no longer available	63W, Super mod. 4 line and 2 disc inputs with full rec-out switching	R	68
Exposure VII/VIII £530/£580	Very Good Good	Supplied as a combination without the separate preamp power supply, this pre power combination performed satisfactorily especially on the moving coil input	50W, MM/MC, 3 inputs, straight line	R	62
Exposure XI/XII/VIII Super £1900	Good Very Good	New preamp and improved power amp led to a smooth and refined sound, MM/MC less transparent than CD	61W, MM/MC, 5 line inputs	R	80
Goodmans GSA-600 £140	Good Poor	Designed to form the heart of a Goodmans separates system, the wishy-washy and faceless sound of this amp fails to stack up	76W, tape, 3 line and MM inputs. Remote control	R	97
Grant G60AMS £948 pr	Good Very Good	This neat and compact 60W valve monoblok gave good sound on the 8ohm tap, better still on 4ohms. The midrange was particularly natural	60W monobloks 8ohms	R	57
Hafner DH120 assembled £365	Very Good Average	Sound quality results were decent enough, but this power amp won't set the world on fire at this price	60W	R	44
Hafner SE-100/SE-120 £370/£380	Good + Good +	The smallest of Hafner's pre/power range but still imbued with the open, sparkling quality of their bigger models. Preamp sounds significantly better via CD than MM or MC	96W, bridging option. 2 Tape, 3 line + Aux/or MM/MC	R	97
Hafner XL-600 £1200	Very Good Very Good	Sounds remarkably open, transparent and inherently 'musical'. XL-600 is tremendously powerful and very compatible	426W in stereo mode, 1.5kW in bridge	R	74
Harman Kardon Citation 25/22 £699/£899	Good Average +	Not as outrageous as previous Citation amplifiers but neither as punchy nor exciting in the sonic stakes. A good all-rounder but lacks sparkle	138W, MM/MC full range of input and record out	R	74
Harman Kardon HK6100 £170	Good Good	Re-packaged version of the popular PM635. Still offers very up-beat and exciting sound	47W, MM, 5 line inputs, tone controls	R	80
Harman Kardon HK6200 £250	Good Good	Supposedly a beefier version of the HK6100 but in practice there's little to distinguish the two amps	50W, 5 line inputs + MM, tone controls	R	97
Harman Kardon HK6300 £330	Good Average +	This amp offers the features of the HK6500 with an internal design culled from the HK6200. Unfortunately its generally bright, grating and mechanical sound is no match for either!	61W, 3 line, 3 tape and MM/MC inputs. Loudness button	R	104

H i - F i t h a t s p e a k s f o r i t s e l f :



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MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Harman Kardon HK6500 £380	Good+	The best of HK's current range. A firm sound that enjoys an impressive grip on the most complex music. Great bass!	74W, 3 line, 2 tape and MM/MC. Tone controls + loudness	R	92
Harman Kardon HK6600 £500	Good + Average +	This amp comes as a real disappointment after the HK6500. Differences in design yield a flat and uninspiring sound	87W, 2 tape, 4 line and MM/MC inputs. Tone defeat		97
Harman Kardon HK6800 £700	Good + Good	Smoother and more evenly paced than previous H/K superamps, this model sounded both confident and nimble. A fine result	115W, 4 line + 2 tape i/p's + MM/MC	R	85
Heybrook C3/P3 £479/£660	Average + Average	Since we last looked at this combo Heybrook has improved the manufacture of its power amp though flaws in the preamp's disc input remain unchecked	146W, oodles of current, passive line inputs		104
JVC AX-A3TN £140	Very Good Good	A true minimalist amp from the masters of mass-production! Offers a very comfortable, accessible sound yet with some loss of deep bass and extreme treble.	50W, 3 line, 1 tape and MM i/p's. CD DiRT and 'Bass Compensator'	R	92
JVC AX-A441 £210	Good+ Average	A return to the traditional style of mass-market design brought an inconclusive reaction from our panel. Blowing 'hot and cold', our listeners ultimately found its music uninteresting	93W, 3 line, 3 tape, MM/MC inputs. CD direct facility		104
Jadis JP30/JA30 £4990/£4900	Average Excellent	Two-box preamp plus monoblok power amps, classic valve design gives stereotype valve sound. Beautiful build, nostalgic styling and delightful sounding midrange transcend limitations at	30W 2-box pre-, monoblok power, MM-only, 4 line inputs	R	60
Jeff Rowland Coherence One/Mod	Very Good Very Good	The technical design of these amps is very elaborate but ensures they achieve an extraordinarily transparent and potent sound. However, the CD i/p is clearly superior to the disc inputs	448W monoblok MM/MC with loading options. Balanced topology	R	72
Kelvin Digital Integrated £550	Good + Very Good	Not so Class A as before but now fitted with a PDM DAC which offers a smooth, detailed and naturally 'musical' sound	34W, digital, line and MM i/p's only	R	85
Kelvin Integrated £449	Good Good	Recent mods have reversed the Integrated's previous good fortune, this unit was just too syrupy	21W with 10-12W in Class A. Four line + MM/MC.		92
Kelvin Labs Absolute Zero/M30 £395/295/595	Good + Average +	Latest versions of the M30 offers a true 30W Class A and a slightly muddled but very comfortable sound. MC preamp is a very linear design	33W monoblok MC only + 4 line inputs. Separate L/R balance	R	74
Kenwood KA-3020 £140	Good + Good +	An unassuming little amplifier that turns in a remarkably balanced and entertaining sound. Lively, detailed and engaging	66W, 2 tape, 3 line + MM disc. Source direct		97
Kenwood KA-4020 £170	Good + Average +	On paper this is a beefier version of the '3020 yet our listeners thought it sounded weaker, lacking richness and detail	103W, 2 tape, 3 line + MM/MC. Source direct		97
Kenwood KA-4040R £220	Good + Average +	In many respects this sophisticated amp is a 'digitised' version of the KA-4020 with relay-switched inputs and full remote control. Unusual looks but can seem insubstantial via CD.	82W, 3 line, 2 tape, MM/MC inputs. Full remote control		104
Kenwood KA-5020 £220	Very Good Good+	Something of a powerhouse on the cheap this amp can keep pace with the most challenging of dynamics. Its sound is vibrant but some fine detail is lost.	115W, 3 line, 3 tape and MM/MC. Source direct.	R	92
Klyne SK5a £2590	Very Good Very Good	Beautifully made and presented, this American thoroughbred has a good lab performance, but although versatile, is rather expensive for the quality of sound offered	Balanced output, versatile cartridge loading		72
Lecson Quattra £350	Average+ Good	Underpowered but with the flexibility of four independent power amps. Very deep, captivating sound with 3D soundstaging.	19W via all 4 channels. 5 line and MM/MC inputs.	R	92
Lecson Stereo £200	Poor Very Good	Can reflect the full weight and ambience of a tense, classical performance. A genuinely deep, detailed and enthralling sound marred by unreliability of our sample. New stock will be cured.	76W, 4 line, 2 tape, MM/MC inputs.		104
Lectron JH50 £2300	Average Very Good	Sexily presented valve power amplifier from France. Lovely valve sound too, with delicate and airy top end. Not especially powerful and rather expensive but very desirable!	50W		78
Linn Intek £398	Good - Average +	Linn have slashed its price and made various internal revisions, but their no-nonsense Intek still lacks the authority and confidence to support its forward balance.	55W, 3 line, 2 tape, MM/MC inputs, rec-out, mono + mute		104
Linn LK1/LK280 £598/£763	Good Good -	A very modern, logic-controlled amp with distinctive and inoffensive sound quality. Its restrained sound could do with extra insight and zip.	84W, compact amp CMOS sw. for 2 tape, 2 line and MM/MC. xlr sockets		68
Linx Nebula £500	Average + Average +	Ambitious both in style and design this amp was less impressive in the sonic arena — positive but two-dimensional	88W, logic-controlled i/p switching		85
MFA Magus £1147	Good Very Good	Versatile valve preamp from USA, genuine MC compatibility and high class construction make the Magus a bargain	3 line, MC, tape out, variable gain	R	100
Magnum MP150/MF150 £320/£320	Average + Good	This is no technical masterpiece but the strain-free, fluid sound augers well for CD-based systems. Excellent value	89W, 3 line + MM/MC i/p's. No tone cont.	R	85
Marantz PM-30 £130	Good + Good +	The building-block for Marantz's popular budget 'SE' amplifier is no slouch, providing a lively and very expressive sound with plenty of strong bass. A good 'un.	49W, 3 line, 2 tape and MM inputs, source-direct	BB	104
Marantz PM-30SE £150	Very Good Good+	The breathed-on version of Marantz' PM-30 offers an engagingly detailed and spacious sound though one that's warmer via MM disc than CD.	50W, 3 line, 2 tape and MM disc. Source direct	R	92
Marantz PM-40SE £240	Very Good Good +	The improved version of their basic PM-40 model has itself been updated to provide a bigger and more exciting sound. A good 'un	61W, tape, 3 line + MM/MC disc. Source Direct	R	97
Marantz PM-50 £260	Good + Average +	One of Marantz's new breed, the PM-50 has a big and beefy sound yet one that lacks refinement	92W, MM/MC, 4 line inputs, source-direct		80
Marantz PM-75 £500	Good Average	More successful than most amps with on-board DACs but still not as balanced as other Marantz products	136W, opt/coax dig inputs, 6 line + MM/MC		68
Marantz PM-80 £400	Very Good Good +	Technically robust with an equally beefy and tactile sound. Great sense of power and control but spatially a little flat	133W, 3 tape, 4 line + MM/MC. Class A option	R	85
Meridian 201/205 £760/£525each	Very Good Good +	A fine preamp with additional luxury option of full system remote, plus competent and attractive monoblok power amplifiers with generally good performance	100W MM/MC 6 line inputs remote capable straight line	R/-	62
Musical Fidelity A1 £299	Average + Average +	Just scraping a recommendation, this current A1 sounded lush but sleepy — lacking the bite and sparkle of old	26W with 9W of Class A. 4 line + MM/MC inputs	R	85
Musical Fidelity A100 £499	Good + Very Good	This is another one recommended for fine sound with which you could keep your Chinese carry-outs warm	50W MM/mc 5 inputs straight line	R	62
Musical Fidelity B1 £200	Average + Good +	The subject of much controversy, this 50W wonder offers a very deep, solid and powerful sound	50W, MM/MC, 5 line inputs, tape monitor	R	80
Musical Fidelity B200 £349	Very Good Good +	Running cooler than other MFs, the B200 delivered fine musical and dynamic sounds with plenty of power	80W MM/mc 4 line inputs straight line	BB	62
Musical Fidelity MA50 £875 pa	Good Excellent	An audiophile bargain. One of the best sounding power amplifiers made	50W, monoblok	R	62
NAD 3020i £150	Very Good Good +	The most balanced and communicative of NAD's 3020 series. Great at revealing subtle musical clues without aggression	31W with tone controls, 3 line + MM inputs	BB	85
NAD 3225PE £160	Average + Average +	Light and detailed if not as rich or weighty sounding as others. MM input sounds warmer than CD	42W + 70W dyn. headroom; soft-clipping, MM only	R	68
NVA P70MC/A60 £830	Average Average +	NVA's speaker cables are a must, the amp offering well-integrated but not particularly crisp sound	68W, MC, 3 passive line inputs		80
Naim Separates £750 pl	Very Good Good	A consistent and coherent series of 'building blocks' for conventional passive or active operation. Sound quality ignores conventional audiophile standards of presentation, but	40-70W, MM/MC etc	R	60
Onix OA-21s/SOAP £350/£180	Average + Good -	Via MM disc this amp comes alive with a fresh and vibrant sound though its CD input sounds utterly dead by comparison	60W, 1 tape, 3 line and either MM or MC. Outboard PSU option		97
Orell SA-040 £359	Good Good +	This promising newcomer from a brand new company sounded pretty good and should improve as production settles	45W MM/MC, 4 line inputs, straight line	R	56

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MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Orell SA-040SE £400	Average Average +	Very natural, relaxing if not overly exciting via CD, the sound closed-in to become 'pinched' or fettered via disc	64W, 5 line + MM/MC i/p's Tweaky components		71
Philips DFA-888 £300	Good Average	As above but including a modified disc input and onboard DAC. Sounds tight but also slightly thin	107W, as above + opt and coax digital inputs		74
Philips FA-880 £200	Good Average	A new and cheaper design from Philips that sounds best via MM disc. Can appear soft and unbalanced via CD	108W, MM/MC source-direct tone		74
Philips FA-890 £230	Good + Good -	Based on their FA880 model but tarted-up with a remote control facility. Inoffensive, civilised but unexciting sound is retained	120W, 6 line + MM/MC logic-controlled input switching		97
Pioneer A-229 £130	Average + Average	An unambitious amplifier that fights shy of tricky speakers with a sound that's equally unadventurous. Slightly soft and comfortably even-handed presentation	60W, 2 line, 2 tape and MM inputs, loudness and direct		104
Pioneer A-300 £160	Very Good Good	The cheapest of Pioneer's dynamic duo gives off its best with CD rather than MM disc which failed to shine quite so brightly.	55W, 3 line, 2 tape and MM. Independent rec out facility.	R	92
Pioneer A-400 £240	Very Good Very Good	Pioneer's design concept snaps into focus with the A-400, an amp that seems to bubble with musical detail. A bench-mark that other manufacturers should strive for.	71W, 3 line, 2 tape, MM/MC. Independent R-out switching.	BB	92
Proton 520 £115	Average Average	Very well equipped budget amp with a slightly flat and undynamic sound - acceptable at the price though	31W, MM/MC with variable MC gain, 4 line inputs	R	74
Proton AP-1000/AA-1150 £250/£395	Good + Average +	Bags of headroom available from this pre/power combo, but can seem bloated or unrefined via MM	67W, MM/MC, adjustable MC gain, 5 line inputs		80
QED A240 CD II £249	Good + Good	Latest 240CD is fine value for CD and has competent MM disc input as well	45W MM 5 line inputs straight line	BB	62
QED A270CD/PA £369/£429	Good Good +	Recent updates have bolstered the output of the A270 without adding to its colourations. The PA option is a touch expensive	61W, 2 tape, 3 line + MM or MM/MC from PA board	R/-	97
QED C300/P300 £329/£370	Good Good	A cost-effective combo, limited in its resolution but no less beguiling as a result. Disc stage is sweeter but samey	58W, 2 tape, 3 line, MM/MC + mono/biamp opt.	R	85
Quad 34 £366	Very Good Average	This well-built durable preamp has useful filtering and above average tone controls but was found lacking in sound quality (viz: detail/dynamics)	4 inputs MM/MC tone controls		44
Rational Audio £175	Average- Average+	This wacky newcomer from Czechoslovakia offers a very open and fluid sound via CD but its performance via MM depends very much on the cartridge's load impedance.	129W, caters for line and MM disc sources but has no i/p selector.		92
Ray Lumley Model 75 £1995 p	Average Good +	Monstrous valve monoblocks which represent good value. What they lack in musical subtlety they make up for in sheer muscle. And these are Lumley's small monoblocks!	75W monoblok		78
Revox B150 £1047	Very Good Average +	Beautifully constructed but hampered by Revox's convoluted logic control. Open and smooth sound. Still costly.	117W, CMOS sw. for 3 line, 2 tape and MM		68
Revox B250 £1467	Very Good Good	With much improved sound over its predecessors plus amazing remote control facilities, this could form the heart of a round-the-dream-house system	150W MM/MC system/house remote tone controls		56
Rose RV-23 £395	Good Very Good	Beautifully built classy British 'hybrid' preamplifier. You can spend more to get a more transparent sound but it's hard to criticise the Rose given the competitive price	MM plus 3 line inputs	R	77
Rotel RA-930AX £160	Good - Very Good	Based on the original RA-820AX but featuring a new look and a tweaked circuit design, this budget wonder captivated our listeners with its clean, vibrant and thoroughly involving sound	53W, 3 line, tape and MM inputs, tone bypass	BB	104
Rotel RC-960BX/RB-960BX £150/£180	Very Good Good -	With excellent standards of construction, flexibility and plenty of power under the bonnet, this duo represents an ideal choice for the first-time buyer.	80W, bridge-mono facility. 3 line, 2 tape and MM/MC on preamp	R	104
SAE P102/A202 £499/£599	Average + Average +	Microprocessor-controlled pre and power amp that sounds much better at low rather than high volume levels. Pro-oriented aesthetics	151W, MM/MC + 2 liner and 2 tape, tone memory, spk switching		74
Sansui AU-X111 £100	Good Average	Sansui has engineered an amp that's both solid and flexible for the price, but its sound is rather bland compared to competition in the £110 sector	5 line inputs, MM, 52W		92
Sansui AU-X911DG £700	Very Good Good +	At its best when used with the on-board MASH/PWM DAC where it sounds technically neutral but still emotionally charged	112W, 4 dig, 3 line and MM/MC i/p's. Rec-out	R	85
Sony TA-F440E £180	Very Good Good	A new budget amp based on tried-and-tested circuits but free of spurious widgets like tone controls. It has a fresh and up-beat sound with plenty of detail, can sound smeared via CD	109W, 3 line, 2 tape and MM + rec out	R	104
Sony TA-F540E £230	Very Good Good -	An extra £50 buys you an MC input but little else over and above the TA-F440E. This version sounds more consistent from input to input but is still rather superficial or unconvincing	108W, 3 line, 2 tape, MM/MC + rec out		104
Sony TA-F730ES £450	Very Good Good	A very stable and coherent amp but one that lacks a crucial sense of involvement	133W, MM/MC, 3 tape, 2 line, full rec-out		80
Sound Audio VP3a/HBP60a £599/£599	Good Average ++	Hybrid power amp and valve line stage. Big 'n' beefy power amp is the stronger partner	4 line, 1tape 60W	R	100
Sugden A21a £395	Average+ Good	The modern-day relative of Sugden's original Class A amp and one that offers a smooth, easy-going sound. Best partnered with sensitive speakers	25W power amp with a good 16W inPure Class A.		92
TEAC A-X400 £115	Average Average	Sibilance and a lack of crisp vitality hamper the performance of this amp, as does the stringent protection circuitry	59W, 4 line + MM + tone + mic i/p level control		85
TEAC A-X5000 £229	Good Average -	This amplifier is compromised by a grey and muddled sound that taxed the concentration of our listeners. Better via MM disc	107W, 3 tape, 3 line + MM/MC. Source Direct		97
Technics SU-810 £130	Average + Average	Our sample started off sounding fast, taut and well-integrated yet eventually failed on the MM disc input	66W, 2 tape + 3 line + MM. Tone + loudness		85
Technics SU-VX600 £200	Good + Good	What looks like a fairly ordinary mass-market offering is actually the first 'tweaked' amp from Technics, its solid and sharply focussed sound a taste of things to come.	90W, 3 line, 2 tape, MM/MC + power-amp inputs	R	104
Technics SU-VX800 £450	Very Good Average	On the other hand, this is a mass-market amp still hampered by over-enthusiastic protection circuits! It sounds raw and congested when the going gets tough - positive but raucous	148W, 3 line, 3 tape, balanced input + MM/MC		104
Threshold FET 10e system/ Renaiss	n/a Very Good	Almost valve-like limpidity and excellent soundstaging are star qualities of the Threshold amps. Line input resistive loading is too low	Component FET phono stage, line pre, FET power amp 100w		Coll. '9
Woodside SC26/STA35 Renaiss	Good Good+	Synergistic pairing with a cool, controlled sound, good focus and transparency. More about poise than grunt	35W, valve, 3 line, optional MM or MC, 2 tape outs		100
YBA 1 power amp £2995	Good Excellent	This equally well finished power amp offers front rank stereo staging and transparency, and is capable of driving the most difficult loads	85W	R	62
YBA 1 preamp £2895	Very Good Excellent	A front line French audiophile product. Great stereo and a fine Krell style finish	MM/MC, 3 inputs, straight line	R	62
YBA 2 pre & pwr £1395/£1695	Very Good Very Good	Superbly finished French separates, with very good space and transparency, slightly softened bass. Needs extra transformer (£300) for MC cartridges	70W MM (MC extra) straight line	R	56
YBA Model 3 £995/£9	Good Good	Suited to highish sens. loudspeakers this duo produced see-through, ethereal stereo images that were more convincing towards the centre of the soundstage than at the edges	56W stereo amp MM only with 3 line i/p's.		72
YBA Model 3 £995/£995	Good Good	Suited to highish sens. loudspeakers this duo produced see-through, ethereal stereo images that were more convincing towards the centre of the soundstage than at the edges	56W stereo amp MM only with 3 line i/p's.		72
Yamaha AX-330e £100	Average + Average +	An improvement on earlier efforts but still a little bland or lack-lustre. Very compatible though	48W, MM, 3 line inputs, source-direct option		80
Yamaha AX-750 £399	Very Good Average	Big and bulky with remotely-controlled input and volume. Impressive handling, but two samples split the opinion of our listeners, one sounded squashed the other fast and articulate	149W, 3 line, 2 tape, MM/MC inputs + remote control		104

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CABLES AND CONNECTIONS

Although cables and connections are sometimes thought to be the least important items in an audio system there has been a growing awareness in recent years that they have a significant effect on sound quality. To this end there is now a vast array of exotic cables and interconnects available to those interested in experimentation. The key observation on cables is that they are much more than mere accessories. Carrying the audio signal, just as any amplifier does, it's really not too surprising that they can influence sound quality.

The characteristics of any cable are determined by the materials and topologies utilised in its construction. The purity of the conductor, nature of the insulator dielectric, mechanical construction, physical geometry, RF characteristics, efficiency of screening and finally the connectors themselves, all play vital roles in the sonic character. These factors tend to vary more with interconnect cables which are used to carry the signal between active components like pre and power amplifiers. The interconnects summarised here were tested in 1m terminated lengths and therefore the results and prices relate

to that length - some cables may well perform differently when used in longer lengths. What's more, most cables are significantly cheaper if you are prepared to fit the plugs yourself. The features column contains information on the material makeup of the different cables with the following abbreviations: OFC - oxygen free copper, OFHC - oxygen free high conductivity (Audionote defines HC as high crystal), PC-OCC - pure copper by ohno continuous casting, LC-OFC - linear crystal oxygen free copper.

CABLES - INTERCONNECT

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Audio Note Copper ANA £44	Average Good	ANC sounded punchy with a faintly lean but tightly-focused bass character. This crystalline precision waned slightly at higher frequencies	OFHC copper twin-axial	R	59
Audio Note Flexible Silver ANS £99	Average Very Good	ANS scored a hit with its transparent midband and revealing but quite unforced treble quality. Bass transients were slightly softened	Silver signal & Copper screen	R	59
Audio Note Silver ANV £154	Poor Excellent	Far weightier-sounding than the flexible ANS, ANV interconnect also possesses a fair degree of treble clarity and sparkle	21 strand silver Litz		59
Audio-Technica AT-6115 £40	Very Good Average	This cable sounds somewhat 'quieter' than the original LC-OFC interconnect, but is also less transparent and three dimensional	PC-OCC copper coaxial		59
Audioquest Livewire Ruby £49	Average Good	Smother sounding than the Topaz, the extended crystal Ruby is less grainy and coarse, better able to resolve complex passages	FCL copper twin axial	R	59
Audioquest Livewire Topaz £35	Good Average	Sounding 'bigger' and faintly richer than Reference 2, Topaz was also slightly grainy at the top end	Gold-plated plugs, OFHC copper		59
Budget OFC Circa £7	Average Average	Subjectively, this cable did lift much of the aural fog experienced with scrawny standard hook-up leads.	OFC		59
Budget Patch Cords (see text)	Average Poor	As thrown in gratis with cassette decks and the like - frequency extremes were restricted and performances were veiled	Thin coaxial		59
Chord Mono-t £27/1.2m	Average + Average +	Offers a slightly rolled-off treble but its rich sound is an upgrade from patch-cords	Unsymmetrical 4-conductor cable	R	83 Supp.
Deltec Gortex Black Slink £152	Very Good Excellent	A true reference quality cable providing an exceptionally detailed and transparent sound	Symmetrical, 8-conductors, Gore-tex ins.	R	83 Supp.
Deltec Slink £32	Good Very Good	Ideally used in lengths of under 4 metres, it errs on the lean side of neutral but has an uncommon transparency in the midrange	4 silver plated OFC strands PTFE dielectric	BB	59
DNM Solid-core £23	Average Good	Transparent in the midband and full of sparkling detail in the treble, low bass was slightly curtailed (unterminated price £2.30 per m.)	Single strand nickel-plated copper. Unshielded	R	59
Kimber Kable KC-1 £65.55	Very Good Average	Tonally faintly leaner and brighter than the more open-weave PSB, KC-1's treble detail was just too sharp and grainy	Multi-gauge PTFE dielectric		59
Kimber Kable PSB £41.40	Very Good Very Good	An exceedingly transparent midband but slightly 'clanky' treble. It always managed to sound remarkably uncluttered and open	OFC, PTFE dielectric	BB	59
Monster Interlink 300 £30	Average + Average	A big, larger-than-life sound but with some emphasis of midband detail and loss of bass	Screened, symmetrical cable		83 Supp.
Monster Interlink 400 £50	Good Good	Bass is solid and punchy, counterpointed by a slightly overblown midband which tends to make vocalists sound larger-than-life	Multi-gauge	R	59
Origin Live Soli-Core Super £60	Good Average	Improves over previous Soli-core samples in stereo depth and bass weight, but a 'loud' treble presentation remains	Solid-core gold-plated AT plugs		59
QED Incon Graphite P1G Gold £19.95	Average Average	A shielded version of Incon P1, it sounded thicker at the frequency extremes, the top end being coarser and more out of focus. Good for long runs though	OFHC Graphite shielding	R	59
QED Incon P1-Gold £16.95	Good Good	A lively open presentation that just borders on the lean side of neutral, the quick and lucid delivery affording considerable musical insight	OFHC, gold plated Deltron plugs	BB	59
Sterling £250	Average Good	Possessing a neutral if faintly rich overall balance, it supplies a pleasantly open and transparent perspective. (Reviewed in pre-production form.)	2 silver strands per conductor		59
Supra EFF-1 £60/0.75m	Average Average	A new, costly and mildly disappointing addition to the range. Edgy, smeared sound	Screeded, symmetrical dir. cable		83 Supp.
van den Hul D300 II £44	Poor Good	It tended to highlight some upper mid detail, but a generally open and spacious acoustic proved its saving grace. Slightly soft at LF	Silver plated single strand VdH plugs	R	59
van den Hul MC-Gold £230	Average Good	It possesses a rich and beguiling treble balance that matches a weighty, slightly warm bass character. Seductive balance may prove worthwhile in some circumstances	Silver & gold plated copper		59
van den Hul MC-Silver £750	Good Good	Although remarkably transparent for an asymmetric design this costly cable was not considered to be of 'state-of-the-art' standard, and is bettered by cheaper models	19 silver plated copper strands		59
van den Hul MCD-102 III £61.50	Good Good	Possessing the same endearing qualities as the D300, it presented open and transparent soundstages and improved timbral resolution	Twin axial silver plated copper	R	59
van den Hul Thunderline £92	Good Average	Thunderline essentially parallels the sonic performance of the cheaper D102. HF is occasionally tainted by a 'tizzy' coarseness, bass is tight and dry	Silver plated 'matched copper'		59
Yfere LC-OFC Quad £85	Very Good Very Good	New cable with a very refined sound. Very transparent with good sense of focus and space	Symmetrical, star-quad with screening	R	83 Supp.

CABLES - LOUDSPEAKER

Absolute Wire Force 4 £4.75 per metre	Good Average +	By current standards there was a loss of fine, sharp detail at the frequency extremes, but it has a big, friendly sound	744 OFC strands, PVC dielectric		64
Audio Innovations OR-200 £16 per metre	Average + Average +	Open and detailed throughout the midband but a grainy coloration tended to corrupt subtle timbral information at very high frequencies	200 LC strands, polyurethane and cotton dielectric		64
Audio Note AN-SP £100 per metre	Average - Excellent	A clean and open sounding cable that offered a deep and pleasantly detailed perspective. Bass was slightly restricted, but seemed tight and coherent	15 silver strands, polyethylene dielectric		64
Audio-Technica AT-6120 £10 per metre	Average + Average	Compared to earlier LC-OFC cables, this PC-OCC derivative sounded smoother and less aggressive	PC-OCC, PVC dielectric		64
Audioquest Livewire Black £15 per metre	Good Good	It proved clear and punchy but with some grain across the treble. Nevertheless Black remains an interesting concept and proved better than Livewire Green	OFHC, surface only - foam core construction	R	64

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CABLES - LOUDSPEAKER

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Bellwire 12p per metre	Poor Average -	Broadly speaking it delivered a bright and tizzy sounding treble with a fairly open and detailed mid with little or no bass resolution	0.5mm single strand, PVC dielectric		64
Cyrus £2.50 per metre	Average + Good	Because of its impedance characteristic this cable will deliver a smooth and unfatiguing treble balance with loudspeakers offering an easy load	0.8mm single strand, PVC dielectric	BB	64
Deltec 8S £144 - 5m pair	Good Good +	The unerring transparency and detail resolution of 8S throughout the midband makes it a cleaner and more spacious sounding cable than others at the price	4 silver plated OF copper strands, PTFE	R	64
Deltec Gortex Black 16 £528 - 4.5m pair	Very Good Excellent	Improvements in bass resolution, transparency and treble poise maintains status of this cable	Silver-plated OF copper with Gore-tex ins.	R	83 Supp.
DNM Solid core £3 per metre	Average Average	A good general-purpose solid-core, though too bandwidth limited for high-end applications Sounds great in some systems	0.65mm single strand, webbed PVC dielectric		64
Exposure £2.50 per metre	Good Good	It could sound a trifle matter of fact but this emotive flattening was also somewhat dependent on the music program. It is also highly suited to long runs	56 OFC strands, webbed PVC dielectric	R	64
Furukawa FS-2F09 £3.50 per metre	Good Average +	Some loss of bass weight but otherwise offers a fresh and open sound. Good value	Multi PC-OCC stranding, PVC dielectric	R	83 Supp.
Furukawa FS-2T15S £50 per metre	Good + Very Good	An advanced solid-core cable with a highly fluid, detailed and inherently musical sound	Single 1.5mm Super PC-OCC	R	83 Supp.
Kimber 4VS £7.15 per metre	Average + Average	Similar construction to 4TC but dissimilar materials infer a slightly tizzy sound	Open-weave, multistrand, PVC ins.		83 Supp.
Kimber Kable 4PR £54 - 5m pair	Average Average +	This directionally marked cable benefited from an open and airy treble quality but seemed notably leaner than 4TC. Bass was well round and satisfyingly taut	4 x 7 copper strands per conductor, PVC diel.		64
Kimber Kable 4TC £17.65 per metre	Good Good +	4TC made a great impression in the listening tests with an open midband, a smooth and unfatiguing treble with slightly rich but suitably weighty bass	OF copper, PTFE dielectric	R	64
Linn K20 £2.95 per metre	Good Average	Subjectively, it erred on the forward and bright side of neutral but enjoyed an essentially clear and punchy delivery	56 OFC strands, webbed PVC dielectric		64
Monitor PC Silverline PC4 £5.75 per metre	Good Average	Sonically, it laboured under a heavy and claustrophobic balance, lacking the see through transparency and lucidity of the better solid core cables	2072 x 0.07mm silver plated copper strands		64
Monster Original £3.49 per metre	Good Average +	Original sounded relatively congested and murky at higher frequencies but possessed weight and conviction in the bass	Multistrand		64
Monster SCI 16-4 £3 per metre	Average Average	Not as thick-sounding as early Monster cables but still slightly unbalanced. Versatile construction	4 x 16-gauge conductors, OFC strands		83 Supp.
NVA LS1 £6 per metre	Average + Good	A light and breezy sounding cable best suited to short lengths, NVA benefited from a clear and transparent outlook	7 x 0.25mm silver alloy strands, PTFE	R	64
QED 79-Strand £1 per metre	Good Average	For much of the last decade QED 79-Strand has been the first port of call for enthusiasts on the upgrading ladder, a tradition that should still hold true today	79 strand, PVC dielectric	R	64
QED Flat 200 £2.20 per metre	Good Good	I detected a degree of confusion at low frequencies but this did not stifle the acoustic atmosphere which remained open and positive	200 strands, flat webbed PVC dielectric	R	64
QED Incon Graphite £2 per metre	Average + Average +	This graphite version of Incon sounded cruder and generally more heavy handed than the cheaper unshielded type. Overall presentation was mildly restricted and cloaked in a faint aural fog	OFHC, polymeric screen		64
Rotel Supra 10 £8.95 per metre	Good + Good	Supra 10 provided a very free and open sound that was unhindered by any excess at low frequencies. Worth its weight in scrap copper!	2,562 OFC strands, webbed PVC dielectric	R	64
Rotel Supra 4 £3 per metre	Good + Good	Ideal for both long and short runs, it furnishes a big sound that benefits further from a smooth, unfatiguing treble	1,036 OFC strands, webbed PVC dielectric	R	64
Solid core lighting cable 36p per metre	Average + Good	It enjoys much of the smooth treble and articulate midrange usually associated with the better solid core derivatives. Lean but taut and rhythmically coherent	1.5mm square, 3 cores, PVC dielectric	BB	64
Townshend Isolda £400 - 5m pair	Average + Good	Isolda possessed a truly dark background out of which rose a very solid and extended bass together with an excellent sense of transparency through the upper octaves	8 coax cables per conductor - very thick	R	64
van den Hul CS-122 £6.50 per metre	Average + Good -	Characterised by a driving and powerful bass, CS-122 is a heavy sounding cable. Mid treble detail was refreshingly clear but there was a slightly muted air about the extreme treble	19 x 0.45mm silver plated strands, rubberised dielectric	R	64
van den Hul D-352 £12 per metre	Good Average +	Subjectively it sounded like CS-122 only more so, the deep rumbling bass tending to overwhelm subtle musical details. It also appeared a trifle peaky in the treble	7 x 0.76mm + 168 x 0.125mm silver plated strands, rubberised diel.		64
van den Hul SCS-12 £10 per linear metre	Good + Good +	SCS-12 set a high standard with a tight and well focused soundstage populated with tactile stereo images. Bass wasn't as extended or resolved as some other cables	19 silver plated strands of 12 different gauges, PTFE dielectric	R	64
van den Hul SCS-2 £99.95 per linear metre	Good + Good +	Overall it was commendably neutral and transparent but nothing less would be acceptable bearing in mind the tremendous cost of a stereo pair	665 silver plated matched crystal copper strands, PTFE dielectric	R	64
Vecteur R-CV30 £5.40 per metre	Average Good	Subjectively the better of Vecteur's cable line-up offering a neutral overall perspective but slight loss of detail resolution at both frequency extremes	4 x 0.8mm LC-OFPC PTFE insulated BB strands		64

CASSETTE DECKS

The bad odour of copyright theft hangs around the compact cassette, but there is no doubt it is the world's most versatile and ubiquitous music storage medium. Hi-fi buffs may wrinkle their noses pointedly, but are still happy to use cassette decks to make up tapes for the car or personal - at the same time complaining loudly about the quality of pre-recorded material. (In fact the very best decks can do a surprisingly good job with musicassettes.)

There is no problem in connecting a cassette deck to any normal amplifier, but some care needs to be taken in choosing the best tapes for a

specific machine. (Trial and error is one effective technique, but many decks have manual bias adjustment and some match up to the tape automatically.)

Lab performance and sound quality often go hand in hand, and are frequently somewhat dependent upon factory alignment. The mechanical integrity of the mechanism itself is another crucial factor, that is often reflected in the asking price.

All modern hi-fi decks have Dolby B and the majority have Dolby C besides; the very worthwhile HX Pro system is becoming steadily

more widespread. Remote control remains rare, though sometimes it is available as a system option.

Three-head recorders allow simultaneous checking of the recording being made. Auto-reverse is a useful convenience feature, but usually with some mechanical compromise, while double-mechanism 'dubbing' decks of dubious quality are fashionable at the bottom end of the market. The welter of different 'music search' systems available is some indication of their frequent ineffectiveness.

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Acoustic Research RD-06 £300	Average Average	Acceptable middle market player with very simple facilities and cramped control section, but unusually good looks	Dolby B/C/HX Pro, fine bias, counter memory, repeat		69
Aiwa AD-F410 £100	Average Average	Comparable to AD-F500 but cheaper: Good all round performance, well adjusted, useful basic and not so basic features	2 head, Dolby B/C/HX Pro, bias adjust	BB	99
Aiwa AD-F500 £160	Average Good	Noise levels are a little higher than usual, but sound quality is otherwise very good - open, explicit and very neutral tonally.	Dolby B/C/HX Pro, cue/review, fine bias, record sensitivity adjust	R	93
Aiwa AD-F810 £200	Good Good	First class budget 3-head machine with a dual capstan transport that really works at reducing the 'fudge' factor	Dolby B, C, HX Pro, bias adjust, track search, variable hdp	BB	99

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CASSETTE DECKS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Aiwa AD-WX616 £160	Poor Poor	Sonically sub-standard twin transport deck which has sensible range of well implemented features, yet which sounds compressed and uneven.	Twin full logic, 1 records, Dolby B/C track search	R	93
Aiwa AD-WX777 £190	Very Good Very Good	Excellent, middle price dual deck with quick side change and a living, breathing sound - though prerecorded tapes sound bright	Twin auto-reverse, one records, Dolby B/C, fine bias	BB	75
Aiwa AD-WX888 £260	Good Good	Inaccurate set-up spoils metal tape operation, but with other tapes the deck works well. This deck offers fine engineering, facilities and sound	Dual auto-reverse twin deck, Dolby B, C and HX Pro	R	75
Akai GX-32 £170	Average Poor	Constrained and smeared sum up this deck well. It has poor bass and treble definition alike, though it proved well aligned for prerecorded cassettes	Dolby B/C, variable bias, headphone out, track search		69
Akai GX-52 £250	Very Good Very Good	Well finished and a pleasure to use, this well specified deck sounds clean and defined with all tape groups, with or without Dolby	Dolby B, C, HX Pro, track locate features	BB	57
Akai GX-65 £300	Average Average	Fine ungimmicky middle ranking deck with simple, purposeful controls, works best with metal tapes. Performance standards fair to good	3-head, dual capstan, Dolby C/HX Pro		87
Akai GX-95 £400	Good Very Good	Well designed and finished cassette deck with features well judged to please the audiophile. The calibration system is simple and effective, and the deck sounds great	Dolby B/C/HX Pro, 3 head, manual tape set-up	R	69
Akai GX-95II £400	Good Very Good	Sharp, clear and articulate sounding deck, with superb performance extending to frequency extremes	3 heads, dual capstans, tape calibration, Dolby B/C/HX Pro	R	99
Akai GX-R35 £200	Average Average	Middling sound quality at best with Dolby B; deteriorates with Dolby C and unsatisfactory anyway with testing material due to loss of low level information	Auto-reverse (optically triggered), Dolby B/C/HX Pro, bias adjust		99
Denon DR-750A £250	Average Average	Workmanlike and simply equipped dual deck which is more appealing on audio grounds than most of its type	Dual transport, Dolby B, C & HX Pro	R	99
Denon DRM-510 £140	Good Average+	An amnesic Dolby switch and lack of timer standby detract from an otherwise strikingly successful deck with a consistently good performance	2 heads, Dolby B/C/HX Pro	R	99
Denon DRM-700A £230	Very Good Very Good	Simple but adequate features, lacks only timer standby. Musically this deck equals the best at this price level despite some clouding of transients with Dolby B.	Dolby B/C/HX Pro, fine bias, 3 heads, record return	BB	93
Denon DRW-650 £200	Average Average	This simply equipped model is a little fiddly to operate at time, partly because of the way the single set of transport keys is assigned. But sound quality is generally workmanlike - good value	Twin transport, Dolby B/C/HX Pro	R	93
Dual 5850RC £230	Poor Average	Average-to-middling deck which does most things well and skates over the more subtle things. Control system is uninspired but easy to master. Overpriced	Dolby C/HX Pro, bias adjust		87
JVC TD-R431 £170	Poor Poor	Modestly specified auto-reverse cassette deck which suffers the usual problems of the breed, to wit unstable, homogenised sound quality	2-head, Dolby B/C/HX Pro, auto reverse		99
JVC TD-V531 £260	Average Average	A simple but potentially Good deck with an excellent transport, let down by poor setting up. With all tapes, sound quality was thin and lacking in both substance and colour	3 heads, dual capstans, Dolby B/C/HX Pro, var bias		99
Kenwood KX-5030 £200	Good Average	confusing mishmash of listening impressions caused by poor set-up afflicting metal tapes and Dolby C in particular. Promising otherwise	2 head, Dolby B/C/HX Pro, auto-bias, track search		99
Kenwood KX-7030 £260	Good Good	Fine, articulate middle price cassette deck whose only (mild) failing with some programme material is a just perceptibly synthetic glaze	3 heads, dual capstans, Dolby B/C/HX Pro, auto bias	R	99
Marantz CP230 £330	Average Average	This is a competitively priced portable recorder though not suited to replay of musicassettes	Dolby B, bias adjust	R	52
Marantz CP430 £400	Average Average	Uniquely flexible and compact package for outside work which at a pinch can double as a domestic cassette deck. dbx is useful for location work; results with Dolby B are acceptable	Portable 3 head, dbx, fine bias, charger/adaptor	R	87
Marantz SD315 £180	Average Average	Sound quality is promising, but somewhat offset by 'shut in' top end. Pitch integrity suspect. Dolby C sound quality and dubbing performance poor	Dolby B/C/HX Pro, twin transports, one rec/play, one play only. Mic input		93
Marantz SD40 £150	Average Very poor	Obstructive aesthetics are offset by apparently good build and sensible features, but sound quality is uneven or worse.	Dolby B/C/HX Pro, fine bias	R	93
Marantz SD50 £230	Good Very Good	Fine, exacting all-rounder offering good stereo, precision and focus. Good with prerecorded tapes too.	Dolby B/C/HX Pro, track & intro search, variable bias etc	R	81
Marantz SD515 £350	Poor Poor +	Good electronic design is let down by mediocre alignment and poor transport stability. Disappointing at the price.	Twin auto-reverse, both transports record, HX Pro, parallel recording		93
Marantz SD60 £350	Good Very Good	A first rate, highly capable deck offering energetic yet refined sound largely due to good electronic design	3-head, Dolby B/C/HX Pro, variable bias & sensitivity	R	81
Memorex SCT-5 £150	Poor Poor	Poor example of a twin cassette deck where everything has been sacrificed on the altar of flexibility	1 rec/play, 1 play only transport, Dolby B/C		87
Nakamichi Cassette Deck 1 £ 700	Good Good	New modernised Nakamichi is still curiously old fashioned in many ways, but offers unusually articulate sound of great insight	Dolby B/C, 3 heads. dual capstans, var azimuth	R	99
Nakamichi Cassette Deck Two £350	Very Good Very Good	Not completely neutral, this deck is assured, dynamic and quick, with abundant detail and some coarseness. Stable transport but rudimentary features accompany fine under the skin engineering	Dolby B/C, manual tape type selection, bias adjust	R	93
Nakamichi RX-202E £600	Good Very Good	Fine, clear and articulate sounding player. Excellent with prerecorded material, but idiosyncratic and sometimes obstructive control	Auto reverse, Dolby B, C, 2 head	R	63
Philips FC870 £250	Average Average	Disappointing at the price, this is a well equipped deck with off-tape monitoring, but a somewhat listless, smeared musical style	Dolby B/C/HX Pro, 3-heads, track/intro search etc		81
Pioneer CT-676 £250	Average Poor	Dull, compressed and hard sounding deck, which is hamstrung by high measured transport flutter. Good points include sophisticated (and accurate) tape alignment	Dolby B/C/HX Pro, auto tape alignment, 3 heads		99
Pioneer CT-900S £500	Good Average	High spec and well built derivative of CT-93, but disappointingly lacklustre sound	Dolby B/C/S/HX Pro, dual capstans, 3 heads, auto alignment		99
Pioneer CT-91a £550	Very Good Very Good	Superb, near state of the art recorder with an excellent dual capstan transport and very capable electronics. At the price, this one is a mould breaker	3-head, tape calibration, Dolby B/C/HX Pro	R	75
Pioneer CT-93 £800	Excellent Excellent	State of the art deck, built like something out of NASA's shuttle, with superb all round performance. Dolby S can muddle ambient information, but increases effective dynamic range	Dolby B/C/S/HX Pro, auto tape align, 3 heads, dual capstans	R	99
Revox B215 £1727	Very Good Very Good	Fine, consistent and solid sound quality, with excellent under the skin engineering and many useful features — but you're also paying for the same	Dolby C/HX Pro, 3 heads, dual capstans, auto tape align	R	87
Revox B215-S £1826	Very Good Very Good	This is a superbly engineered deck with a classically fine performance that almost transcends the stereotypes. Ergonomics are flawed but the user interface is both powerful and flexible	3-head, dual capstan, Dolby B/C/HX Pro, auto calibration	R	75
Revox H1 £1,145	Very good Very good	Bare bones version of B215 is still a sophisticated piece of kit, and lacks for none of the 215's engineering prowess	3 heads, Dolby B/C, auto tape align, semi-auto record level set.		99
SAE C102 £549	Average Good	Looking most unlike a cassette deck designed in the States and proving competitive in its price group. Not sonically that outstanding, however	Real-time counter, track search, Dolby B & C		52
Sansui D-X211HXR £170	Good Good+	Clean, stable and open sounding recording quality distinguishes this player, - and auto-reverse too. A great improvement on earlier mid price Sansui models, and excellent value.	Auto reverse, Dolby B/C/HX Pro, bias adjust	BB	93
Sansui D-X311WR £250	Poor Poor+	Not wholly successful auto-reverse deck which suffers because it has tried to be all things to all people. Lack of clarity is the main limitation	Twin optically triggered auto-reverse, Dolby B, C & HX Pro		99
Sherwood DS-1135C £100	Average Average	Excellent value. There is a low level constant background drone, and Dolby C recordings sound flat and coloured. Elsewhere sound quality exceeds expectations	Dolby B/C/HX Pro	R	87
Sherwood DS-7000R £230	Average Poor	Rough and ready cassette deck in which sound engineering has been sacrificed on the altar of extra selling features, namely three heads for real time off-tape monitoring	3-head Dolby B/C/HX Pro		87

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CASSETTE DECKS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Sony (WMD6C) Pro Walkman £249	Good Very Good	One of the finest sounding cassette decks on the market today. A mandatory Best Buy, which also fits in your pocket	Dolby B, & C	BB	60
Sony K870ES £350	Average+ Average+	Good but not outstanding deck which proved slightly disappointing on audition. This model is no standard setter	3 heads, dual capstan transport, Dolby B/C/HX Pro, tape calibration		99
Sony TC-K520 £170	Average Good	Fine, assured and detailed performer with a very well designed and straightforward user interface	Dolby B/C/HX Pro, variable bias, display on/off	BB	87
Sony TC-K570 £200	Good Average+	Good if slightly untransparent sounding recorder, comfortable with all noise reduction circuits and all tape groups	3 heads, Dolby B/C/HX Pro, bias adjust	R	99
Teac V-5000 £300	Average+ Good-	Fine middle ranking heavyweight with blemish free overall performance, beaten only on subtleties by the best at the price	3 heads, dual capstans, bias/sensitivity adjust, Dolby B/C/HX Pro		99
Teac V-7000 £400	Good Good	Intrinsically sharp, clear and solid sound spoiled by exaggerated detail with prerecorded material and losses imposed by Dolby circuits	3 heads, quartz locked dual capstans, tape align, Dolby B/C/HX Pro		99
Technics RS-B965 £350	Very Good Very Good	Messy control layout, but ultra capable deck with clear electronics and excellent headroom, low noise, an ultra-stable transport - and first rate sound quality.	3 head, dual capstan, Dolby B/C/HX Pro, dbx, assisted tape alignment.	R	93
Yamaha KX-250 £150	Good Good	Excellent if somewhat fiddly deck with all mod cons. Play trim helps bring recalcitrant tapes back into line. Refined, expressive sound quality and stable transport	Dolby B/C/HX Pro, Intro Scan, Play Trim	BB	93
Yamaha KX-330 £180	Average Good	Cramped control panel but a strong, dynamic and comparatively stable performance distinguish this strong middle-price deck	Dolby C/HX Pro, optional remote control	R	87
Yamaha KX-530 £230	Good Good	Excellent all-rounder that does most things at least competently and many things well. One of the best middle price decks	Dolby C/HX Pro, 3 motors, optional remote control	BB	87
Yamaha KX-650 £300	Average+ Good	Fine audio manners, especially in the midband and treble, mark this high class deck out from the crowd	3 heads, dual capstans, Dolby B/C/HX Pro, play trim, bias adjust	R	99
Yamaha KX-930 £400	Good Average	Worthy but ultimately slightly disappointing mixture of fussy ergonomics and tidy but cluttered sonics	3 heads, dual capstans, Dolby C/HX Pro, remote control		87

CD PLAYERS

Now nearly a decade old, this all digital music source is well established despite high disc prices and the opposition of many hi-fi enthusiasts. Compact Disc's strengths over conventional vinyl are complete freedom from surface noise, ease of use, and more robust software. Remote control is just about standard on all new players.

However, many vinyl enthusiasts find CDs

sound less involving than top quality vinyl.

Prices average out at a little over £200, although entry level models are now available for little more than £100. Even the most basic models can sound very good indeed and employ state of the art decoding chips and the most useful play features. Extra money can buy remote volume control, audio 'tweaks', plus improved build and component quality control.

Digital outputs facilitate an easy upgrade path.

Machines can be split into bitstream and multi-bit with each school having its adherents. Bitstream is the newer technology and will probably win in the end, although the development time spent on multi-bit systems means that excellent results can still be obtained.

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Acoustic Research CD-06SE £450	Average- Average-	Basic Philips machine with beefed-up chassis and a revised analogue board. Distortion is higher than normal while the sound lacks both immediacy and clarity.	Remote control, programming but no direct track access, 16bit 4x		95
Acoustic Research CD-07 £300	Good Good	AR's first Bit Stream CD player relies heavily on Rotel know-how to produce a smooth, detailed but undemanding sound	Few features on player, remote, dig o/p. SAA7321 PDM DAC	R	100
Aiwa XC-700 £180	Good+ Very Good	Generously equipped player that harbours a top Philips' Bit Stream DAC. Offers a characteristically smooth and effortless 'bitstream sound'. Exceptional value	Remote control plus index skip, midship transport and 7350 PDM DAC	BB	95
Aiwa XC-900 £210	Good + Good -	The loss of transparency and general awkwardness of this player comes as a surprise after the XC-700. Extra features have taken their toll	Remote control with variable o/p, midship transport, 7350 PDM DAC	R	100
Akai CD-52 £249	Good Good	A nice surprise from Akai, genuinely good sound from this mid-priced model. Better linearity will help further	Remote, digital output, headphone socket	BB	64
Akai CD-55 £230	Good Average -	Budget model which fails to compare with the CD52	Remote, hdph, Good programming		83
Akai CD-62 £330	Average Very Good	Looks, build quality and the technical specification are right up to date. As it stands it sounds very good but if the indifferent lab performance is improved, it would probably sound even better	Remote, programme, hdph, comprehensive display etc	BB	70
Akai CD-73 £450	Good Average	A little uneven musically, the Akai tends to smother fine detail, but has first class dynamics and stereo imagery. Worth auditioning	Track entry keypad remote, menu display (switchable)		62
Akai CD-93 £700	Good Very Good	Undoubtedly a CD player of real class in build, presentation, lab performance and sound quality, but also a shade expensive for formal Recommendation - though that's not to dissuade lovers of black lacquer wood finish	Track entry remote, menu display etc.		58
Arcam Alpha £420	Very Good Very Good	Arcam's new star, its best CD player yet and great value	Remote, etc, coax dig. out	BB	83
Arcam Delta 70.3 £650	Good Good+	Latest in a line of Delta 70 CD players and one that offers a distinctly rugged, beefy sound. Plenty of power behind individual instruments but lacks a feeling of involvement	Remote control, display dimmer, variable and dig outputs. 7350 PDM		95
Ariston CD1 £400	Good Good	Easy on the ear compact disc for those who like their music Radio 2 flavoured. And it looks good	digital output, remote control	R	87
Ariston Maxim CD2 £550	Good+ Good+	Yet another re-worked Philips player with chunky alloy casework and sophisticated analogue stage. Narrowly escaped a recommendation with its dynamic and purposeful sound. Still a hint of graininess through the treble	Remote control, coax digital output. 16bit 4x chipset		95
Cambridge Audio CD3 £649	Poor Good +	Unique internal configuration gives the CD3 a fluid and detailed sound falling off at the frequency extremes. The controls and displays are primitive	Optical/electrical digital out, remote control		87
Carver TL-3100 £340	Average Average -	The sound quality did not live up to the excellent fascia. Carver's DTL did not aid the indifferent sound	DTL sound shaping, usual facilities, remote, memory		76
Carver TL-3220 £495	Good Average	A lightweight player with primitive display. We thought it sounded rather sparse and dry, and though Carver's DTL feature certainly fleshed-out the bass it also softened the stereo focus	Remote control with volume keys, 'Digital Time Lens', 18bit 8x		95
Carver TL-3300 £595	Good + Poor	Carver needs to listen critically to CD sounds; in our opinion. DTL does not improve the recipe	DTL, remote, programming, digital output		83
CEC 880CD £230	Poor Average	The dynamic and spritely sound of this machine is gratifying in the light of its primitive design but is otherwise poor value	Remote control, direct track access, dig o/p, hybrid PWM DAC		100
Denon DCD-1460 £400	Good+ Average+	Here's a player that benefits from solid casework and decent features yet the overly complex electronics knock the stuffing from its sound	Remote control, volume, index search. 18+2-bit DACs		100
Denon DCD-2560 £550	Very Good Good	Beautifully built and, once again, generously equipped yet with a sound that's decidedly sluggish or reserved, particularly through the bass. Vocals are more forward but can sound a little glassy	Remote, pitch, tape edit features, opt/coax digital output, 20bit 16x.		95
Denon DCD-860 £250	Average+ Good+	This is a well designed and generously equipped budget player that offers a very spacious and appealing sound. There's a hint of treble emphasis but it still sounds great at high volumes!	Remote, pitch and full tape edit facilities. 18bit 8x.	R	95

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CD PLAYERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Denon DCD-960 £300	Good + Average	A fine feature package with good lab results, but unfortunately an unexceptional sound quality	Remote inc vol, hdph, keypad, well featured		88
Ferguson CD007 £130	Good Average	The cheapest recommendation in the test group; don't expect the earth but the value is good	Manual, digital output, headphone R socket		64
Ferguson CD008 £150	Average Average	Not as strong as its relatives, sample fault perhaps? Though performance is fair enough overall	Remote, midi digital output, 2x O/s, timeshare 16 bit		64
Goodmans GCD-435 £140	Poor Average -	Goodmans has the power to source with more care than this, music centre quality!	multibit, remote, basic facilities		88
Harman Kardon HD7450 £300	Good Average	A very stylish machine but one that is let down by its aggressive and 'dirty' treble quality which pierces through most types of music. Weak bass resolution undermines the 'roots' of the player	Remote control but no headphone socket. MASH/PWM bitstream		95
Harman Kardon HD7500II £350	Good+ Good+	An update of the original HD7500 but featuring superior analogue electronics to the HD7450. Tonal integration is much improved, packed with detail that's expressed with enthusiasm.	Remote, variable, digital and headphone outputs MASH/PWM	R	95
Harman Kardon HD7600II £429	Good+ Average+	Based on the HD7500II but with a motorised volume control and extra-heavy casework. Either way it lacks the transparency and sparkle of the cheaper machine	Remote, variable and digital outputs MASH/PWM DAC		100
Harman Kardon HK7300 £200	Average Average -	Budget low bit technology, does not deliver enough for a recommendation	No remote, no digital out; basic control features		83
JVC XL-V231 £149	Excellent Average -	Text book lab result but below par sound, nice and boring. Must be some potential here	Remote, hdph (fixed), JVC 1-bit PFM		88
JVC XL-V241 £160	Good Average	Even with its mkII PEM DAC this new machine sounds pleasant but not especially interesting. Stereo imaging is a trifle suspect	Remote control, slim centralised drawer, PEM bitstream DAC		100
JVC XL-Z1011 £520	Very Good Good+	JVC's current flagship combines old K2 technology with PEM bitstream to deliver a full, beefy and engagingly dynamic sound	Remote control, variable and digital outputs, PEM bitstream	R	100
JVC XL-Z431 £200	Very Good Average-	This is a player that started life off the back of the successful XL-V231 but whose performance fails to come up to scratch. The sound is weak and uninspiring - poor use of JVC's PEM DAC.	Remote operation, motorised volume + tape edit. PEM bitstream		95
Kenwood DP-4030 £180	Good+ Good+	Kenwood's first and cheapest bitstream player enjoys a deceptively detailed and refined sound but one that is mildly veiled right across the spectrum. Excellent value nonetheless.	Remote, variable and opt digital outputs. NPC bitstream DAC	R	95
Kenwood DP-5030 £200	Good+ Good+	This looks like the DP-4030 but has more in common with the DP-7030 inside. Either way its neutral, uncluttered and intimately detailed sound is better than both	Remote control, motorised volume, R disc file. Sony PLM DAC.		100
Kenwood DP-7030 £300	Good+ Good+	By adapting established Sony bitstream technology Kenwood has moulded its own exceptionally smooth and polite sound. Very nicely built machine with midship transport mechanism.	Remote, index scan, variable and optical outputs. Sony PLM bitstream	R	95
Kenwood L-10000 £830	Very Good Good	A beautifully constructed and very stylish player that really only gives off its best when teamed-up in balanced-mode with Kenwood's matching pre/power combination	Remote control, balanced XLR's, 16-bit integrating DACs		100
Luxman D105u £699	Average Average	Visible valves are essentially for show in this rather ordinary player - both sound and lab	"valves", remote inc vol, hdph, well equipped		88
Marantz CD-52 £200	Average+ Good+	Hardly the most neutral player on the planet but its rich, full and very generous sound cannot fail but warm the coldest of hearts	Remote control, FTS and dig outputs. SAA7350 PDM DAC	BB	100
Marantz CD-62 £300	Good Good-	Basically this is a Philips CD850II with Signetics op-amps all plonked into an old CD-50 chassis. Something of a range-filler	Remote control, index, 8-step volume and FTS. SAA7350 PDM	R	100
Marantz CD-80 £560	Very Good Good	A dynamic and bold sound from a machine that is equally bold in appearance. It betrays no fear of the most thundering crescendos yet can sound a little hard or glassy with pop CD's.	Remote, motorised volume + FTS programming, 16bit 4x.		95

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CD PLAYERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Memorex CD1650 £200	Poor Poor	An overpriced music entre player. Surely the giant Tandy corp. can get a better standard than this?	remote, keypad, multi bit, midi		88
Meridian 206B £995	Excellent Excellent	What a stunner! Audiophile quality from the reference one box CD player, and at a most realistic price	Differential bitstream, keypad remote, prgming	R	88
Meridian 208 £1,550	Excellent Excellent	State of the art CD sound combined with a decent preamp and full remote control	Hdph + remote level. Programming, R phase invert, various outputs		83
Micro Seiki CD-M100 £5541	Very Good Good	One of the hernia inducing bricks of hi-fi, the Micro is extravagantly styled, finished and built. The good lab performance led to an 'only good' sonic display when the price demanded excellent	Balanced output, remote, display blanking		72
Micromega Logic £500	Good- Good	A rather expensive version of Philips CD624 with new op-amps and CD tray. Still, it does sound rather meatier, better integrated and more purposeful	Remote control, no FTS but switchable digital output, SAA7321		100
NAD 5425 £200	Very Good Very Good	Not much in the way of facilities on offer but a sound that is both wonderfully open, detailed and appealing. This is a very communicative player that sounds positive without being brash	Worthless remote control, track skip/scan. MASH/PWM bitstream DAC		95
NAD 5440 £300	Very Good Good+	The 'no compromise' version of NAD's 5425 but still rather lacking in facilities. Its sound is smoother and richer than the 5425, preferring to seduce with subtlety rather than have you perch on the edge of your seat	Remote with direct track access, variable output, MASH/PWM	R	95
Nakamichi CD Player 2 £625	Average+ Average+	This may look like a CD Player 4 but features a special transport able to store 7 CD's with one in play. Nevertheless its digital electronics are flawed and its sound powerful but blunt	Music bank, remote, volume control, digital o/p, 18 bit DACs		100
Nakamichi CD Player 4 £300	Average+ Good-	Attractively styled but suffers high-ish distortion for a modern CD player. Best suited to up-beat pop rather than complex classical works which seem to lack focus and secure soundstaging	Remote with track access, coax dig. output. 18bit 8x		95
Nakamichi OMS-5EII £1500	Good + Very Good	"... delivers near state of the art performance and build quality in a deliberately starkly functional package, but at a very high price. ..."	Skip and scan, simple track programming, I		51
Nakamichi OMS-7EII £2000	Good + Good	The only serious criticism here is of the price. And in our opinion you can get better sound quality for less elsewhere in Nakamichi's range	10 digit track entry programming, hdph		51
Philips CD618 £170	Good Good	Cheapest of Philips bitstreamers and quite possibly the best with its excellent definition, punch and sparkle	Remote control, shuffle play, variable headphone, SAA7321 PDM	R	100
Philips CD624 £200	Good Good-	Philips' cheapest Bit Stream machine is still equipped with a vast array of features. Sounds pretty civilised too but lacks the crispness and freedom necessary to set it apart.	Remote, FTS programming, digital output. SAA7321 Bit Stream DAC		95
Philips CD634 £250	Good Good-	The all-singing all-dancing version of Philips' budget Bit Stream player and one that seems better able to cope with the pizzaz and dynamics of a decent recording. Nevertheless it still lacks the lucidity and conviction of the best at this price.	Remote, FTS + Title + personal programming. SAA7321 Bit Stream		95
Philips CD850mkII £400	Very Good Good	This looks just like the original but sounds completely different, trading a little transparency and pizzaz for an altogether smoother but slightly less memorable performance	Remote control, 2 FTS, personal presets. SAA7350 Bit Stream DAC	R	100
Philips CDV185 £350	Average + Average	Hard to value with the video singles facility but it all works well enough for a recommendation	Video singles + CD scart + digital out etc	R	76
Pioneer PD-7700 £250	Good+ Good+	A busy-looking player with an upside-down transport yet one that offers a very tight, confident and dynamic sound. Bubbly and entertaining but still very refined	Remote control, turntable drive mechanism. 1-bit PDM DAC	R	100
Pioneer PD-8700 £300	Good+ Very Good	A pair of PDM DACs builds upon the sound of the '7700, crafting a generous soundstage populated with big-hearted and thoroughly captivating musical images	As 7700 plus index skip, display off and motorised volume. 1-bit	BB	100
Pioneer PD-91 £900	Excellent Excellent	Close to state of the art in nearly all areas - soundstaging, clarity and simple lack of artificiality. A well made and sophisticated player	Track entry remote, calendar display	R	64
Pioneer PD-93 £1430	Very Good Good+	The extremely civil, understated feel of its music contrasts markedly with the over-engineered construction of this unit. It will not offend anyone but then neither will it spark much excitement	Remote with fader and index facilities. Two dig o/p's. 20bit 8x		95
Proton AC-120 £180	Average Average -	Fine styling, low price but barely average performance	15 track memory, simple design, remote, hdph		76
Revox B126 £649	Very Good Good	Made in Switzerland so the build quality and technical performance is high, but then so is the price and the sound quality is only good	Programming, Revox system compatible		70
Revox B226S £840	Good Average	Top quality build and finish for the Revox system enthusiast. For high value sound look elsewhere	Remote vol, hdph, 19 track memory, digital op		76
Rotel RCD-965BX £300	Average+ Excellent	Two years on and the 865's replacement turns out to be an exceptionally refined bitstreamer: transparent, exquisitely detailed and powerfully emotive. A landmark player	Remote control, index skip, digital out. SAA7323 PDM DAC	BB	100
SAE D102 £700	Good Good	Considering the high price of this player, most of the innards seem fairly prosaic. Sound quality and lab performance are both respectable enough, but hardly justify the price premium involved	Remote (inc volume), skip, scan etc.		58
Sansui CD-X311mkII £250	Good+ Good	Sansui's mid-ranked player uses Technics' technology but provides a warm and cuddly sound that's atypical of the breed	Remote control, variable and digital out, MASH/PWM DAC	R	100
Sansui CD-X711 £600	Excellent Very Good	Luxury features, finish and sound from this classy Sansui; no excuses required here	Hdph + vol, remote full programming	R	83
Sharp DX150 £129	Average Average	This is one oversampled player which is rather outclassed for technical and sonic merit by the vast majority of the competition. Pretty enough but would you want to put discs in it?	Programmable, skip, search, repeat		70
Sharp DX750 £179	Average Average	It has a remote control but it's too like the 150 which is rather outclassed for technical and sonic merit by the vast majority of the competition	Remote, programmable, skip, search, repeat		70
Sony CDP-591 £160	Good+ Average+	Tons of features at a highly affordable price but let down by its lacklustre if inoffensive sound quality. The sound of these new Sony players lacks the grip and purpose of the last generation	Remote control, variable and optical digital out. PLM bitstream		100
Sony CDP-991 £230	Good+ Average+	Another well-equipped and well-specified machine and one that can sound very up-beat and detailed with simple material. Tends to loose its way with complex stuff, however	Remote control, Custom File programming, variable out. PLM DAC		100
Sony CDP-X333ES £400	Very Good Good-	This beautifully built player has a very tidy and well-ordered style of music-making, but in the long run it lacks the ability both to excite and involve	Remote control, Custom File programming. Complementary PLM		100
Sony CDP-X77ES £1000	Excellent Good+	Rather like Pioneer's PD-93 this flagship player is beautifully put together but simply lacks the thrill or conviction of cheaper and perhaps more ragged-sounding machines. Still, this sample was well-used from demonstration stock...	Remote, everything but Custom File titling. Complementary PLM DAC		95
Stax Quattro £2995	Very Good Very Good	Now in mkII guise this substantial player recreated exceptionally strong and convincing bass lines together with a beguilingly musical midband	18-bit DACs, 20-track memory, full IR remote, variable o/p	R	72
Technics SL-PG200A £160	Good+ Good+	This season's version of last season's favourite (the SL-P277A) offers extra features and a similarly punchy, dynamic and up-beat sound. All this plus an uncommon poise - Best Buy	Remote control, random play, variable out, MASH/PWM bitstream	BB	100
Technics SL-PS900 £350	Very Good Good-	Just about the quietest transport in existence and a sound that is equally unobtrusive, polite and refined. There's plenty of detail too but the overall result won't set your pulse racing	Huge remote control, function manager MASH/PWM DAC		100
Wadia WT-2000/Digimaster 2000 E5614/E6641 £1095	n/a Very Good	Very high grade player which provides state of the art in believable music making from CD, and promises a degree of upgradeability	Transport/multi bit DAC - 32, 44.1, 48kHz o/s		Coll. '90
Woodside WS2 £1095	Good Good+	Prompted a mixed reaction on audition, responding well to our jazz and classical selection but sounding bright and grainy with the pop CD's. RF emission is very high	Remote control, display defeat, variable and digital outputs, 16bit 4x		95
Yamaha CDX-450 £170	Average+ Good	A contentious player this and one that prompted a range of reactions from enthusiasm to disinterest among our listeners. It could prove too safe-sounding but worth a try at the price.	Remote control, track access, variable out. 18-bit hybrid DAC	R	100
Yamaha CDX-750 £250	Good Average+	A sleek machine that can sound rich and vibrant with simple material but seems to lack expressiveness and subtlety when dealing with busier, more complex passages	Remote control, variable and digital out, LC display. PDM DAC		100

The Directory

CD TRANSPORTS AND DACS

A CD player can be split into two basic components, the mechanism which reads the information from the disc, known as the transport, and the device which turns the digital numbers contained on the disc into the music that comes out of your speakers, this device being referred to as a digital to analogue convertor or DAC. Although at the lower end of the market both of these are contained in a single box, at the top end of the market two box machines consisting of a CD transport and a separate DAC become more common.

Although many of these units will be purchased as two box machines, which are generally considered to sound better than a one box equivalent, a DAC can also be used to upgrade an existing CD player. A good example is where an early machine with a satisfactory drive unit but a rather dated DAC can be brought up to the latest spec by the addition of a new DAC.

When upgrading an existing player best results are usually obtained using the electrical digital output rather than optical, and obviously

to be upgradeable your CD player must have a digital output in the first place.

The choice of interconnect is crucial in linking drives and DACs and conventional interconnects used for analogue signals should be avoided, a dedicated 75ohm digital cable will give far better results.

Mixing and matching transports and DACs from different manufacturers can be a bit of a lottery and readers are referred to the full reviews where this subject is discussed in more detail.

CD TRANSPORTS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Arcam Delta 170.2 £620	Very Good Good	An upgraded Delta transport, it sounds different but not really better. More research is required here	Transport only, display off, usual programming		88
Kenwood DP-X9010 £500	Average Average +	Compromised by jitter, RF noise and poor clock selection this transport generally encourages a dynamic but bright and edgy sound with most DACs	CD transport, optical + coax outputs, Class 2		96
Marantz CD-95DR £1500	Very Good Good	At its best with Philips-based DACs, this transport sounds confident if not totally pure, sparkling or fresh	CD transport, optical + coax digital, Class 1		96
Meridian 200 £895	Very Good Very Good	Broadly compatible with most DACs and offering a light, fresh and very bubbly sound that is both natural, engaging and unfatiguing	CD transport, optical + coax outputs, Class 1	R	96
Meridian 602 £1,750	Very Good Good	This dedicated CD transport teams-up most successfully with the 606 DAC. Otherwise it lacks the life and pizzaz of the 200	CD transport, optical + coax outputs, Class 1		96
Philips CDD882 £500	Good Good	A butchered CD880 CD player-cum-CD transport that pairs up well with most Philips-based DACs. Dynamic and lively but can also sound a little mechanical	CD transport, optical + coax outputs, Class 1		96
TEAC P-10 £1499	Good Very Good	A chunkier and altogether more successful transport than the P-500 with an especially beefy and compelling sound. TEAC's best	CD transport, coax + optical outputs, Class 1	R	96
TEAC P-2 £2849	Very Good Good	TEAC's flagship CD transport is beautifully styled and constructed but its sound is bleached and generally less inspiring than that of the P-10	CD transport, coax + optical outputs, Class 1		96
TEAC P-500 £649	Good Good +	Provides a smooth and very sympathetic sound with most DACs yet is also rather vague, lacking the crispness and resolution of its peers	CD transport, coaxial and optical outputs, Class 2	R	96
Technics SL-PA10 £470	Good + Good	Built to partner the SU-MA10 upmarket integrated amp/DAC, this transport has the unusual limitation of only optical output. Reassuringly solid and more immune to vibration than most	CD transport, optical output only, remote		88
Wadia WT2000 £5614	Very Good Good +	Based on TEAC's P-2 with outboard mains transformers, active digital output and solid alloy casework. Dynamic and crisp sound best realised with Wadia DACs, otherwise less impressive	CD transport, AT&T opt + direct -coupled coax outputs, Class 1		96
Wadia WT3200 £1800	Excellent Very Good	Based on Marantz's CD-95DR with new casework, active digital output and revised grounding. Very clean, clear and authoritative sound with Wadia and Philips-based DACs	CD transport, AT&T opt + direct -coupled coax outputs, Class 1	R	96

DIGITAL TO ANALOGUE CONVERTORS (DACs)

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Arcam Black Box 2 £260	Very Good Very Good	An upgraded version of the old BB1 with more inputs and improved sound quality	Optical and wired inputs	BB	76
Arcam Black Box 3 £360	Good + Very Good	Top of a series of three decoders it can offer a high sonic standard with top class transports	Bitsream, auto input switching,	R	88
Audio Alchemy Digital Decoding Engine V1.0 £376	Good Very Good	A very sweet and seductive sounding unit that gives good results with a wide range of CD players/transports	Coaxial and optical inputs, phase invert, Bit Stream DAC	BB	101
Audio Research DAC1-20 £3898	Very Good Good	This expensive DAC works surprisingly well with Meridian's cheaper 200 transport, an impressively weighty and engaging combo that proved entertaining on audition.	BNC, Toslink and AT&T optical inputs, phase invert, 20-bit DACs		103
Audiolab 8000DAC £695	Very Good Good	Needs to be used with a genuine Class 1 digital drive. At its best with the Wadia WT3200 where it sounds vivid and alive. Otherwise can sound a little antiseptic.	Coax and opt inputs, phase invert, crystal lock, Bit Stream		103
Deltec Bigger Bit £650 + £98	Good Very Good	Partnered with either TEAC P-10 or Meridian 200 transports, the Bigger Bit delivers a very taut and dynamic sound, bathed in an open acoustic. Deltec's RF mains filter is a must.	Coax and opt. inputs, Deltran sync facility, DAC7 Bit Stream	R	103
Deltec Little Bit (Optical) £400	Very Good Good	Our sample suffered from radiated RF interference but new LB's are now cured. Works especially well with Meridian's 200 transport but does require the services of Deltec's 'Power' mains filter.	Coaxial and optical inputs, SAA7350 Bit Stream DAC		101
Deltec PDM1 £500	Average Very Good	A no frills audiophile bitstream converter at an affordable price	Coax-in, special cable and mains filter options	R	83
Deltec PDM1 Series 3 £1195 + £196	Very Good Good +	Hailed as a budget version of the PDM2, it bears technical comparison with both the PDM2 and Bigger Bit but - in terms of sound quality - is no great advance on its cheaper relative.	Coax and opt inputs, two-box construction, DAC7 Bit Stream		103
Deltec PDM2 £2000	Excellent Excellent	State-of-the-art technical performance with a pristine sound to match. Repertoire includes a solid, invert, two-box DAC7	Coaxial and optical inputs, phase	R	101
Forte Audio Model 50 £950	Good Very Good	The first American DAC7 design and one that offers a typically big and full-blooded sound, infiltrated by a slightly euphonic quality but never hard or gritty.	2 Coax and 2 optical inputs, DAC7 Bit Stream technology	R	103
Kelvin PDM DAC £200	Average + Average +	Don't disregard this DAC-in-a-matchbox for though it can sound a little unconvincing it is capable of developing a surprisingly lyrical and natural sound with the right transport.	Single coaxial input, low analogue outputs, SAA7320	R	103
Meridian 203 DAC7 £510	Good Very Good	This is another broadly compatible DAC that's free of fatiguing nasties yet remains bubbly and exciting. If you find the 606 too sober then the 203 will undoubtedly suit	Coaxial and optical inputs, single-box DAC7 Bit Stream	R	101
Meridian 606 DAC7 £1220	Very Good Good	Extra cash buys you a better standard of construction and finish over the 203 yet by refining its sound further Meridian have also tempered its vibrancy and 'life'. Fickle with other transports	Two coaxial and optical inputs, phase invert, DAC7 chipset		101
Micromega Duo BSII £500	Average Good	This DAC has a tendency to sound light, airy and 'fast' but it can also become a little hard or - fatiguing with some digital outputs. At its best with Meridian's 200	Coaxial and optical inputs, phase invert, SAA7321 Bit Stream		101
PS Audio Superlink £1498	Average Good -	Another transport-fussy DAC that, once again, does the business with Meridian's 200 but can sound bloated, smeared and even vaguely electronic with standard 75ohm digital outputs.	Touch-sensitive coax and optical inputs, phase invert, 18-bit		103
Proceed PDP2 £1595	Average Good -	The PDP2 has a wobbly input impedance that's suited to specific drives, ie Meridian 200, or Proceed's own. At its best expressive and enticing, otherwise it can seem gutless and smeared.	Coax and XLR inputs, balanced outputs, 18-bit DACs		103
Stax DAC-Talent £1400	Excellent Good +	Natural, refined and never over-zealous, the DAC Talent is also capable of sounding very spicy and dynamic. Capable of wielding a maturing influence over a light or bright-sounding system	Coaxial and optical inputs, phase invert, mute, 20-bit DACs		101
TEAC D-500 £399	Good + Good +	An unusual combination of NPC oversampling filter and no less than two Philips' DACs. Its reliable 75ohm input infers broad compatibility. A dynamic and 'interesting' sound	Coax and optical inputs, complementary 16-bit DACs.	R	103

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DIGITAL TO ANALOGUE CONVERTORS (DACs)

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Threshold DAC 1/e £3150	Very Good	The DAC 1/e can sound beautifully detailed with a marvellous sense of scale and sharp, solid images. Its unpredictable behaviour with unknown transports precludes recommendation.	Coax and opt inputs, balanced outputs, phase invert, MASH/PWM DA		103
Wadia DigiMaster X-32 £2000	Average - Good -	Wadia's freaky input circuit gives unpredictable results with non-Wadia transports. Otherwise it can sound bold, dynamic and crisp but lacks the warmth to bind its music together	BNC and optical (TosLink and HP) inputs, 18-bit 32x		101
Wadia DigiMaster X-64.4 £5000	Average Good*	The X-64.4 positively buzzed with vibrant, sharply-etched detail. An exciting sound	BNC + Toslink/AT&T optical inputs, phase invert, 18-bit 64x		101
Woodside DAC 1 £895	Good Good	Fine but slightly dated and costly package in performance terms - but flexible, musical and t well built	2 electrical + optical i/p. tape ou		87
Woodside DAC2 £510	Good Good +	Based on Woodside's earlier 16-bit CD player and offering a similarly sharp and dynamic sound, all the more captivating for its lack of graininess and 'tizz'. Should be a reliable upgrade	BNC coaxial input (no optical), 16-bit 4x	R	101

DIGITAL AUDIO TAPE

DAT, or digital audio tape, has been on the market for quite some time now but has never really 'made it' as a consumer medium, probably due to the fact that very little prerecorded software has been made available.

In the last year or so it has begun to carve itself a niche at the top end of the market replacing reel to reel tape recorders as the audiophile's tape based medium.

The DAT standard specifies a 48kHz sampling rate, which is higher than CD, so direct copying in the digital domain is only possible on those machines with dual sampling frequencies, ie 48kHz and 44.1kHz. Some machines also record at 32kHz to give a longer recording time for a given length of tape.

To try and get around the copying problem many machines incorporate SCMS, the Serial

Copy Management System, a device which enables you to record from a CD but not to 'clone' one digital tape from another.

Portable machines are now entering the market but make sure the price you are quoted includes an analogue to digital convertor, with some portables these have to be purchased separately and increase the price considerably.

DAT

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Aiwa XD-S1100 £550	Poor Average -	A muddled fascia detracts from the appeal of this inexpensive deck, but the real no no is a significant loss of the finer virtues: detail, imagery etc	SCMS, analogue, coaxial & optical in/outputs, full subcode editing		99
Aiwa XD-S260 £500	Poor Poor	Unlovely sounding deck lacks weight, clarity and presence. Low pricing and mini dimensions excuse many sins however	SCMS, optical/coaxial and analogue in, optical and analogue out		99
Denon DTR-2000 £800	Good Very Good	Not cheap, but first rate DAT recorder, good to excellent fidelity in all modes, with a slightly cool detached quality when differences are detectable.	Digital LP/digital & analogue SP record/play, LP analogue play only, fade, fine cueing, remote control.	R	93
Kenwood DX-7 £500/£150	n/a Average	Sound quality is pretty fair, but a little rougher than the best of the breed. Controls are good, the display however is poor - and most users will require the accessory pack	AC powered recorder, no analogue LP mode. Optional accessory packs adds battery/ADC & case		94 Supp.
Kenwood DX-7030 £700	Average Average-	Bland sounding deck that lacks low level clarity and imaging. No analogue LP mode. Build quality is good however and ease of use ranks highly	SCMS Remote control, stand-alone DAC facility, analogue/optical/coaxial in/out		99
Luxman KD-117 £1499	Good Good	Slightly soggy, earth-bound sound quality, this model trails the other DAT decks tested so far	Two analogue inputs, remote twin address		63
Sony DTC-1000ES £1299	Very Good Very Good	Only available from professional outlets. Fine, consistent performer with accomplished tape handling and good build quality	Standard track ID and search, remote	R	63
Sony DTC-55ES £550	Very Good Good	Broadly comparable to a middle ranking CD player sonically, the Sony is particularly well equipped and well priced.	DAT with all record modes, inc LP (analogue) record	R	93
Sony DTC-M100 £799	Very Good Very Good	Only available from professional outlets. Clean clear sounding second generation model with most of the features and sound of the DTC-1000ES	Midi-width, alpha-numeric display, remote, optical/interfaces	R	63
Sony TCD-D3 £500	n/a Very Good	Compact, well equipped, easy to use and excellent sound, it undercuts rivals by a clear £100 At the time of writing, this model represents the state of the art, and beats all comers.	DAT recorder, detachable rechargeable power pack, LP/SP	BB	94 Supp.

EQUIPMENT SUPPORTS

It's becoming more and more apparent that all the components in a hi-fi system benefit from being placed on the right kind of support. It is already acknowledged that performance of electro-mechanical transducers, such as turntables and loudspeakers, can be greatly improved by using highly rigid supports. This notion has been expanded to include electronics such as amplifiers and compact disc players, and inevitably a broad range of stands and supports have been produced to cater for this requirement.

With loudspeaker stands there seems to be two broad schools of design. The most common

is the open frame type which uses square section steel tubing (usually less than an inch square) made up to form a tripod or quadropod stand usually fitted with spikes top and bottom to ensure good coupling to both floor and cabinet. However, for reasons of domestic harmony this latter option is often not pursued as eagerly as perhaps it should be.

The alternative approach is to use mass. Larger section (approximately 3 inch x 2 inch) tubing is welded between square top and bottom plates and filled with sand and/or lead shot. Again, this type uses spikes at the base but Blu-

lack or the like for coupling with the cabinet.

Equipment supports generally place isolation quite high on the list of priorities and usually use a lightweight steel frame to support an MDF platform. Once again spikes are used to minimise contact with the platform and ensure good coupling to the floor. Minimising weight without compromising rigidity seems to be the aim with turntable supports but those designed for electronics often employ some form of damping to kill vibration, sometimes in the form of mass.

EQUIPMENT SUPPORTS - COMPONENTS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE (H x W x D)	VALUE	ISSUE
Alphason R444 £120	Rack Good	A heavyweight structure with stressed MDF shelves, ideally suited to the Sonata turntable	82 x 60 x 39.5cm	R	83
Audioquest Sorbothane Feet £40 for four	Feet Good	These large gumdrops are very useful for damping vibrations in amplifiers and especially CD players.	6.5 x 2.5cm (circular)	R	57
Cornflake TCS6 £60	Shelf Good	A squat and rigid frame supports a Medite top board with four adjustable spikes, better suited to suspended sub-chassis turntables.	43 x 23 x 33cm		83 Supp.
Foundation Stable Table £100 (with Supe	Table Good	Similar to Stand Design's table though less well finished and certainly less stable	64 x 46.5 x 36cm		58
Origin Live Skyline Super £100	Table Good	An asymmetric table that helps provide a quick, lucid and solid sound with most decks	41 x 50 x 40cm	R	83
Roksan Equipment Table £169	Rack Good	An upgradable/expandable system suited to Roksan's Xerxes if not other competing turntables	65 x 52 x 38cm		58

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EQUIPMENT SUPPORTS - COMPONENTS

■ MODEL ■ PRICE	■ LAB ■ SOUND	■ COMMENTS	■ SIZE (H x W x D)	■ VALUE	■ ISSUE
Sound Organisation Table £55	Table Very Good	A deceptively simple structure that just happens to be engineered in a thoughtful, and ultimately successful manner.	37 x 45 x 35cm	BB	57
Sound Organisation Wall Stand £40	Shelf Very Good	The first of its ilk and still amongst the best, this simple framework represents a vast improvement over standard furniture shelves.	27.5 x 43 x 35cm	BB	57
Sound Organisation 2022 £97	Table Excellent	A small but costly table made from thin steel tubing. Suited to the LP12 but not other decks	49 x 45.5 x 36cm		58
Stand Design Duplex £75	Table Very Good	Well made and nicely finished, this table is broadly compatible with most heavy turntables	63.5 x 46.5 x 36cm	R	83
Target TT2 £64	Table Very Good	Standing up to the best in most areas, the TT2's only real foible concerns a slight loss of bass 'slam'. Design was updated in 1990	52 x 46.5 x 35.5cm	BB	57

EQUIPMENT SUPPORTS - LOUDSPEAKERS

■ MODEL ■ PRICE	■ LAB ■ SOUND	■ COMMENTS	■ SIZE (H x W x D)	■ VALUE	■ ISSUE
Appolo A10 £52.50	4 leg Average	A robust and lightweight model, it would make an ideal upgrade for those still happy with the big boxes of old.	19 x 19cm 44cm	R	58
Appolo A820 £44	4 leg Average	A light open-framed budget design slightly lacking in rigidity and subjectively superceded by other stands costing £10 more.	19 x 19cm 53cm		58
Foundation Fred £70	2 leg Average	With sand filling the Freds made speakers sound tight and coherent with a more even balance.	19 x 19cm 36/43/59cm		58
Foundation Maggi £159 to order	Plinth Very Good	Made for Magneplanar and other similar panel speakers they seem to have a healthy effect on the sound quality thereof.	50 x 2cm 2cm	R	58
Foundation Pi £269 to order	2 leg Very Good	Overpriced in material terms the Pi nevertheless has a very positive effect on the low frequency performance of conventional speakers.	20 x 20cm 25/38/46/5	R	58
Foundation Sir Fred £80	2 leg Good	Upgraded 'Fred' with special in-fills. Sweet sound but one that also lacks bite and edge	19 x 19 x 46.5cm		83 Supp.
Goldring Black Satin £65	1 leg Very Good	Screw together stand tastefully hewn from medite. Some loss of bass but still pleasantly rhythmic	18 x 20 46cm	R	83 Supp.
Heybrook HBS1 £109	4 leg Very Good	With its new aluminium base frame the HBS1 fared very well in the listening tests. It allowed much of the speakers own 'sound' to remain intact.	23 x 21cm 47cm	R	58
Heybrook P5S £69	3 leg Very Good	An unusual triangulated open frame stand that can help certain speakers sound more transparent and fluent - a good value stand	23 x 21.5cm 47cm	BB	58
Linn Kan II £101	4 leg Very Good	Built to support Linn's Kan speaker this stand is well suited to the task, but is less successful with other loudspeakers.	19 x 16cm 59cm		58
Linn Sara £112	4 leg Very Good	The Sara exhibits some odd properties so its use other than with the Sara loudspeaker should be viewed with caution.	25 x 21cm 53cm		58
Origin Live Three Leg £89	3 leg Good	An unusual tripod stand devoid of top plate and taking up more floor space than normal, subjective and technical performance was exemplary.	(support area) 22 x 17.5cm 52cm	R	58
QED TS22 Tristand £60	3 leg Very Good	Most tracks sounded uplifted or buoyant, never thick nor coloured. It worked well with most of the speakers tried and encouraged a fluid and revealing midband.	19 x 17cm 45/50/58cm	BB	58
Standesign Z20 £75	1 leg Excellent	Well built and finished with optional sand in-fill. Ideally suited to Wharfedale 505.2's	16.5 x 19 50cm	R	83 Supp.
Target HJ15/3 £107	3 leg Very Good	Sound quality was basically very good though without the sand infill some loudspeakers may sound a little unbalanced as both bass and treble regions are subjectively exaggerated.	28 x 28cm 40cm	R	58
Target HS20 £64	1 leg Excellent	This monopod stand can be used either filled or unfilled and encourages different characteristics in the speakers sound accordingly	19 x 16.5cm 53cm		58
Target T-40 £51	2 leg Very Good	Not very stable, tends to infer a slightly forward, ragged sound with diluted pitch	19 x 19 40cm		83 Supp.

HEADPHONES

There are a variety of different approaches to headphone design, and examples of each turn up in this group. Amongst the more expensive esoteric models, electrostatic drivers are used in square open-backed phones such as the Jecklin and Stax models.

The majority of these come with some form of transformer which takes the signal initially from the speaker terminals on the amplifier. The actual speaker cables then travel from this unit

bypass switch to the loudspeakers.

The more down to earth models feature dynamic drivers in circular open-backed designs. The advantage of open backs seems to be a correspondingly open sound and a less claustrophobic feel to the music.

One can also of course hear external noises, as well as irritating the hell out of people on public transport.

The third category are closed-back designs,

which are useful in situations where it is necessary to block out background noise. Another means of distinguishing different types is the way they sit on your head.

There are three styles: circumaural models enclose the ear and rest on the side of the head; supra-aural designs press on the outer ear (pinna); and intra-aural types rest inside the ear and are popular amongst users of personal stereos.

■ MODEL ■ PRICE	■ FIT ■ SOUND	■ COMMENTS	■ TYPE	■ VALUE	■ ISSUE
Aiwa HP-X30 £31	Good Good -	A flashy personal stereo phone which alternatively could be used at home. A slight LF tonal preference slightly colours the response, but it ain't a bad can	Supra-aural, closed-back, dynamic		75
AKG K1000 £500	Very Good Excellent	One of the best moving coil headphones on the market, hooks directly to speaker outputs and makes much of the competition sound lame. Looks a tad weird	Extra-aural, open-back, dynamic	R	99
AKG K135 £33	Poor Average	Despite a very appealing design the K135s don't live up to the usual AKG standards, though they do have the ability to reproduce rhythm well	Supra-aural, semi-open, dynamic		63
AKG K145/S £60	Good + Good +	Electrostatic tweeters combine with a dynamic mid/bass unit to create very confident sounds in a comfortable headphone. Balance is on the bright side	Supra-aural, semi-open, electrostatic/dynamic	R	75
AKG K240 Monitor £60	Very Good Good	Something of a classic, these AKGs are very user friendly in all respects; sonically on the warm side of neutral	Circumaural, semi-open, dynamic	R	63
AKG K280 Parabolic £90	Good Very Good	A very revealing and unusual twin driver design that uses the same principle as a satellite dish to beam sound into the ear	Circumaural, open-backed, dynamic	R	63
AKG K340 £140	Good Excellent	Heavyweight cans in most respects, the K340 with its electrostatic tweeter is a very revealing headphone. Gives the total electrostatics a good run for their money	Circumaural, closed-back, electrostatic/dynamic	R	75
AKG K44 £40	Good+ Average	Good quality personal oriented phone, could have a better sense of space but is musically quite communicative	Supra-aural, open-back, dynamic		99
Audio-Technica ATH-609 £31	Average Average-	Warm feeling and sounding with impressive physical substance for the price, could be more relaxed and open	Circumaural, open-back, dynamic	R	99

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HEADPHONES

MODEL PRICE	FIT SOUND	COMMENTS	TYPE	VALUE	ISSUE
Audio-Technica ATH-611 £51	Average Good	Same basic design as 609 but bigger thinner diaphragm makes this a more relaxed and informative headphone	Circumaural, open-back, dynamic		99
Audio-Technica ATH-909 £60	Average Average	Quite impressive in the treble though a bit bass shy, the 909s worked well at highish levels	Circumaural, semi-open, dynamic		55
Audio-Technica ATH-910 £70	Average Good	The closed-back 910s are an improvement on the 909s with a nice rhythmic quality rarely found with headphones	Circumaural, closed-back, dynamic	R	55
Audio-Technica ATH-911 £80	Very Good Very Good	Nicely finished dynamic headphones with all the trimmings, plus a very clean and subtle sound	Circumaural, open-backed, dynamic	R	63
Beyer DT 325 £32	Very Good Average	Lightweight in more ways than one, the 325s may be a little bright for some systems and tastes but will suit duller sources	Supra-aural, open-back, dynamic	R	63
Beyer DT330 Mk II £50	Good Poor	Not the most revealing 'phones encountered, the 330s were nevertheless enjoyable and rarely offended	Circumaural, semi-open, dynamic		55
Beyer DT550 £61	Good Good	On their own the 550s sound articulate with a slightly 'gritty' treble and 'keen' midrange; not suitable for headbangers!	Circumaural, semi-open, dynamic		55
Beyer DT880 £80	Good Good	Well made cans with a warmish sound but fairly solid midrange, though they're not that informative for the price	Circumaural, semi-open, dynamic		63
Beyer DT990 £102	Very Good Very Good	The 990s are definitely a significant pair of dynamic headphones; they have a smooth and yet revealing neutral sound that is hard to criticise	Circumaural, open-back, dynamic	R	55
Beyer IRS690 £203	Good + Very Good	High quality infra-red headphones with soft comfy earpads and mellow but informative sound quality which is hard to dislike	Circumaural, open-back, dynamic	R	75
Jecklin Float Electrostatic £399	Good Excellent	One version of the state-of-the-art, these electrostatics have an openness of sound rarely found in the breed, with good dynamic range to boot	Circumaural-ish, open-back, electrostatic	R	55
Jecklin Float Model One £79	Good Very Good	Whilst very unusual in appearance, the Floats give remarkable sound quality and openness at a reasonable price	Circumaural-ish, open-back, dynamic	BB	55
Jecklin Float Model Two £99	Good Very Good	Helmet shaped and pretty unflattering but open sounding and comfortable in the long term. Note lack of adjustment means you should try before you buy	Circumaural-ish, open-backed, dynamic	R	63
JVC HA-D990 £65	Good + Good +	Good looking well made cans that offer good sound quality for the money. Sonic nature is of the easy-going, laid-back variety	Supra-aural, closed-back, dynamic	R	75
Koss K/6X Plus £30	Average Poor	'Sixties-style' phones from the good ole US of A, their sonic style is unique and can make a system sound quite different	Supra-aural, closed-backed, dynamic		63
Koss TD/60 £20	Good Average	Although they're devoid of channel identification and have a decidedly Stateside approach to sound, these are very listenable phones for the price	Supra-aural, closed-back, dynamic		75
Pioneer SE-72 £30	Good + Average -	Neat, very nicely made personal stereo phones along the lines of Sony V3s. Sound is on the veiled side, good for aggressive sources	Supra-aural, closed-back dynamic		75
Quart Phone 30 X £40	Good Average	Slightly dark character makes these more suitable for some sources/material than others, specifically music that needs bass weight	Supra-aural, open-back, dynamic		99
Quart Phone 70 £70	Good Good	Competent performers that were hard to criticise but lacked the life and sparkle of which some of the competition are capable	Circumaural, closed-back, dynamic		63
Quart Phone 95 X £100	Good+ Good+	Can sound even handed, relaxed and open with a good drive system but may be a bit too transparent for lesser headphone outputs	Circumaural, open back, dynamic	R	99
Ross RE2530 CD £20	Average Average	Rather an 'average' £20 phone that some found uncomfortable due to high pressure on the ears. Sonic balance is on the bright side	Supra-aural, closed-back, dynamic		75
Ross RE2560 CD £25	Good Average +	If you're not too fussy about quality of finish and don't have an elfin head then these British phones warrant attention. Sound could be smoother	Supra-aural, semi-open, dynamic		75
Sennheiser HD40 £20	Very Good Good -	Very light and comfortable headphones with an even sonic balance that will suit most sources, but jack is 6.3mm and not suited to personals	Supra-aural, semi-open, dynamic	BB	75
Sennheiser HD450II £40	Good+ Good-	A neat looking supra that makes quite acceptable noises with a variety of outputs, could sound more spacious but is pleasantly relaxed	Supra-aural, open-back, dynamic		99
Sennheiser HD480 Classic II £60	Good+ Good	The same basic design as the 450 but improved sound quality as a result of aluminium coil and extra damping, natural with good bass	Supra-aural, open-back, dynamic	R	99
Sennheiser HD520 £65	Good + Good +	A very comfortable and musically capable headphone. If you've got this sort of bread to blow on cans, give 'em a blast	Circumaural, semi-open, dynamic	R	75
Sennheiser HD530 £75	Very Good Good +	One of the better dynamics in its group, the 530s create a sense of space that eludes most sub £100 cans, and they're dead comfy to boot	Circumaural, semi-open, dynamic	R	75
Sennheiser HD540 Ref Gold £160	Good Very Good	The 540 Golds prove that dynamic headphones can be subtle, informative and capable of creating a remarkable sense of space	Circumaural, open-back, dynamic	R	55
Sennheiser HD560 Ovation II £120	Very Good Good+	A comfortable and nicely styled headphone that could be more natural sounding at HF, but is detailed and open with good power	Circumaural, open-back, dynamic		99
Sony A21EX £20	Good - Good -	Forward facing in-ear drivers on a folding plastic band provide exceptional clarity for such an inexpensive phone. However, no bass, and fit isn't to everyone's taste	Intra-aural, semi-open, dynamic	BB	75
Sony MDR-CD3000 £300	Very Good Very Good	Better than most of the headphone outputs around so hard to make the most of, potentially up there with the electrostatics	Circumaural, closed-back, dynamic	R	99
Sony MDR-CD350 £32	Good+ Good	Very impressive for the price the 350 is possibly the most open sounding cheap closed back can around, lightweight in balance but transparent	Circumaural, closed-back, dynamic	BB	99
Sony MDR-CD550 £50	Good+ Good+	A very competent headphone for the price, creates a remarkable sense of space for a closed back design and sounds natural to boot	Circumaural, closed-back, dynamic	BB	99
Sony MDR-R10 £2500	Excellent Excellent	Costly state of the art sealed moving coil design built to the highest standards using the finest materials. Sound quality reflects this care, being big, clear, sweet and refined	Circumaural, closed-back, dynamic	R	72
Stax Gamma pro/SRD-X pro £296/£230	Very Good Excellent	The Gamma pros are like a stethoscope for your hi-fi, revealing subtleties that many loudspeakers fail to resolve	Circumaural, open-backed, electrostatic	R	63
Stax Lambda Signature/SRM-T1 £470/£895	Very Good Excellent	The Signature when combined with the SRM-T1 valve driver must be the most transparent headphone available	Circumaural, open-backed, electrostatic	R	72
Stax SR Gamma £299 (inc. SRD-6 Adaptor at £100)	Very Good Very Good	The next model down the Stax range from the Lambda, the Gamma is an excellent headphone with little to criticise but the price	Circumaural, open back, electrostatic	R	55
Stax SR Lambda Pro/SRD-7SB Mk 2 Adaptor £360/£185	Very Good Very Good	A bit of an industry reference, the Pros are frighteningly revealing, bringing across more information than loudspeakers costing twice as much	Circumaural, open-back, electrostatic	R	55
Stax SR Lambda Pro/SRM-1 Engisier £360/£635	Very Good Excellent	This combination extracts layers of information that other headphones only hint at. The SRM-1 has more edge than the SRM-T1, but it's good	Circumaural, open-back, electrostatic	R	75
Stax SR34 £140	Average Very Good	The least expensive Stax headphones around, the SR34s are lively and rhythmic with good tight bass and a sweet midrange	Supra-aural, open-back, electret		55
Stax SR84 £210	Very Good Very Good	The stepping stone between dynamics and full electrostatics, these electret phones are revealing, open and highly enjoyable	Supra-aural, open-backed, electret	R	63
Yamaha YHL-006 £30	Average Average	Unusual personal stereo oriented phones that curl up when not in use. Earphones are like golf balls and balance is well suited to Walkmans	Supra-aural, open-back, dynamic		75

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LOUDSPEAKERS

Last item in the hi-fi chain, to some extent the loudspeaker is merely the slave of what has gone before, capable only of reproducing a signal as good as it is fed. Nevertheless the distortions (colorations and stereo effects) introduced by loudspeakers (and rooms) tend to be more immediately obvious than those anywhere else in the chain, so careful choosing according to taste is very important.

The average loudspeaker consists of a smallish enclosure, much of which may have begun life as part of a tree, plus a couple of drive

units hidden behind a removable grille. Inside the box lurks a simple electrical circuit known as a crossover, which divides the incoming (full range) signal into the right bits for the drivers to handle. Variations on the above formula are specifically identified in the entries. The designer's primary task is to balance the sensitivity of the loudspeaker (how loud it goes for a given electrical input) against the bass extension (how low does it go) for the given box size. After that such subtleties as coloration and dispersion come into the equation.

Careful placement of the loudspeakers within the room is as important as the initial choice of model.

For good stereo they need to be more or less the same distance from nearby walls, and preferably on rigid stands. The listener should be about the same distance from and listening angle to each loudspeaker. The ideal placement depends on the way a particular model has been balanced (not to mention a number of other factors), and our recommendation is given in the entries.

MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	ISSUE
Acoustic Energy AE1 £767	Good Good	Amongst the best miniatures around, this metal driver pioneer shows exceptional mid focus and coherence, but is pricey and could be faster and more agile.	29.5x18x25cm stands clear of walls	84dB 48Hz (in room)		102
Acoustic Energy AE2 £916	Good Very Good	Dynamic, solid and lively, a great allrounder if a bit small considering the price. AE proves that metal cone/dome drivers really work	39 x 23.5 x 29.5cm heavy stands, free	88.5dB/w 45Hz	R	66
Acoustic Energy AE3 £1650	Very Good Very Good	Solid, authoritative and impressively accurate – if a shade ponderous and slow – AE's latest 'big one' is a much better bet than the earlier '4, combining	63 x 26.5 x 37cm low stands in free space	85dB/w 23Hz (in room)	R	86
Acoustic Research AR-112 £125	Average Average -	Nicely presented and engineered, but sounds a bit small and boxy without true coherence	36 x 19 x 18.5cm stands near rear wall	87dB/w 75Hz		66
Acoustic Research AR-122 £150	Average Average	Despite a promising enough list of ingredients, the 122 failed to excite real enthusiasm amongst the listening panel	38.5 x 19 x 22cm stands near rear wall	87dB/w 68Hz		68
Acoustic Research AR-132 £200	Average + Average -	Good presentation and detail engineering was not sufficient to counter bass heavy balance problems on auditioning	44.5 x 23 x 25.5cm stands 1ft from rear	87dB/w 50Hz		66
Acoustic Research AR-152 £373	Good Good-	Large bookshelf size model with luxury finish has a slightly thin overall balance, but fine coherence and agility makes it well worth considering	44 x 23.5 x 28cm stand 1-2ft wall	87dB 25Hz in room		98
Acoustic Research Red Box £100	Average Average	Lively and balanced if a bit crude and uneven, this econobox succeeds partly because of its simplicity, and works well with some rear wall assistance	32 x 19.5 x 17cm close to rear wall	87dB/w 85Hz	R	74
Alexander SE11 £299 (stands £69)	Good Good	Clearly better than its cheaper stablemates, the metal jacket delivers a different – and in some respects superior – sound than the wood-based	52 x 14 x 17.5cm stands close to wall	86dB/w 25Hz (in room)	R	82
Alexander SE5 £199	Average Average	Particularly well suited to surround sound A/V applications, the SE5 can give any miniature a run for its money on bass performance; hardness and coloration	40.5 x 12 x 15cm ALS stands near wall	82dB/w 50Hz (in room)		78
Allison AL100 £120	Average- Average	Loud and lively budget wall-mount is bigger and beefier than most of the competition, if lacking some subtlety and refinement	33.5 x 24 x 21.5cm stands against wall	87dB/W 30Hz (in room)	BB	94
Allison AL105 £150	Average Average -	Pretty enough in appearance, sonically the AL105 doesn't really make the grade at the £150 asking price	37 x 24 x 21cm high stands against wall	87dB/w 45Hz (in room)		78
Allison AL110 £220	Good+ Good-	Compact bookshelf model is a little dry and mid forward, but bass is extended and solid. Free space balance is good, though build quality could be improved	40x24.5x22.5cm stands 1-2ft from wall	86dB 28Hz (in room)	R	102
Allison AL120 £429	Good Average	Cleverly engineered compact floorstander is pretty well balanced if slightly mid forward, but sound quality is a little disappointing for the price	63 x 28 x 27cm floor, clear of walls	88dB 30Hz (in room)		98
Allison CD6 £290	Average Good -	An unusual cube-shaped model designed for wall mounting gives exceptional bass extension from a small box, though it's also a bit heavy, coloured and slow	28.5 x 28.5 x 28.5cm stands against rear	88dB/w 45Hz	R	71
Alphason Amphion £680	Good Good	This fine-sounding, nicely finished compact wall-mount is just a little too expensive for formal Recommendation, but is a good performer for all that	44 x 23 x 27.5cm high stands against wall	88dB/w 47Hz (in room)		78
Alphason Artemis £299	Average Average+	Pretty little miniature sounds nicely unboxy but is also a bit short of punch and balanced rather too bright.	27 x 17.5 x 22cm stands 1ft from wall	86dB/W 50Hz (in room)		94
Alphason Orpheus £1000	Good Good +	Large hi-tech two-way features unusual, sweet-sounding isodynamic tweeter; well engineered and balanced if a shade odd in appearance	65.5 x 28 x 34cm stands near rear wall	87dB/w 43Hz	R	71
Apogee Caliper Signature £3350	Good + Very Good	Pretty but power hungry full range panels have remarkable transparency and delicacy, though loudness and bass 'grunt' are both a bit lacking	122 x 59-70 x 6.5-28cm floor, free space	81dB/w 30Hz (in room)	R	81
Arcam Alpha £200	Good Good	It has its own colorations to be sure, but delivers a fine room balance with unusually good dynamics, timing and 'life', and is fine material value	46 x 26.5 x 26cm stands close to wall	89dB/w 30Hz (in room)	BB	82
Arcam Delta Two £340	Average+ Good	Pretty luxury compact sounds a shade forward and coloured but has dynamic and lively bass for its size	37.5 x 22.5 x 27.5cm stands 1-2ft from wall	87dB/W 40Hz (in room)	R	94
Ariston Image £180	Average - Average -	Despite a sweet treble character, the Image fails to impress with a 'lumpy' over-rich balance that has room integration problems	42 x 22 x 27.5cm stands in free space	89dB/w 28Hz (in room)		82
Ariston Q £395	Average + Average	The prettily shaped Q delivers a good impression of scale from a small box, but a rather laid back, ponderous and over-rich overall sound	35 x 16.5-25 x 20-27cm high stands in free	85dB/w 30Hz (in room)		86
ATC SCM20 £1320	Very Good Good +	Massively built to no-compromise Pro monitoring standards, the SCM20 is invariably informative but the rather forward presentation can be uncomfortable	44 x 24 x 31cm stands close to rear wall	82dB/w 28Hz (in room)		86
Audio Electronics TC10 II £599	Good - Good +	Oddball appearance is rescued by a respectable technical performance, interesting and impressive engineering and fine sound quality	70 x 33.5 x 33.5cm low stands in free space	87.5dB/w 40Hz	R	68
Audioplan Kontrapunkt £799	Good Good +	Cute little German miniature sounds as sweet as it looks, dressed expensively in real wood with matching stands. Not for bass or loudness freaks	31 x 24 x 13cm free space, matching stands	83dB/w 48Hz (in room)	R	86
B&W 610 £200	Good Average	Fine presentation and good perceived value, with good in-room bass extension and impressive loudness credentials too, but rather indifferent integration and coherence.	49x23.5x30cm stands clear of walls	89dB/W 25Hz (in room)		102
B&W 620 £299	Good Good	Good value floorstander has well balanced, laid back and slightly lazy sound that is pleasantly easy on the ears; could do with its own spikes	74 x 23.5 x 30cm floor, free space	89dB/W 25Hz (in room)	BB	94
B&W CM1 £400	Good Average	Cleverly thought out luxury design package is also fundamentally well engineered, if a shade pricey on 'sound for pound' basis	24.5 x 16 x 22cm close to rear wall	84dB/w 90Hz		74
B&W DM550 £149	Good + Average -	Beautifully presented, well engineered near-miniature with precise sound but a distinct lack of 'wellie'. Ideal for considerate flat dwellers	35 x 20.5 x 22.5cm stands in free space	86dB/w 70Hz		71
B&W DM560 £199	Average + Average -	Fine cosmetic presentation and good engineering for the price; overload protection may be handy but listening panel was underwhelmed	49 x 23.5 x 30cm stands in free space	88dB/w 55Hz		66
B&W DM600 £150	Good+ Average+	Attractive hi-tech appearance and clever engineering makes for an impressively smooth overall balance, but sound is a touch bland with it	35 x 20.5 x 25cm stands 1-2ft from wall	85dB 30Hz (in room)	R	98
B&W Matrix 801 £3295	Good + Good +	Lacks the transparency of the best panels, and the drama of the best dynamics, but is something of an acoustic tour de force, with low coloration and fine imaging	77/99 x 56 x 43cm floor or stands, free	86dB/w <20Hz (in room)	R	81
B&W Matrix 805 £915	Very Good Good	A genuine compact monitor, stylish, with remarkable imaging properties, good balance and low coloration, though less successful at communicating musical	42(max) x 26 x 22.5cm Slate stands in free	87dB 30Hz (in room)		98

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LOUDSPEAKERS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	ISSUE
B&W Vision DS1 £120	Average Average -	Although significantly hampered by upper bass cabinet coloration, the DS1 cleverly combines high sensitivity with a rich and generous soundstage	36 x 21 x 19cm stands quite close to wall	91dB/w 40Hz (in room)	R	82
B&W Vision DS2 £180	Average Average -	Although the box is generous for the price, the DS2 is a rather uneven performer, both on the measurement and listening.	50 x 24 x 25cm stands in free space	89dB/w 43Hz (in room)		86
Bose 305 £350	Average Good -	A bit of an oddball, fine dynamic liveliness and a good room match more than make up for the strange stereo imaging and treble	28 x 45 x 23cm high stands near wall	88dB/w 40Hz (in room)	R	78
Bose 901 MK6 £1600	Good Average	Still controversial after all these years, the pre-equalised multi-driver 901 is cleverly engineered to deliver exceptional loudness.	33 x 54 x 32cm rigid stands in free space	(92dB/w midband) 28Hz (in room)		86
Bose Interaudio 3000XL £150	Average Average -	Lots of perceived value and well enough balanced, but low cost cabinet and driver engineering results in a crude and unsubtle sound	46.5 x 29 x 23cm stands in free space	89dB/w 45Hz		71
Boston A120 £349	Average + Good -	Ugly but cleverly engineered, the 120 combines a tiny main driver with much larger ABR to give a generous, bighearted and lively sound despite little bass	62.5 x 31.5 x 25cm stands in free space	89dB/w 48Hz	R	86
Boston A40II £120	Average Average -	Competent performance for size and price but below average relative to the UK competition	34 X 21 x 20cm on stands near wall	88.5dB/w 63Hz		41
Boston Acoustics T830 £399	Good Good	A lot of speaker for the money, the T830 is a smooth and accomplished performer with a big and easy - or alternatively a lazy and laid back - sound	82.5 x 25.5 x 24cm floor, away from walls	87dB/w 30Hz (in room)	R	82
Cambridge SoundWorks Ambiance £179 (mail order only)	Average Poor	Attractively styled sub-miniature sacrifices sensitivity in the interests of bass extension, but manages to lose dynamics along the way too	28 x 18 x 14cm close to wall	83dB/W 45Hz (in room)		94
Canon S-50 £349	Average Average+	Though only a small cone miniature at heart, the fascinating styling and extended stereo listening area feature make it utterly original and unique.	30x24(diam)cm stands in free space	84dB 48Hz (in room)	R	102
Castle SG Trent £129	Average Average	The grey paint finish looks much more modern than black vinyl woodprint, and this miniature wall-mount sounds lively and engaging, if a bit rough at the top.	33.5x18x20cm stands close to wall	88dB 50Hz (in room)	R	102
Castle Chester £599	Good Very Good	A brilliant throwback, using horn-type approach to provide startling midrange dynamics and coherence	94 x 23 x 27cm floor, experiment	87dB 45Hz	BB	98
Castle Durham £259	Average + Average	Listening results were encouraging, well engineered and finished, but lean on treble and a bit weak on bass; still recommended	41 x 21.5 x 25cm near rear wall	89dB/w 67Hz	R	46
Castle Pembroke £379	Good Average +	Comfortably recommended, a sweet smooth sound with good overall balance of engineering-based performance	55 x 37.5 x 30.5cm open space on stands	88dB/w 46Hz	R	31
Castle Warwick £229	Good Average -	Excellent presentation and fine engineering with overload protection, but a sonic disappointment in bass and dynamic qualities	46.5 x 25 x 23cm stands 1ft from rear	88dB/w 50Hz		66
Castle Winchester £1400	Very Good Very Good	This unconventional and beautifully crafted model is physically large for its bass extension but is engagingly agile and sounds attractively open and airy	114 x 24 x 47cm in free space	87dB/w 25Hz	R	90
Celef CF2 Nimbus £230	Good - Good -	Nicely balanced overall but a little uneven with it, this lively and dynamic largebookshelf model came close recommendation	46 x 25.5 x 24cm stands in free space	88dB/w 55Hz		71
Celef Cirrus £180	Average Good	It's nice to see Celef back in the UK, with this decent sounding small reflex box that seems unusually tolerant of siting	39 x 20.5 x 23cm stands in free space	84dB/w 60Hz	R	66
Celestion 3 £109	Average + Average	This attractive little wall-mount gives good balance and stereo imagery, with a character which leans more towards inoffensiveness than excitement	31 x 18.5 x 21cm high stands against wall	86dB/w 55Hz (in room)	R	78
Celestion 5 £149	Good Average	Cunningly conceived and balanced, the 5 may be a little slow for some tastes, but is well suited to CD-oriented budget systems	35 x 20.5 x 26cm heavy stands close to wall	89dB/w 30Hz		90
Celestion 6000 £1470	Very Good Very Good	A genuine fullrange audiophile quality speaker system - with Star Wars styling to suit a high tech environment	Complex, on floor in free space	82.5dB/w	R	60
Celestion 7 £200	Average Average+	Good value, good looking large bookshelf size wall-mount has lively up front presentation. Can sound a bit coarse and stand selection is critical.	45 x 24.5 x 32cm heavy stands close to wall	87dB 30Hz (in room)	R	98
Celestion 9 £249	Good Average	Nicely presented and fair material value, with impressively flat bass-to-mid balance, the 9 doesn't really make a convincing case for the return of the three-way.	49.5x20.5x24cm stands clear of walls	89dB 30Hz (in room)		102
Celestion DL6 Series II £179	Good Average	Good tonal colouring and plenty of bass for the enclosure size; the metal dome tweeter is excellent, but bass and mid lack clarity and 'bite'	45.4 x 24.5 x 26.2cm near wall, on stands	87dB/w 65Hz		59
Celestion DL8 Series II £199	Very Good Good	A refined middle market speaker has a smooth but slightly dull quality, with good definition and deep, if slightly boxy bass	50 x 27.5 x 27.8cm open, stands	87.5dB/w 60Hz	R	59
Celestion SL12Si £599	Average Average	Careful setting up does reveal elements of fine sound quality, but this 'grown up' SL6 variation has a lumpy response alongside its improved power handling	53 x 20 x 27cm matching stands clear	85dB/w 50Hz		66
Celestion SL600Si £799	Good + Good	This Aerolam high tech miniature has certain remarkable qualities that some will find irresistible, but needs careful system and room matching	27 x 20 x 23cm free air on tall stands	82dB/w 52Hz		68
Celestion SL6Si £399	Average+ Average+	This stereotype luxury compact can sound a bit dull and congested, but really opens up on Slate Audio stands; favours CD	37.5 x 20 x 25cm stands 1-2ft from wall	86dB/W 30Hz (in room)		94
Creek CLS20 £200	Good Average -	Looks good material value, but sound is distinctly over-rich and thick in the mid-bass region; maybe the box is a little too large.	49 x 24.5 x 24cm open frame stands, free	88dB/W 30Hz		90
Dali 700 £600	Very Good Average	Good material value and fine bass extension for size and price, but overall sound is disappointing, perhaps due to complexity of driver array	110 x 28 x 35cm clear of walls	88dB/w 20Hz		90
DCM Timeframe TF250 £350	Average + Average	Neat and unusual floorstanding presentation, marred by indifferent build and cuddly but rather coloured sound, especially on spoken word	86 x 32 x 16cm close to rear wall	88dB/w 45Hz		90
Duntech PCL1000 Crown Prince n/a £6120	Excellent	Immensely 'listenable', refined sounding speaker capable of creating lifelike musical images. Not overly transparent to source, but very civilised	180 x 30.5 x 43.5 free standing away from	90dB/w 42Hz	R	72
Duntech PCL500 Marquis £3998	n/a Very Good	Better value for money than the Crown Prince - and arguably more dynamic, with real bass 'slam' but a little less refined in the higher registers	147.5 x 27 x 40cm free standing away from	92dB/w 48Hz	.R	65
Eltax Linear Response 8 £399	Average- Average+	Good material value Danish floorstander suffers from 'loudness contour' balance due to twin main drivers, but nevertheless has pleasing coherence	97 x 21 x 33cm floor, free space	88dB 22Hz		98
Epos ES11 £300	Good Good+	Pretty luxury compact uses integral baffle/driver to give a remarkable combination of low coloration, transparency and speed; bass is a bit shy	37.5 x 20 x 25cm stands 1ft from wall	86dB/W 45Hz (in room)	BB	94
Epos ES14 £449	Good Very Good	Substantial stand mount model delivers delightful midrange focus and delicacy with good bass control. Tends to be system sensitive	49 x 22.5 x 29cm own stands 1-2ft from wall	85dB 25Hz (in room)	R	98
Equation 0 £1290	Average + Very Good	Expensive but most attractive floorstanding miniature. Bass is limited and mid tends to shout but sound is fast and lively with fine dynamics and timing	85 x 20 x 35.5cm floor, c1ft from wall	85dB/w 45Hz	R	90
Faraday Siren £330 (direct sale)	Average- Average-	Interesting if ugly high mass concrete cabinet is let down by imbalance of ageing driver combination	46 x 27 x 27cm stands, free space	87dB/W 48Hz (in room)		94
Faraday FS5 £589	Good Good	Priced and ugly, but with its own sonic charm nonetheless, thanks to the substantial (largely positive) influence of the concrete enclosure has upon the sound	46x27x26cm stands in free space	90dB 28Hz (in room)		102
Goodmans B-Max/Maxim 2 £100/£90	Poor Average -	Stick with the Maxims on their own until you can afford some real grown up loudspeakers	60 x 21 x 26 see above, suck and see	89dB/w 55Hz (in room)		78
Goodmans HIM 440 £350	Good Average -	Amazing perceived value, sensitivity and good bass extension, marred by serious cabinet coloration, a nasty tweeter and a difficult amplifier load	87 x 38 x 40cm low stands clear of walls	94dB/w 24Hz		90
Goodmans M100 £80	Average + Average -	Effectively a Maxim on the cheap, the M100 measures more smoothly but sounds somehow less involving than its more famous stablemate.	20 x 17 x 26cm close to rear wall	85dB/w 50Hz (in room)	R	86

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MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	ISSUE
Goodmans M300 £100	Average Average -	Conveying much of the charm and life which has made the Maxim 2 so popular, the M300 is sensitive, but hampered by upper bass cabinet coloration	38.5 x 21.5 x 17cm stands close to rear	89dB/w 50Hz (in room)	R	82
Goodmans M500 £130	Average Average-	Large 'bookshelf' size means plenty of speaker for the money plus good sensitivity, let down by unruly mid/bass performance and indifferent build	47 x 24.5 x 21.5cm stands, free space	89dB/W 50Hz (in room)		94
Harbeth HL Compact From £539	Very Good Average	The clean and neutral sound lacks resolution and gives rather unobtrusive though well differentiated stereo. Can be bi-wired to advantage	52 x 27.2 x 28.1cm open space, on high	87.5dB/w 65Hz		59
Harbeth LS3/5A £343	Good Average	Still a classic miniature, though not to every taste, and none the better for the recent update under our listening conditions. Limited dynamic range	30.5 x 19 x 16cm stands in free space	81dB/w 60Hz		66
Heco Interior 120 £169	Good Average	Drab appearance belies a lively enough character, though the balance is altogether a bit bright for UK tastes	32 x 23 x 23cm high stands against wall	88dB/w 50Hz (in room)		78
Heco Interior 430 £429	Good Good -	This tall floorstanding enclosure delivers an impressively even sound balance with good bass extension, if not the lively dynamics to satisfy enthusiasts	85 x 24 x 27.5cm free space	88dB/w 43Hz	R	71
Heco Interior 90 £159	Good Average -	Neatly finished and engineered miniature, but the disappointingly 'lifeless' sound left the listening panel decidedly underwhelmed	27 x 18 x 16cm on high stands	87.5dB/w 90Hz		74
Heco Interior Plus 404 £400	Average+ Average+	Odd shape and size; twin main driver arrangement creates a slight 'boom'n'tizz' effect, but mid focuses well and bass extension is impressive	58 x 26 x 31cm low stands free space	88dB/W 25Hz (in room)		94
Heco Reflex 10 £160	Average+ Average	This nicely balanced and well mannered small bookshelf wall-mount is a competent rather than exceptional package for the price, thanks to indifferent build.	32x21x23cm stands up to 1ft from wall	90dB 30Hz (in room)		102
Heco Superior 740 £599	Good Good -	A similar sonic package to the cheaper Interior 530, these Superior clothes are very pretty indeed, though spikes are still awaited	84.5 x 22 x 25cm on floor in free space	88dB/w 30Hz (in room)		78
Heco Superior 940 £999	Good Good	This large and beautifully finished floorstander has an impressively smooth and transparent midband. Bass is well extended but follows rather than drives the music	110 x 26 x 31.5cm free space	88dB/w 20Hz		86
Heybrook HB1 S3 £250	Average+ Good	Latest version of long established favourite delivers good liveliness and fine coherence for the price, even though the shape looks a bit dated	47 x 29 x 24cm HBS1 stands close(ish) to	88dB 30Hz (in room)	BB	98
Heybrook HB100 £279	Average + Good	Well matched for wall siting, the HB100 is a lively and informative performer in the tradition of the popular HB1	47 x 26 x 28cm stands near rear wall	86dB/w 50Hz	BB	66
Heybrook HB150 £369	Average Good	Convincingly communicative but a bit coloured and congested, this lively compact wall-mount is nicely finished but a little costly for the content	40.5 x 23 x 22cm stands close to rear	89dB/w 42Hz (in room)		82
Heybrook HB200 £429	Average Average	This luxury successor to the HB2 is lively and informative, but sounded insufficiently balanced to convince our listening panel	46 x 23 x 26cm stands against rear wall	87dB/w 55Hz		66
Heybrook Point 5 S2 £179	Good Good	Lively, revealing and enjoyable wall-mount can sound unruly with multi-strand but comes dramatically into focus with solid core cable.	37.5 x 23 x 24.5cm HBS1s against wall	85dB/W 28Hz (in room)	BB	94
Heybrook Point 7 £185	Average Average	Physically an attractive package, but not entirely convincing in lab or listening panel test; interesting for all that	40.5 x 23 x 23cm stands against rear	85dB/w 60Hz		68
Heybrook Solo £159	Average + Average +	Discreetly styled wallmount sounds a little untidy in both bass and treble but handles complex rhythmic material much better than most	36 x 23 x 22cm HBS1 stands close to wall	87dB/w 28Hz	R	90
Heybrook Sextet £949 (inc frame)	Good Very Good	Elegant floorstanding three-way wall-mount is engagingly coherent and a highly analytical, partly due to distinct and not always comfortable upper-mid forwardness.	96x27x20cm close to wall	85dB 25Hz (in room)	R	102
Infinity Kappa 6 £795	Good Good	Interestingly styled US loudspeaker has unusual high tech drivers and good neutrality, but the sound seriously lacks excitement	63 x 38 x 24cm stands, free space	85dB/w 35Hz		66
Infinity Kappa 8 £1850	n/a Very Good	Very nicely made and unobtrusive but large four-way speakers which have a tendency to sound bass heavy unless used with solid core cables	118 x 51.5 x 17.5cm floor standing, open	89dB/w 33Hz		72
Infinity Modulus £695	Good Average +	Luxury hi-tech miniature, carefully conceived and beautifully built. Undeniably attractive in the mid and treble, it failed to handle the bass as successfully	30 x 18 x 26cm high stands 1ft from wall	84dB/w 45Hz (in room)		86
Infinity Reference 10 £149	Average Average	Follows the Infinity tradition in providing an engaging and lively sound from a prettily finished and substantial small bookshelf size model	36 x 23 x 23cm stands in free space	87dB 50Hz (in room)	R	98
Infinity Reference 20 £220	Good Average	Large bookshelf size model is well presented and balanced with good bass control, but somehow lacks convincing cohesion and agility; build was slightly suspect too.	46x27x24cm stands 1-2ft from wall	88dB 27Hz (in room)		102
Infinity Reference 50 £499	Average Average-	Despite hi-tech drivers, attractive presentation, good bass extension and sensitivity, this three-way floorstander suffers from a forward, coloured sound	86 x 26.5 x 25cm floor in free space	89dB 25Hz (in room)		98
Infinity RS2001 £180	Average Average +	A little coloured and unruly in the treble, the 2001 nevertheless retains the lively dynamic bounce of its predecessor; pity the price has gone up	36.5 x 22.5 x 20cm lightweight stands	87dB/w 50Hz (in room)	R	78
Jamo Concert II £250	Good Average -	A thoroughly respectable 'bookshelf' performer that needs free space siting but includes attractive cabinetwork and a neat grille	41 x 24 x 25cm stands in free space	85dB/w 48Hz		66
Jamo Concert V £500	Average Average	Compact, solid, nicely finished floorstander delivers unusually extended bass at the expense of lowish sensitivity; midband is smooth but laid back.	86x24x28cm well clear of walls	85dB below 20Hz (in room)		102
Jamo Concert VII £650	Average+ Average	Beautifully built large floorstander uses unusual double reflex bass system, unsuccessfully as far as low frequency resolution is concerned	96 x 28 x 31.5cm floor, free standing	87dB/W 25Hz (in room)		94
Jamo Cornet 40 £100	Average- Average	Pretty little Danish-built miniature with respectable rather than exceptional sound quality for the price	32 x 20 x 22cm stands 1-2ft from wall	86dB 48Hz (in room)		98
JBL Control 1 Plus £229	Average Average	Sub-miniature with forward midrange and no real bass; highish price partly justified by cute, near-indestructible Pro styling and build	23 x 15.5 x 14cm close to rear wall	89dB/w 50Hz		90
JBL L20T3 £249	Average- Average-	Compact bookshelf model delivers bouncy miniature-type sound when free space mounted; pleasant enough but uneven and undistinguished	39 x 23 x 20.5cm stands free space	87dB/W 48Hz (in room)		94
JBL LX33 £259	Average + Good	A bit of a cheat, but a lot of speaker for the money, which manages a better room balance than many 'large bookshelf' rivals, and delivers a fine acoustic	80 x 25 x 21cm floor, 1ft from wall	89dB/w 48Hz	R	82
JBL LX44 £339	Good - Average	This generously built model offers good power handling, bass extension and dynamic range, but suffers from the 'three-way syndrome', with middle muddle	58.5 x 30 x 29cm stands in free space	89dB/w 40Hz		71
JBL LX55 £350	Good Average	This big bluff three-way provides lots of speaker, bandwidth and loudness for the asking price, but is ultimately a bit of a dinosaur	66x34.5x29cm stands clear of walls	91dB below 20Hz (in room)		102
JBL XE2 £149	Average- Average-	Budget Danish-built 'bookshelf' model has anomalous 'laid back' balance and lacks the genuine JBL spirit	38 x 23 x 23cm stands in free space	88dB 48Hz (in room)		98
JBL XPL 90 £699	Good Average +	Though undoubtedly pretty and very expensively engineered, this elaborate near-miniature didn't really convince our listeners.	39.5 x 24 x 24cm stands in free space	85dB/w 45Hz (in room)		86
JPW AP2 £175	Good Good	Few grounds for criticism but purchasers should check out the treble qualities to avoid hammering the ear anvils	46 x 26 x 25cm 40cm from wall on 45cm	89dB/w 65Hz	R	53
JPW AP3 £225	Good Average +	Pretty good stereo and well balanced overall it had its own character which is well suited to vinyl replay	52 x 25 x 29.5cm near wall on stands	90dB/w 57Hz	R	46
JPW Minim £85	Average + Average -	Very civilised but dynamically limited, the Minim is well suited to the smaller room and where limited loudness is acceptable	27.5 x 18 x 19.5cm stands against wall	85dB/w 28Hz (in room)	R	82
JPW P1 £145	Good Average +	Honest and basically articulate if not very sophisticated, resolution is good but it can sound a little wearing in bright systems or with rough sounding material	44 x 25.9 x 26.1cm free space on stands	89dB/w 60Hz	R	59

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MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	ISSUE
JPW P1 Vinyl £135	Good Average	Not particularly pretty, this is still a lot of highly competent loudspeaker for the price, with a safe and middle-of-the-road sound that's unlikely to disappoint.	43.5x25.5x26cm stands 1-2ft from wall	87dB 32Hz (in room)	BB	102
JPW Sonata £115	Good Average +	Well balanced and integrated, this near-miniature offers fine sound if limited bass and dynamic range, plus real tree wood at a nearly silly price	32 x 23 x 20cm stands near rear wall	86dB/W 55Hz	BB	71
JPW Sonata Plus £135	Average Average -	This luxury variation on the redoubtable Sonata theme features a metal dome tweeter, and is not the better for it	32 x 23 x 21cm about 1ft from wall	87dB/W 30Hz		90
JRT AD1 £500 (stands £100)	Average + Good +	A most auspicious Choice debut for relative newcomers JRT. A fair share of cosmetic deficiencies do little to spoil the impressive coherence and timing	59.5 x 28 x 36cm own stands close to rear	86dB/W 28Hz (in room)	R	86
JRT AD1 Micro £389	Average Good	Beautiful bijou miniature has delightful life and coherence and gives surprising impression of scale; some aggressive tendencies but very open to system tuning	28 x 17 x 21cm stands against wall	87dB/W 50Hz (in room)	R	94
Kammerzelt Reference Mini Monitor £545	Average+ Good	Lovely miniature has a beguilingly sweet sound with good pace and drive, but scale is restricted and presence a little dulled considering the high price	stands 1-2ft from wall 85dB/W	50Hz (in room)		94
KEF 104/2 £1,295	Very Good Very Good	A reference point for dynamics, preferred without KUBE, suited to many rooms. Good stereo, high sound level	90 x 28 x 41.5cm floor standing in free space	92dB/W 50Hz	R	60
KEF Q60 £349	Good Good	Uni-Q co-axial driver provides fine imaging and mid coherence, while magnet decoupling reduces cabinet coloration. Goes loud, bass not entirely convincing.	48x25x27cm stands close to wall	90dB 25Hz (in room)	R	102
Lindley New Age £1100	Average - Average +	Attractively different presentation with classy finish, this tall cylindrical floorstander has fine bass extension but a rather uneven overall balance	105 x 23 x 23cm clear of walls	86dB/W 25Hz		90
Linn Index II/KuStone £235/£109	Good Good	Combination of stand and speaker looks and sounds very good for the price, with good bass extension and control, fine dynamic range. Clean, clear if a shade slow	44 x 21 x 23.5cm (box only) close to rear	86dB/W 28Hz	BB	90
Linn Helix II £357 (stands £109)	Good Good+	Ku-Stone supported, this is one of the best 'large bookshelf' size models around. Dry, controlled bass and very open, if slightly aggressive balance.	57x24x30cm KuStones 1-2ft from wall	88dB 33Hz (in room)	R	102
Linn Kaber LS500 £1098	Average Good +	Discreet wall-mount package trades sensitivity for fine bass extension and midbass performance; can be a little relentless but has prodigious dynamic capabilities	93 x 19 x 28cm floor against rear wall	86dB/W 28Hz (in room)	R	82
Linn Kan II £439	Average + Average +	A niche product for those prepared to tolerate its strong character for the sake of its fine bass performance and near invisibility	30.5 x 18.5 x 16.5cm Kan stands against	82dB/W 35Hz (in room)		78
Linn Nexus LS250 £458	Good Average	Good features include a solid, meaty bass plus good imagery and tonal balance. The catch is that Nexus lacks resolution and timing	49 x 23.5 x 30.4cm near rear wall	89dB/W 60Hz		59
Magneplanar MG1.4 £1190	Good + Good +	Replaces the stalwart MGlc with a revised panel layout. Offers a very crisp and articulate sound, particularly revealing of upper mid vocal details	155 x 8 x 57cm open space	88dB/W 40Hz	R	72
Magneplanar MG2.5R £1998	Good Good	Offers the low coloration and profound musical insight of better electrostatic loudspeakers but without loss of low frequency extension	183 x 56 x 4.5cm Open space	83-85dB/W 35Hz	R	60
Magneplanar MGIIla £2700	Good Very Good	Another excellent true-audiophile loudspeaker this American panel speaker helps to convey much of the original character of the music	180 x 62 x 38cm well clear of walls	84-86dB/W 35Hz	R	46
Magneplanar SMGa £675	Average - Average	Tonally 'rich', in the right room it proved a satisfactory musical experience	122 x 48 x 4.5cm on floor clear of wall	85dB/W 56Hz		46
Marantz LD-50DMS £230	Very Good Good	Well behaved larger two-way has fine balance, stereo and integration with good bass extension, albeit with mild boxy, chesty and fizzy effects	106 x 22 x 32cm floor, free space	88dB/W 30Hz (in room)	R	71
Martin Logan CLS II £3998	n/a Very Good	Much improved high resolution design, fussy about system set-up and demanding of ancillaries and software alike. It rewards the efforts though	60 x 28 x 7.5cm open space	86dB/W 45Hz	R	72
Meridian Argent 1 £1,200	Good+ Good+	Beautifully built, finished and shaped but pricey compact has fine bass extension and virtual absence of 'boxiness'; needs a big amplifier	33 x 27(max) x 27(max)cm Slate stands	83dB 28Hz (in room)		98
Meridian Argent 2 £995	Good+ Good	This beautiful but pricey high-tech 'large compact' delivers an extended, smooth and neutral sound with fair speed. Slate Audio stands are almost essential	48.5 x 21 x 29.5cm stands free space	85dB/W 23Hz (in room)		94
Meridian M30 £895	Average + Average	Pricey but easy on the ears and worth considering especially where space is at a premium	38.5 x 18 x 32cm free space on stands	Active 40Hz		46
Mission 760 £100	Good Average +	Smart presentation and an engaging sound, this sensitive budget miniature sounds notably more lively and less boxy than most of its peers	29 x 18 x 20cm stands close to wall	88dB/W 50Hz	BB	90
Mission 761i £150	Good Average	Variation on 760 theme adds an extra main driver for easier amp loading and power handling. Sound was judged slightly inferior to its simpler, cheaper stablemate.	38x19x24cm stands close to wall	88dB 48Hz (in room)		102
Mission 762 £200	Average Average -	Mission's 'bookshelf middleweight' offers high sensitivity and loudness capability, but at the expense of a somewhat untidy and rather 'heavy' sound	50 x 25 x 27cm stand, experiment advised	91dB/W 55Hz		66
Mission 763 £300	Average + Average +	A very artful combination of generous volume and good bass extension at a modest price. Works well in the listening room despite a few rough edges	77 x 25 x 32cm near rear wall	86dB/W 40Hz	BB	68
Mission 764i £480	Good Average	Despite improvements, this large floorstander still lacks low frequency authority, which is probably a function of its comparatively modest price	1ft from wall, freestanding 87dB/W	below 20Hz		94
Mission 767 £2500	Very Good Very Good	Magnificent and massive part-active monoliths have fine acoustic subtlety and impressive loudness capability, ultimately limited by partnering (Cyrus) electronics	138 x 29 x 43cm floor, flexible	91dB/W <20Hz (in room)	R	81
Mission Cyrus 780 £180	Good Average +	Pricey but very pretty miniature based on Mission 760 but with beefed up box and crossover network to enhance sound quality still further	29 x 18 x 26cm light stands close to wall	88dB/W 50Hz	R	90
Mission Cyrus 781 £250	Average + Good	Properly run in, the pretty little 781 delivers a fast, dynamic and informative sound which more than justifies its price.	43 x 22.5 x 28cm matching stands 1ft	88dB/W 28Hz (in room)	R	86
Mission Cyrus 782 £350 (stands £80)	Good - Good -	Lively, articulate and beautifully finished, this compact wall-mount model with twin main drivers has good integration but a rather rich, 'Loudness' balance	50 x 25 x 32.5cm Cyrus stands near wall	90dB/W 50Hz		71
Monitor Audio MA1200 £900	Average Average +	This smooth and civilised slimline floorstanding loudspeaker is well built and nicely presented. But it is also expensive	94 x 20 x 26cm in free space	85dB/W 48Hz		68
Monitor Audio MA1800 £1400	Good Average +	Attractive and beautifully finished, even when ballasted with lead shot the 1800 inclines towards upper bass richness and lacks genuine extension	106 x 22 x 32cm floor, free space	88dB/W 30Hz (in room)		81
Monitor Audio Monitor 11 £330	Average Good	This tall and slim and attractive free space compact has an extra driver to help out in the bass, giving extra urge at some price in delicacy	52 x 20 x 24cm stands free space	87dB/W 48Hz (in room)	R	94
Monitor Audio Monitor 14 £400	Average Average	Floorstanding version of M11 suffers from excess upper bass, giving a thick, chesty coloration beneath a quite lively and well focused mid and treble	78 x 20 x 24cm floor well clear of walls	86dB 30Hz (in room)		98
Monitor Audio Monitor 7 £180	Average - Average	This lively and punchy near-miniature looks pretty enough and is good value but is let down by an unruly and indifferently integrated tweeter	34 x 16.5 x 17cm stands 1ft from wall	84dB/W 70Hz		74
Monitor Audio Monitor 9 £220	Good Average	Despite a much better treble balance than the 7, the Monitor 9 is less engaging and lively at low frequencies than its smaller sibling	37 x 20 x 21cm high stands near wall	85dB/W 30Hz		78
Monitor Audio Studio 10 £1200	Average Average +	Expensive, luxury build/finish and all-metal driver diaphragms provide engagingly transparent midrange and treble, spoiled by over-strong mid-bass.	40 x 20 x 25cm heavy stands clear of walls	87dB/W 45Hz		90
Monitor Audio Studio 5 £500	Average+ Average+	All metal diaphragm luxury miniature has splendid presence coherence but sound can be aggressive and lacks welly.	32 x 18 x 20cm stands close to wall	83dB 28Hz (in room)		98
Monitor Audio Studio 15 £1,600	Average+ Good	A little slow and lazy but better balanced than the smaller Studio models, the midband coherence and focus is superb, but it aint cheap	51x20x26cm free space	87dB 45Hz (in room)	R	102

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MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	ISSUE
Mordaunt-Short Classic 20 £395	Average+ Average+	Luxuriously finished compact delivers beguiling mid transparency but bass is altogether less convincing — one for the carpet slippers generation perhaps	37x22x27cm stands in free space	86dB 45Hz (in room)		102
Mordaunt-Short MS3.10 £110	Average Average+	Probably the liveliest and most communicative miniature around, this beautifully presented design is probably better suited to budget 'real hi-fi'	28.5x17.5x20cm stands in free space	88.5dB 48Hz (in room)		78
Mordaunt-Short MS3.20 £140	Average Average+	All the charm of its BB rated £99 baby 3.10 brother, plus a smidgeon more bass for those in a suggestible frame of mind	35.5x18x20cm stands against wall	85dB 50Hz (in room)	R	82
Mordaunt-Short MS3.30 £200	Average Average+	A little too mid-forward for neutrality or formal recommendation this attractive, good sized model nevertheless has more than enough appealing qualities	46x23.5x27cm stands 1-2ft from wall	87dB 38Hz (in room)		78
Mordaunt-Short MS3.40 £260	Average+ Average	It looks pretty and sound civilised but the 3.40 failed to ignite any degree of enthusiasm amongst our listeners. LF room matching is critical	57x23.5x27.5cm stands in free space	87dB 30Hz (in room)		86
NAD 8100 £269	Average+ Average+	Floorstanding variation on attractive 8225 miniature adds some half convincing extra bass thump and saves the price of stands - very cost effective	75 x 20 x 25cm floor clear of walls	88dB 25Hz (in room)	R	98
NAD 8225 £150	Good Average +	Notwithstanding lacklustre styling and an unprepossessing appearance, this NAD miniature has a smooth and even midband plus an appealing overall jauntiness.	34 x 20 x 18cm stands close to wall	87dB/w 45Hz (in room)	R	86
Naim NA IBL £798	Average+ Good	This tiny and elaborately engineered floorstanding wall mount delivers outstanding dynamics, speed and detail, marred by pronounced upper mid forwardness	wall, freestanding 84dB/W	30Hz (in room)		94
Naim SBL £1,527	Good Very Good	Impressive scale and full bandwidth coherence from an attractively discrete floor standing wall-mount — coloured midband but very well balanced and agile with it.	88x26.5x17-27cm close to wall	86dB 25Hz (in room)	R	102
Neat Petite £525	Average Good+	Priced and far from perfect, this near miniature is nevertheless one of the most entertaining and enjoyable speakers around, colorations notwithstanding.	30.5x20x18cm stands close to wall	86dB 33Hz (in room)	R	102
NVA Cube 1 £600 (stands £200)	Good - Good +	Attractive, cube-shaped semi-omni is very sturdily built, and gives an idiosyncratic but unusually open, spacious and informative sound	33 x 32 x 32cm own stands c0.5m from wall	85dB/w 52Hz	R	71
NVA Cube 2 £380	Average Good	A rude but exciting miniature, with unusually accomplished bass capabilities for its size	28.5 x 27 x 28.5cm NVA stands against wall	85dB/w 48Hz (in room)	R	82
NVA Cubix £1100	Average Good	Too idiosyncratic for formal recommendation, the Cubix possesses remarkable bass extension for its size, but is tricky to optimise	60 x 32.5 x 32.5cm	84dB/w 28Hz (in room)		78
Opus 3 Capella £599	Good Good	The sound of this Scandinavian curiosity certainly benefits from the crushed marble enclosure, though presentation is strictly DIY	32 x 40.5 x 26(ave)cm amongst books in	86.5dB/w 45Hz		66
Opus 3 Credo £399	Average Average	Credo's odd-shaped silicate-based cabinet confers good box and bass performance, but the sound could be more neutral for the price	32 x 28 x 32cm stands in free space	88dB/w 65Hz		74
Pearl & Oakley Victoria 200 £1099	Average - Average -	Extraordinary — and to many very attractive — 'ginger jar' presentation in Staffordshire ceramics, but let down by need for further acoustic development	93 x 33 x 33cm on floor in free space	87dB/w 30Hz (in room)		78
Philips FB815 £250	Average Average	An impressively — indeed imposing — physical package for the price, clever engineering gives a very competent if slightly hard and brittle sound quality	63 x 27 x 27cm low stands in free space	85dB/w 30Hz		86
Philips FB820 £450	Good Average	Big-but-less-than-beautiful three-way is well enough balanced but lacks communication skills in the time domain	86 x 27 x 35cm floor clear of walls	87dB 28Hz (in room)		98
Philips FB825 £650	Good Good	Generous sounding and impressively uncongested for the type, loudness and bass extension don't quite match the large and rather plasticky box	110 x 29 x 41cm on cones clear of walls	88dB/w 25Hz	R	90
QLN Model One £700	Good Average	Similar to Signature at two thirds the price, Model One exaggerates the latter's rich and heavy midbass and lacks its velvet smoothness	35 x (16-25) x (21-27)cm pillar	85dB/w 28Hz (in room)		82
QLN Signature £1100	Good Good	Beautiful but expensive luxury compact has a rather laid back and 'heavy' sound, but coloration is low and stereo imaging very good	37 x 18 x 36cm heavy stands in free space	83dB/w 30Hz (in room)		78
Quad ESL-63 £2072	Good + Very Good	With its unusual but subtle characteristics this classic electrostatic may not be punchy in the bass, but has strengths that some cannot live without	92 x 66 x 27cm open stand well clear of	84dB/w 34Hz	R	60
RAM Hermes £425	Average- Average+	Slim small floorstander is a bit tall for its footprint. Good sensitivity is combined with an attractively lively sound, but it's uneven and not truly coherent	70 x 21.5 x 23cm floor, freestanding	91dB/W 45Hz (in room)		94
RCF Mytho 3 £1,395	Average Average+	Undoubtedly very attractive and well built, incorporating a number of unusual and interesting ideas, the highish price isn't really justified by the performance.	100x21.5x30cm away from walls	88dB 25Hz (in room)		102
Richard Allan CD5 £184	Average - Average -	This neatly presented small reflex design can sound engagingly communicative, but is flawed sonically and technically and quite expensive too	38 x 19 x 23cm on rigid stands	88dB/w 80Hz		68
Rogers LS2a £193	Average Average	Provides very good engineering and stereo performance for the price, alongside some 'boxiness' and certain dynamic constraints	36 x 23 x 21cm low stands 1ft from wall	88dB/w 50Hz (in room)		82
Rogers LS4a £255	Good Good -	This artfully voiced and well balanced compact gives a fair flavour of the classical 'BBC sound' at a very reasonable price	43 x 25.5 x 24.5cm stands 1ft from wall	87dB/w 32Hz (in room)	R	78
Rogers LS6a £316	Good Good	Stereotypical model with impressively even balance, prospective purchasers will have to weigh the midband naturalness against slightly lazy dynamics and timing	51 x 27.5 x 28cm stands in free space	86dB/w 25Hz (in room)	R	86
Rogers LS7t £449	Good + Good +	A fine combination of classic qualities at reasonable price produces the "R" tag, but try to get a pair home on approval to check for bass 'heaviness'	56 x 27 x 28cm free space on 40cm stands	88.5dB/w 48Hz	R	59
Rogers LS8a £425	Average + Average +	This modestly priced floorstander is a bit of a mixed bag, with plenty of scale and welly but lacking the subtlety, clarity and agility delivered by some rivals	89x25.5x25cm clear of walls	91dB 48Hz (in room)		102
Rogers Studio 1a £612	Very Good Good -	The classic BBC monitor style sound sensitively updated — transparent and natural with fine stereo, but a touch 'heavy' in balance	63.5 x 30.5 x 30.5cm stands in free space	87dB/w 36Hz	R	66
Roksan Darius £1569 (£389 integral stand)	Good Very Good	Now totally realigned, the current Darius provides an exceptionally impressive combination of transparency and delicacy with fine information retrieval and speed	47 x 27 x 40cm own stands angled in space	82dB/w 20Hz	R	86
Royd A14 II £199	Average Good	Not the smoothest or prettiest around, this is still an informative if sometimes aggressive large bookshelf model, with plenty of welly for the price	40 x 26 x 23cm stands 1ft from wall	88dB/W 30Hz (in room)	R	94
Royd A7 Series 11 £115	Average + Average	Lively clear sound; good upper bass and dynamics, but treble "ramp" made vocals sound shut in. Try before you buy	31 x 20 x 17cm shelf or 50cm stands near	86dB/w 75Hz	R	53
Royd Apex £485	Average + Good	Not the smoothest sound around, it more than compensates with an impressively communicative and informative musical presentation	85.5 x 20 x 30cm on floor close to wall	87dB/w 33Hz (in room)	R	78
Royd Eden £235	Average Average +	Delightful mid/treble speed and transparency but determinedly bass light, this oddball miniature threatens cult status but could use a sweeter tweeter	31 x 20.5 x 18.5cm stands close to wall	87dB/w 85Hz	R	66
Royd Sapphire £200	Average+ Good-	Neat little miniature sounds a touch cold and thin but unusual main driver delivers remarkable speed and coherence for such a reasonably priced model	30.5 x 20.5 x 21cm frame stands 1ft from	88dB 28Hz (in room)	R	98
Royd Sintra £330	Average + Good	Balance is bass light and a little bright, but superb dynamics, speed and timing make this luxury miniature musically very informative and satisfying	30.5 x 20.5 x 19cm stands close to wall	88dB/w 50Hz	R	90
Ruark Swordsman £219	Good Average	Very attractively styled and finished, the Swordsman is a well built 'small bookshelf' model that delivered better test than listening results	38.5 x 20 x 27.5cm stands 0.5m from wall	84dB/w 50Hz		71
Ruark Swordsman Plus £269	Good Average	This real wood variation on the established Swordsman theme looks and measures rather better than it sounds, probably due to rather prosaic drivers	38 x 20 x 28cm stands 1-2ft from wall	84dB 27Hz (in room)		98
Ruark Talisman £629	Average Good	Clever and beautifully finished compact floorstander has some coloration but is impressively informative and communicative, with fine pace and timing	83.5 x 21.5 x 31 (max) cm close to rear wall	86dB/w 30Hz	R	90

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SD Acoustics OBS £845	Average Good	Recent changes have added some refinement to a seductive midrange, good timing and fine sensitivity, though bass extension is limited and coloration obvious	102 x 35 x 25cm floor, angled, away from	92dB/w 30Hz (in room)	R	82
SD Acoustics Ribbon £2150	Average Good +	Entertaining but a little underdeveloped and rather amplifier sensitive, the Ribbon is a lively and loud hybrid marred by some colorations; some like it, others don't	152 x 30 x (15-30)cm floor, angled, away	91dB/w 30Hz (in room)		81
SD Acoustics SD1 £1350	Average Very Good	A large scale, airy and unusually detailed system with excellent dynamics. Current model has more civilised top-end and warmer balance than original model	123.5 x 38.2 x 31.9cm free space	90dB/w 50Hz	R	60
SD Acoustics SD3 £379	Average Good	Neither cheap nor perfect, this near miniature sounds unusually lively and dynamic within inevitable physical constraints. Both engaging and entertaining!	38 x 19 x 29cm stands 10cm from wall	83dB/w	R	86
Seventh Veil System IV £1290 (£340 integral stand)	Average Good +	Lacks welly and loudness but delivers astonishing results with female vocals in particular. Antithesis of the 'good allrounder'	72 x 44 x 21 x 29cm own-stands close to	84dB/w 28Hz (in room)	R	86
Shan Shimna £315	Average+ Good-	Pretty little miniature with resin-based enclosure has a bright, thin but sweet and communicative sound; loudness and welly are both limited	31 x 21 x 17cm own stands 1ft from wall	84dB 48Hz (in room)	R	98
Sony APM-101ES £100	Good Average	Big hearted sound from small bookshelf successor to BB '10ES, sounds a little untidy at frequency extremes, so suits CD better than vinyl	39.5 x 22.5 x 23.5cm stands, free space	86dB/w 52Hz	R	71
Sony APM-121ES £150	Average Average -	Good perceived high tech value, but the balance has an artificial 'loudness' character, too rich in the bass and too strong in the treble	43 x 25 x 28cm stands, free space	86dB/w 25Hz (in room)		86
Sony APM-141ES £200	Average Average	A great deal of loudspeaker for the money, the rich sounding '141 needs a big room and still shows significant 'loudness' (boom'n'lizz) tendencies	61.5 x 26 x 32cm stands in plenty of	88dB/w 30Hz (in room)	R	78
Sony APM-181ES £300	Very Good Average	Big and beefy but equally fat and bass heavy, this well engineered 3-way has notable strengths but lacks transparency and sounds better at lower levels	57.5 x 29 x 36cm low stands, free space	87dB/w 40Hz		71
Spendor SP1 £800	Very Good Good	A very subtle and musical performer that works particularly well with digital material. An exceptional allrounder	63.5 x 29.5 x 30.5cm stands, free space	87dB/w 41Hz	R	60
Spendor SP2/2* £500	Very Good Good +	Conceding little to the SP1, this 30 litre model displayed good tonal balance with a highly articulate midrange, only slightly marred at frequency extremes	50 x 25 x 30cm stands, free space	87dB/w 45Hz	R	59
Spendor S20 £510	Very Good Good	This solid and elegant luxury compact maintains Spendor's tradition for peerless mid-to-treble coherence and perspectives. Bass is rather unconvincing.	38x22x26cm stands 1-2ft from wall	83dB 25Hz (in room)	R	102
Spica Angelus £1295	Good Average	A little bass shy and soft in the bass and lower mid, the free standing Angelus is otherwise tidy, extremely lively and fluid, if uneven overall	116.8 x 53.3 x 26cm away from walls	86.5dB/w 50Hz		60
Spica TC50 £599	Good - Good	This triangular-profile 'grown up' miniature is a shade boxy and laid back but has good rhythmic and musical integrity	40.5 x 33 x 29cm stands in open space	88dB/w 55Hz		71
Spica TC50SE £799	Good - Good	A heavily UK-modified TC50, the SE sounds less boxy and more spacious, but lacks some of the urgency of the standard model	40.5 x 33 x 29cm stands in open space	88dB/w 55Hz		71
Studio Power DMS100 £249	Average + Average +	Close to a BB rating, and in many respects remarkable value for money. Delivers an impressively smooth and large sound, but sheer ugliness will limit its appeal	51 x 26 x 32cm open stands 1ft from wall	86dB/w 25Hz (in room)	R	82
Tannoy Westminster £3600	n/a Good +	These awesome horn loaded speakers are remarkably controlled and impressive, if only suited to a few pockets and rooms	Huge, flat against rear wall, away from	96dB/w (manuf.)	R	Coll '87
Tannoy 603 £120	Average+ Average+	Pretty hexagonal cabinet miniature is optimised for free space siting and delivers fine imaging with little boxiness, but little in the way of welly and power either.	33.5x22(max)x16cm high stands in free space	85dB 45Hz (in room)	R	102
Tannoy 609 £250	Good Good	Distinctive hexagonal cabinet reduces box colorations, and new dual concentric driver is sweeter than its predecessors, making this one very superior speaker	50x32(max)x22cm stands clear of walls	90dB 25Hz (in room)	BB	102
TDL Monitor £1799	Very Good Very Good	Fine solidity and good accuracy, with enough bass extension to satisfy even organ freaks. Needs a big room and can sound a bit lazy and a shade tinkly	118.5 x 30 x 47cm 0.5m from walls	85dB/w 28Hz	R	66
TDL Studio 0.5 £399	Average Good	This tiny floorstanding transmission line has good agility but doesn't provide the coherence or even balance of the slightly bigger Studio 1	55 x 20 x 30cm own stand, free space	85dB/w 40Hz (in room)		94
TDL Studio 1 £599	Average + Good	Delivering genuinely extended bass from a compact floorstanding enclosure, the Studio is very detailed but a shade clinical and detached in presentation	76 x 23 x 33cm	84dB/w 25Hz (in room)	R	78
Technics SB-CS5 £70	Average Average	Clearly fine material value for money, the CS5 nevertheless betrays its midi system heritage.	42.5 x 25 x 24cm Stands in free space	86dB/w 48Hz	R	86
Technics SB-EX2 £179	Average- Average	Nicely presented, well built and decent size enclosure sounds solid but somewhat dull, thanks presumably to rather ordinary, low cost drivers	48 x 23.5 x 27cm stands clear of walls	86dB 20Hz (in room)		98
Technics SB-RX50 £600	Very Good Average +	With its unique coaxial drive unit the RX50 proved a smooth and well balanced loudspeaker, its minor weakness being a mildly excessive low bass	48 x 30 x 26cm free space on 40cm stands	86dB/w 40Hz	R	46
Technics SBC 250 £140	Average + Average -	Despite a fairly even tonal balance, the 250EK sounded muddled in the midrange and dull in character	36.5 x 23.5 x 20.5cm free space, stands	86dB/w 60Hz		46
Townshend Glastonbury IIS* £1700	n/a Very Good	What? No bass? Actually, like the KEF 107, Glastonbury II goes down so low you might not notice how good it is. A truly remarkable performer. Superb	91.5 x 28 x 4.6 free standing in room	88dB 27Hz	R	65
Townshend Glastonbury Tor £1495	Average - Very Good	Prodigious bass extension, stunning stereo focus and low cabinet coloration, but limited loudness from low sensitivity and power handling	99 x 26.5 x 33cm well clear of walls	82dB/w below 20Hz	R	90
Vandersteen Model One £1000	Average + Average +	This compact American floorstander's elegant staggered baffle arrangement contributes to a refreshing freedom from boxiness, but the price is quite high	100 x 30.7 x 25.6cm floor clear of walls	87dB/w 23Hz (in room)		86
Vecteur Premiere £695	Average Good	Expensive for its material content, this pretty French compact nevertheless has a beguiling sound quality that indicates painstaking development	34 x 19.5 x 25cm light stands clear of walls	88dB 48Hz (in room)		98
Videotone Minimax 2 £80	Poor Average -	Cheap in build and QC as well as price, but cheerful (if coarse) with it - if a little too cheerful after extended listening	27.5 x 17 x 20cm near rear wall	84dB/w 90Hz	R	74
Visionik David 6001 £173	Average - Poor	Sharp styling a classy looking miniature makes, but the complex grillework worsens a sound which starts off with too much top and not enough bottom	20 x 12 x 13cm against rear wall	87dB/w 130Hz		74
Wharfedale 410 £130	Good Average-	One step up from the Diamond, this attractive and sensitive small bookshelf model sounds smoother but is also rather bland and uninvolving	34.5 x 22 x 22.5cm stand against wall	89dB/W 45Hz (in room)		94
Wharfedale 505.2M £260	Average+ Good-	Luxury red mahogany finish version of 505.2, confirms that this well balanced design remains fully competitive nearly three years after the original	44 x 25.5 x 25.5cm stands in free space	87dB 45Hz (in room)	R	98
Wharfedale 505/2 £190	Average Good	This lively Wharfedale provides plenty of speaker with unusual refinement for the money, and should be fairly tolerant of room siting	44 x 25.5 x 24cm stands 1ft from wall	86dB/w 55Hz	BB	66
Wharfedale Coleridge C £600	Good Good	Very prettily dressed and sounds pretty good as well, though whether enough to justify the £600 pricetag is open to debate. Well balanced, smooth and a little dull	48x25.5x25.5cm stands clear of walls	86dB 30Hz (in room)		102
Wharfedale Delta 30.2 £100	Average- Average	This hundred pounder has a bigger main driver than many of its rivals, and so packs a bit more welly and loudness. Coloration is rather obvious, but timing is good	38 x 22 x 17cm stands close to wall	88dB 48Hz (in room)	BB	98
Wharfedale Diamond IV £109	Good Average +	Thanks to a new metal dome tweeter, the new Diamond is much more civilised than its predecessors, with an attractive lively bounce but some boxiness	27 x 18 x 18.5cm stands close to wall	86dB/w 48Hz	R	90
Yamaha NS 1000M £900	Good Good +	Living up to its monitor label, and tonally well suited to digital material, the NS 1000M is superbly crafted and capable of high levels	67.5 x 37.5 x 32.5cm 30cm from wall, stands	90dB/w 40Hz	R	46

The Directory

LOUDSPEAKERS - SATELLITE AND SUBWOOFER SYSTEMS

Satellite and subwoofer systems, sometimes referred to as three way systems, consist of a small pair of speakers (the satellites) and an extra box (or two) to handle the low frequencies.

Most systems use a single sub-woofer to supply low bass output, although stereo sub-woofer systems are available. By freeing the main speakers of the necessity of generating deep bass they can be made much smaller than a standard design and as a result satellite

and subwoofer systems are usually visually unobtrusive.

Positioning of the sub-woofer is usually not as critical as the positioning of a conventional speaker and as a result the largest part of the system can be hidden away entirely, although please refer to the placement notes below as this does not apply to every system.

In general the sonic performance of these systems will fall below the performance of a good, comparably priced, conventional speaker.

The value ratings given below are judged in the context of sat and sub woofer systems only and are not judged by the same criteria as the main loudspeakers, thus a Recommended sat and sub system probably won't sound as good as a Recommended traditional speaker.

If you are prepared to compromise slightly in terms of sound quality then a satellite and sub-woofer system might represent a good solution for those situations where the loudspeaker should be heard but not seen.

LOUDSPEAKERS - SATELLITE AND SUBWOOFER SYSTEMS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE (cm) PLACEMENT	SENSITIVITY BASS FROM	VALUE	ISSUE
Allison MS 205 £420	Average Good -	Tasty high quality satellites give this quite pricey 3-box system a touch of class. Subwoofer is very compact and only slightly boomy.	25.5x14.5x15 + 29x 29x36 stands close to wall	86dB 30Hz	R	104
Bose Acoustimass AM3 £289	Average Average	Ultra compact 3-box is well balanced though limited in loudness and bass. Tiny satellites are a bit fierce, and grilles unhelpful	9x11x11 + 20x37x19 close to wall	85dB 48Hz		104
Bose Acoustimass AM5 £569	Average + Average +	Pricey but cleverly engineered 3-box system is well balanced and uses tiny twin-driver satellites to good effect	16x7.7x12 + 36x19x48 sats at wall, sub 2ft from wall	85dB 40Hz	R	104
Heco Libero £375	Average Average	Attractive 3-box package uses neat metal satellites with versatile mounting accessories, but subwoofer is boomy in the midbass	18x11x12 + 21x55x 31.5 uncritical	85dB 45Hz		104
Jamo SW/SAT300 £300	Average Average	Attractively finished 3-box package has 'tunable' subwoofer that allows boom to be minimised and a good balance achieved	21x15x8 + 21x48x34.5 uncritical	85dB 40Hz	R	104
RSS Solid/Bass Station £550	Average Average	Multi-driver macho subwoofer adds mucho muscle to Solid satellites, but it's much more midbass than serious extension	24x12x12 + 47x 4& x 20 sub at wall, sats in free space	91dB 45Hz		104
Wharfedale 2130 £300	Average Average +	3-box system marred by indifferent boomy subwoofer but rescued by novel wide-dispersion satellites that give an open sound	14x24x11 + 19x32x 50 sub away from wall	86dB 48Hz	R	104

PERSONAL STEREOS

Whilst not exactly hi-fi components, personal stereos probably play more music to more ears than all manner of domestic systems and as such demand some attention.

Now that personal CD players have joined the ubiquitous Walkman in the market, the variety and standard of sound quality is huge, with obscurely named cassette players practically falling out of your cornflakes packet and the top Discmen going for £300 or more.

Despite their diminutive size personals attempt to incorporate as many gimmicks and features as possible, cassette players often incorporating tuners, Dolby noise reduction or even graphic equalisers.

CD players are still relatively expensive, although prices have come down a lot, and don't tend to vary that much on the features front, rather the amount and quality of accessories differs. Rechargeable batteries are extremely useful and increasingly popular, some can now be recharged within the unit and charge capacities are also being increased.

Most models come with a mains adaptor, which in some cases doubles as a battery charger and some include a wired remote control. A few are now appearing with infra-red remote control although this is more applicable to CD players.

Sound quality on the cassette front seems to

have a proportional relationship to price and integrity of construction – wow and flutter being quite obvious on the cheaper models.

CD players become less noisy as they get dearer and also reduce in size; one drawback of the latter seems to be that immunity to shock suffers as a consequence, although newer models are starting to buck this trend. Cassette players do, on the whole, seem better suited to the outdoor life than their digital counterparts, as does the software. Bear in mind that the sound and lab ratings given below cannot realistically be compared to those in other categories or between cassette and CD personals

PERSONAL CASSETTES

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Aiwa HS P505MkII £70	Good	Very good clutch of features and accessories plus good sound at a reasonable price. Could be more user friendly	Remote control, rechargeable battery and charger	BB	102
Aiwa HS-PL707 £135	Very Good-	Has a precise, attractive sound, if a little clinical and cold. This player might be ideal for the user who will listen to mostly classical music. Somewhat fiddly to use	Remote control, BBE sound enhancer, charger & battery	R	102
Aiwa HS-JX705 £220	Good	Rather expensive radio-equipped player. Sound quality on tape playback didn't match up to the Aiwa HS-PL707	FM/AM tuner, recording mic remote control, charger		102
Panasonic RQS15 £85	Good	Considerable power and immediacy to the music though with some raggedness. Good features and accessories. Well designed and easy to use	Remote control, rechargeable battery and charger	R	102
Panasonic RQV520 £100	Good	Features an onboard radio without sacrificing sound quality on tape playback. You lose out on accessories, though (no battery charger)	Radio, remote control, bass enhancer		102
Panasonic RQS65 £130	Good+	Solid, warm sound plus a good selection of features and accessories all combined in a stylish and very user friendly package. Comes with one of the better remote controls	Remote control, rechargeable battery and charger	R	102
Sanyo MGR401D £40	Average-	Easy to use budget model with a radio and some useful features (including a simplified remote control). Sound quality on tape isn't great but is helped by the bass enhancer	Radio, remote control, bass enhancer with graphic equaliser		102
Sanyo MGR580 £50	Poor	A more sophisticated radio than on Sanyo's 401D but the feature count is low and the tape playback unexceptional	Radio 'digital tuner', auto reverse		102
Sanyo SPT1000 £40	Average	Despite outlandish colourful trim and features completely unrelated to audio enjoyment (a 'Pedometer' for monitoring jogging) this has a better basic sound than the other Sanyos	Bass enhancer		102
Sharp JC-510 £30	Average	Serviceable sound quality and some decent features at a low price	Radio, bass enhancer, auto reverse		102
Sharp JC-K99 £160	Good-	Sharp's 'extremely lightweight' model. Well made, elegant and it certainly doesn't weigh a lot. Pleasant sound, marred on the test sample by some distortion	Remote, rechargeable battery and charger, bass enhancer		102
Sony WM DD33 £90	Good-	Well built and resistant to vibration on the move but comes with very limited features and accessories for the price	Bass enhancer		102
Sony WM EX80 £150	Good	User friendly Sony with a good remote control and high quality, accurate sound. Comes with all the extras	Remote control, rechargeable battery and charger	R	102

The Directory

PERSONAL CASSETTES

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Sony WM DD99 £240	Good-	Mixed bag of accessories (nice headphone storage system, but no remote control) with variable sound quality at a steep price. But it does have Dolby B&C, good build quality and ergonomics	Dolby B&C, rechargeable battery and charger, auto reverse		102
Sony Walkman Pro £249	Very Good	One of the finest sounding cassette decks on the market today. A mandatory Best Buy, it takes other personals to the cleaners (except on weight and power consumption)	Dolby B, C, types I, II & IV, record, line in/out, varispeed	BB	52/56

PERSONAL CDS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Aiwa DX-P50 £155	n/a Average -	A tad aggressive both through earphones and domestic systems, not very walkable but it has got two stage bass enhancement	Digital output, mains adaptor, remote		94 Supp.
Denon DCP-100 £250	n/a Good	Solidly constructed and nicely finished in the slightly impractical Velvex, almost walkable, competent if uninspiring sound quality	Remote, mains adaptor, no earphones, rechargeable batts		94 Supp.
Denon DCP-50 £180	n/a Average +	Not very walkable, but lightweight and nicely finished in a nextel like grey. Sound through a system is a tad unexciting but not too bad	No headphones, remote, mains adaptor		94 Supp.
Goodmans GCD-10 £120	Average - Poor	Cheap, flashy and not short on accessories, the GCD-10 is a rather noisy player that left a lot to be desired on the sound quality front	13.5 x 3.7 x 18cm, 478g, mains adaptor		66
Kenwood DPC-41 £130	n/a Average -	Lightweight, not very walkable but nice control layout. Sound through the phones is on the thin side, through the line output it's pretty average for a portable	Mains adaptor, rechargeable batts		94 Supp.
Kenwood DPC-81 £200	n/a Good +	Chunky metal cased player that makes pretty confident sounds through a system but sounds dry via earphones and ain't exactly walkable	Remote control, mains adaptor/charger and batts, digital output		94 Supp.
Philips AZ6897 £200	n/a Good +	Unusually designed and equipped with a radio the Philips is almost joggable, it sounds remarkably good via a system and a little cautious through the phones	Mains adaptor with built in plug, wired remote, clock and carrying case	BB	94 Supp.
Sanyo CP-12 £260	Average Good +	Sonically amongst the more enjoyable personal CD players and capable of revealing the musical aspects of a disc in an interesting and entertaining fashion	12.5 x 2 x 12.7cm, 380g, wired remote, mains adaptor	R	66
Sony D-350 £300	n/a Good	More buttons and widgets than any of the others but not the sound quality or walkability to go with it	Mains adaptor, clock, comprehensive facilities, rechargeable batteries		94 Supp.
Sony D-66 £180	n/a Average +	One of the few walkable CD players on the market, sound quality is a little muddled but not offensive	Mains adaptor, rechargeable battery pack	R	94 Supp.
Technics SL-XP1 £140	n/a Good +	Remarkably competent and enjoyable player that you can actually use on the move and sounds enthusiastic through a domestic system	Rechargeable batts, mains adaptor/charger	BB	94 Supp.

TUNERS

The radio medium operates at a much lower profile than TV, but in areas outside pop music the BBC service is the envy of the world. Live Prom concerts can rival all other sources from a hi-fi perspective. Only the FM (VHF) bands give stereo hi-fi sound, though AM (MW & LW) are useful for certain transmissions in the UK.

Something of a hi-fi afterthought, tuners are often selected merely to match a chosen amplifier

cosmetically. However, the task they carry out is far from simple (or cheap), combining the skills of RF (reception) and audio (signal processing) engineering. The importance of the former will depend on local reception conditions, but money invested in a high quality outside aerial system is well spent.

Tuners come in two basic types. Analogue models tune gradually (and usually manually)

across the bands, and can have analogue or digital displays; they are often preferred for sound quality, and are certainly best for AM bands. Digital tuners offer convenient automatic tune facilities and hold many station positions in pre-set memories. (The Lab and Sound results for models tested in issue No. 65 refer to FM only. For AM results see under Comments.)

TUNERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Aiwa XT-003 £105	Average Average-	Economically designed and built in the UK, but trade-offs have a marked influence on FM and AM sound quality.	FM/AM digital, 30 presets, no signal strength meters.		93 Supp.
Akai AT-52L £150	Very Good Very Good	Holds its own on FM against many much more expensive tuners, but AM is very poor	All bands	BB	65
Akai AT-93L £250	Good + Good +	By AM standards presentable (good) while FM delivers the goods	All bands, aerial switch	R	65
Arcam Alpha 2 £185	Good Average+	Re-styled to blend in with the Alpha system, Arcam's cheapest tuner makes up for its lack of features with a sensitive front-end and mellow sound.	FM/AM analogue, no presets, manual tuning + AFC	R	93 Supp.
Arcam Delta 80 £340	Very Good Very Good	Hi-fi sound on FM, good on AM, a dependable British all-rounder	6AM, 6FM presets, FM/MW/LW display, manual tune	BB	55
Creek T40s3 £220	Average+ Average	Creek's FM-only analogue tuner is now in series 3 form, though the aesthetics remain unchanged. Our sample was hampered by an obvious bass 'hump' though production units are said to be cured.	FM-only analogue, no presets, manual tuning + AFC		93 Supp.
Denon TU-260L £100	Very Good Good+	A new cheapie from Denon with the bare minimum of features. Careful designwork promises a surprisingly open and vivacious sound, so don't overlook it!	FM/AM digital, 20 presets, manual and auto tuning.	BB	93 Supp.
Harman Kardon Citation 23 £600	Good Very Good	Fine performance, interesting features and ease of use are this tuner's forté, and the sound quality is top notch	FM/AM seek/manual adjustment muting 16 presets remote control	R	60
Harman Kardon TU9400 £250	Good Very Good	Striking in appearance and with a sound to match, this new digital tuner comfortably exceeded our expectations. On stereo FM it's HK's best yet.	FM/AM digital, 24 presets, auto-tuning, signal strength meter	R	93 Supp.
Linx Theta £475	Good Very Good	A Magnum Dynalab on the cheap with the hallmark styling of this small British newcomer. Some of the best midrange from any tuner	Manual analogue tuning, no presets, signal strength meter	R	72
Magnum Dynalab FT101 £599	Good Very Good	Although expensive for its fairly minimum set of facilities, its excellent sound makes up for what it lacks elsewhere	Analogue manual tuning, no presets, signal strength meter	R	72
Marantz ST-40L £140	Average + Good	A little slow to tune but once accomplished it provides a meaty and dynamic sound on FM. AM too has a little extra bite to its performance	FM/AM digital, 30 presets, manual/auto tuning	R	93 Supp.

The Directory

TUNERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Meridian 204 £660	Good + Good	Pleasant sounding with a fine finish but does not make the grade at this price	FM only, auto scan, digital, remote, timer		55
Naim NAT 01 £1377	Very Good Excellent	There may be better sounding tuners in the world, but we have yet to hear one	No presets. Two box, flywheel tuning, FM only, Analogue	R	50
Nakamichi ST-7E £750	Good + Good +	Exceptionally good for weak-signal areas, and good all round	16 AM/FM presets, auto time digital		55
Pioneer F91 £360	Excellent Good +	Easy to use, this model has excellent RF performance and scored very high ratings on the listening tests	FM/AM 24 presets	R	60
Proton AT-300 £199	Good	The AT-300 is pretty on the outside, orthodox on the inside and rather dear. AM - poor	FM/MW only	R	65
Quad FM4 £399	Very Good Good +	Fine sound, excellent ease of use, good build and finish and a more than satisfactory technical performance	7 presets. Digital	R	50
Revox B260 £1120	Excellent Very Good	Sophisticated and expensive, the B260 is ideally suited to the rest of the Revox range and should also work well in other systems	FM - virtually everything	R	60
SAE T-102 £449	Good + Good +	Expensive for all the radio you get, but sounds interesting. AM - poor	FM/MW only	R	65
Sony ST-S530ES £200	Good+ Good	The cheaper version of Sony's revered '730 certainly looks and feels the part but its sound is, well, less startling. Civilised, yes, but lacks much enthusiasm.	FM/AM digital, 30 presets, hi-blend + Cal tone + manual/auto		93 Supp.
Technics ST-G70L £200	Good+ Good+	Another very polite and refined-sounding tuner but one that does retain just enough sparkle to keep your interest. Plenty of widgets to play with too...	FM/AM digital, 39 presets, selectable RF/IF + fine tuning, signal. str. mtr.	R	93 Supp.

TURNTABLES - CARTRIDGES

Very much the 'slave' of turntable and tonearm and to some extent undermined by the supply of free 'starter' cartridges on many turntable systems, the cartridge is still worth taking seriously. The quality of both the stylus itself and the cartridge's tracking performance are important in preserving that most important part of the hi-fi system – the record collection – and the cartridge also plays a significant role in determining the overall balance of a system.

Cartridges fall into two groups: high output models, capable of working directly into any amplifier, and more expensive low output models.

Stereotypically, low output cartridges use the moving coil principle of operation, have better mechanical integrity and tighter tolerances, and give better performance but at much higher cost. Most under-£150 amplifiers and many valve designs need either an extra head amp or

transformer to cope with the low output.

Cartridge/amplifier interfacing can be very subtle, but even basic high output moving magnet designs benefit in overall balance from optimised amplifier capacitance loading. Still more important, the mechanical characteristic of cantilever compliance ('springiness') needs to be considered in the light of the effective mass of the tonearm which will be used.

TURNTABLES - CARTRIDGES

MODEL PRICE	LAB SOUND	COMMENTS	ARM EFFECTIVE MASS OUTPUT/TYPE	VALUE	ISSUE
Arcam C77 £22	Average + Average +	A sensible moving magnet package with good bounce at a competitive price	6-16g Normal, MM	BB	48
Arcam C77Mg £30	Average - Average	Punchy sound quality with plenty of extra energy to liven things up. The solid body seems well worth the extra £10	4-8g Normal, MM	BB	67
Arcam E77Mg £50	Average Average	Our sample had a disappointing stylus, but gave a coherent, rich and laid back sound, with good 'scale'	3-8gN Normal, MM	R	48
Arcam P77Mg £60	Average + Average +	Cautiously recommended, the P77Mg was preferred to its cheaper partner by virtue of a better tip. Channel balance could have been better	4-9g Normal, MM	R	48
Arcam PMX10 £100	Good + Very Good	Not the very clearest in complex high-frequency sounds, but lively and exciting, good transients	5-11g Low, MC	R	85
Audio Note I02VDH £1295	Good Very Good	One of the best, giving 'an extraordinarily relaxing midrange clarity', needs a transformer	8-18g Very low, MC	R	43
Audio-Technica ART1 £800	Good + Very Good	This is a delicate and very fluid-sounding MC that tracks well, offers very low distortion and exceptionally good stereo separation	9-18g Low, MC	R	72
Audio-Technica AT-420E £35	Average Average	Better suited to pop recordings, this MM bears some of the sonic hallmarks of the Linn K5	7-14g (damp) Normal, MM	R	67
Audio-Technica AT-95E £19	Average - Average	Clear, dynamic if richly balanced, the magnetic '95E is a definite Best Buy	8-14g Normal, MM	BB	48
Audio-Technica OC-10 £307	Good + Good +	Good treble and good detail too, but some congestion and coloration reduces its informativeness.	4-12g Low/MC	R	103
Audio-Technica OC-5 £123	Good + Good	For the price, it's unusually effortless and detailed, but it tends to become rather relentless and tiring after a while.	5-14g Low/MC	R	103
Audioquest AQ 4041-L £400	Very Good Good +	Slight harshness detracted from the performance of this otherwise clear-sounding and detailed cartridge	8-16g Low, MC		84
Audioquest AQ 7000 £1200	Good Good +	Stunning stereo imaging and good detail at low levels are spoiled by less-than-perfect tracking and high sensitivity to arms.	6-20g Low, MC		91
Audioquest MC5 £220	Average Average	Offers high-output benefits but the drooping frequency response and severe VTA error preclude recommendation	10-20g Normal, MC		54
Cello Chorale £750	Average + Good	Now available through a new distributor at a saving of some £300, the Chorale is still blessed with a delicate but highly detailed treble. Arm matching is a problem	3-9g Low, MC		72
Denon DL103 £99	Good Average +	An oldie but in many ways a goodie, the 103's good performance in bass and general 'life' is seriously let down by its spherical stylus which kills subtle details.	9-22g Low/MC		103
Denon DL110 £69	Good Good	Firmly recommended as a fine all-rounder, this high-output moving coil model is likely to perform well in nearly all circumstances	6-16g Normal, MC	BB	48
Denon DL160 £89	Average + Good	Although listeners just preferred the 110, its brother here proved a twin in lab tests and is still "thoroughly competent"	6-16g Normal, MC		43
Denon DL304 £200	Very Good Excellent	Uncoloured, detailed, neutral, superb tracking; top notch altogether, and a top notch bargain too.	4-12g Low/MC	R	103
Dynavector 17D2 £280	Very Good Very Good	Clear, detailed, neutral and generally very informative - excellent	6-18g Low, MC	R	91
Dynavector DV-50X £99	Good Average	A high-output MC model with impressive lab performance, but whose tip and sound quality both disappointed	6-14g Normal, MC	R	48

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The Directory

TURNTABLES - CARTRIDGES

MODEL PRICE	LAB SOUND	COMMENTS	ARM EFFECTIVE MASS OUTPUT/TYPE	VALUE	ISSUE
Dynavector DV10X IV £125	Average Average +	Fine sounding and realistically priced, damping is recommended to ensure successful tracking ability	8-18g (damping) Normal, MC	R	48
Dynavector DV23RS £230	Average + Good	Sound quality was described as "shut-in", lacking energy and sparkle but with some "edginess" in high frequencies	10-22g Low, MC		28
Dynavector XX-1 £680	Very Good Good +	Good, but not immensely competitive at the price, and not helped by comparison with the low output version	7-15g Normal, MC		84
Dynavector XX-1L £680	Very Good Very Good	Very clear, very detailed, no troubles with tracking; response lift around 20kHz seems to do no harm	7-13g Low, MC	R	84
Empire Benz Micro MC-Gold £130	Good + Good	Nothing is obviously wrong, but nothing is stunningly right either and tracking isn't perfect. Safe, but perhaps a little too safe	7-17g Low/MC		103
Empire Benz Micro MC-Silver £130	Good Good	High output MC that though ultimately not the peer of the MCGold is more appropriate to the sort of equipment it's likely to be partnered with	8-18g Normal/MC	R	103
Empire Benz-Micro MC-2 £699	Average Good +	Similar to both the Empire MC1000 and vdH MC2 in design, the Benz offers a warmer and very transparent account of the music. Its tracking prowess is slightly limited	5-12g Low, MC	R	72
Glanz GMC-10EH £50	Good Good	The rising HF trend of this high o/p MC may cause problems in certain systems but with a favourable wind its seductive qualities will win out	8-14g Normal, MC	R	67
Glanz GMC-10LX £80	Average + Average +	Bearing some of the hallmarks of the '10EH, the '10LX is still less competitive in the sonic stakes	7-15g Low, MC		67
Glanz GMC-20E £129	Good + Good +	Very good tracking, smooth sound and good detail. Very slight surface noise enhancement	5-10g Low, MC	R	91
Glanz MFG-110EX £25	Average Average	A little bright but giving detailed bass and clear treble, this was competitive at the price	6-16g Normal, MM	R	43
Glanz MFG-310LX £50	Good + Very Good	Detail and treble outstanding for sub-£100 cartridge. Slight coloration may be due to body resonance	6-10g Normal, MF	BB	85
Glanz MFG-610LX £90	Good + Good +	Similar to cheaper '310 but slightly clearer transients and bass. Benefits from lowish impedance loading	3-10g Normal, MF	R	85
Goldmund Clearaudio £1500	Average + Very Good	Something of a mixed bag overall, its sonic character bears a strong resemblance to the Pradikat though it shares some of the hallmarks of the more expensive Accurate	5-12g Low, MC		60
Goldring 1012 £50	Good + Good	Slightly harsh sound but plenty of life and quite good detail. Some very high frequency coloration apparent	6-12g Normal, MM	R	85
Goldring 1022 £70	Good + Good	As with 1012, a touch harsh; detail and transient purity improved, though, and it goes well with electric guitar!	5-11g Normal, MM	R	85
Goldring 1042 £90	Good + Good	Not terribly subtle, and not such good value alongside 1012 and 1022. Quite lively, though	7-12g Normal, MM		91
Goldring Elan £20	Average + Average	A lightweight and frisky-sounding MM that appears to be based upon the same body as the Nagaoka mm4	7-15g Normal, MM	R	67
Goldring Elite £200	Good + Good	The basics are right, and the Elite will cheerfully tackle any source material, but its sound possesses a certain dirtiness which can irritate.	8-18g Low/MC		103
Goldring Epic II £32	Average Average +	An excellent budget choice though the limitations of the stylus are rather obvious at higher frequencies	5-12g Normal, MM	R	67
Goldring Eroica H £105	Good Good -	More confused and coloured than its low-output sibling - high output less of an issue in these days of cheap MC-compatible amplifiers	8-15g Normal, MC		84
Goldring Eroica LX £120	Good + Good	Not the most subtle cartridge in the world; can sound edgy at times, but lively and informative	8-14g Low, MC	R	84
Goldring Excel £549	Average + Good	Goldring's most expensive cartridge to date errs on the warm and heavy side of neutral. Strong bass lines are its forte though its ability to resolve subtle treble details is weaker	6-13g Low, MC		72
Goldring Excel GS £600	Very Good Good +	The Excel has some true high end quality in its lack of annoying colorations, but tracking seems indifferent and high levels tend to sound rough and edgy.	9-20g Low/MC		103
Grado ZF3E + * £47.50	Average - Average	Downtilting balance disguises the brightness of this cartridge; bit of a mixed bag at this price	9-20g (damping) Normal, MM		54
Grado ZTE +1 £26.50	Average - Average	Bass and treble are a trifle coloured but the midband proved highly enjoyable. Ideal for budget systems	6-13g (damping) Normal, MM	R	54
Kiseki Blackheart £1795	Good Good	This cartridge demonstrated refined poise and a delicate but at once potent security, however, the price did seem a little on the high side compared to other Kisekis	6-16g Low, MC		60
Kiseki Blue Goldspot £450	Very Good Good +	Good bass and imaging, but hints of spit and coloration let the side down slightly	8-15g Low, MC		84
Kiseki Lapis Lazuli £4000	Good Very Good	Combining very sensible design concepts at a silly price, the Lapis Lazuli is best thought of as combining the detail of the MC3000 and the fluidity of the Clearaudios	4-12g Low, MC		60
Kiseki Purpleheart Sapphire £799	Good + Good +	Rare, beautiful to look at and sweet to listen to, our review of this high-flyer conjured up images of Japanese art	5-14g Low, MC		48
Koetsu Black S £612	Average Good +	The S is an OEM design built to Koetsu's blueprint. It features a sturdier fixing plate and offers a brighter, faster and more tactile sound than the earlier K	8-15g Low, MC	R	72
Linn Asaka £373	Good + Good +	Disciples of Linn who are trying to realise their true "Karma" may find that saving money is not a short cut to heaven	9-18g Low, MC	R	Coll. '86
Linn K5 £39	Average Average +	Not as crisply focused as the costlier Linn magnetics, the K5 offers a smoother presentation	7-16g Normal, MM	R	67
Linn K9 £89	Average Good	Linn threw this model into the leading pack by beefing up the Basik's bodywork, adding a super stylus, and keeping the price fair	6-15g Normal, MM	BB	Coll. '86
Linn Karma £564	Very Good Very Good	A specialist which is strongly recommended for Linn-based systems; results may be less predictable in more general application	9-18g Low, MC	R	Coll. '86
Linn Troika £798	Very Good Good +	Good all-rounder, but still some hint of unhappiness at very high levels. Good imaging and bass.	6-18g Low, MC		91
London Maroon £149	Average Average +	Now manufactured under the London brandname this Decca cartridge is as iconoclastic as ever	9-20g (damping) Normal, MM		67
London Super Gold £300	Poor Average -	Immediate and (in the midrange at least) detailed, but very coloured, very nonlinear and questionable effect on records. Devotees swear by it	9-15g (damping) Normal, fixed stylus MM		84
Milltek Aurora £249	Good + Good +	An overall feeling of relaxed ease characterised this clear and atmospheric Kiseki-built cartridge	8-16g Normal, MC	R	Coll. '86
Milltek Olympia £349	Average + Good +	Warm and detailed sound - packs the punch of the best MCs with high output as a bonus	12-20g, (damping) Normal, MC	R	54
Nagaoka MM4 £9	Average - Average -	Clear punchy sound that delivers the rudiments of a good performance	6-16g Normal, MM	R	54
Nagaoka MP10 £18	Average Average	High frequencies sounded "shut-in" with this spherical-stylus model, but mid and mass were energetic, bouncy and punchy	5-13g Normal, MM	R	48

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TURNTABLES - CARTRIDGES

MODEL PRICE	LAB SOUND	COMMENTS	ARM EFFECTIVE MASS OUTPUT/TYPE	VALUE	ISSUE
Nagaoka MP11 Boron £40	Average Average +	Responding well overall in PM's equipment and listening room, this model was mildly criticised for low level and dynamic limitations	5-13g Normal, MM	BB	48
Nagaoka MP11 Gold £47	Average - Average +	There were mild criticisms directed at most areas, but in general the sound was clear, open and even	3-8g Normal, MM	R	48
Ortofon 510 £30	Good Good +	For the price, a good blend of virtues - weight, clarity and neutrality	3-11g Normal, MM	BB	85
Ortofon 520 £50	Average Average +	Very sensitive to load capacitance this new Ortofon maintains the company tradition for a lively, effervescent SQ	7-16g Normal, MM	R	67
Ortofon 530 £80	Good + Good +	Very clean and assured sound; transients not quite perfectly pure but plenty of detail.	4-11g Normal, MM	R	85
Ortofon 540 £100	Average - Average	Graced with an advanced FGII stylus our sample possessed too high a compliance for broad arm matching. It could also sound a little unforgiving	3-8g Normal, MM		67
Ortofon MC10 Super £70	Average Good	"What a delightfully sweet-sounding cartridge this is . . ." we said	5-15g Low, MC	BB	48
Ortofon MC15 Super £100	Good + Very Good	A good all-rounder, with outstanding performance in detail retrieval, even if it can be very slightly bright and close-up at times.	10-24g Low/MC	BB	103
Ortofon MC20 Super £200	Average + Good +	An "inviting" sound quality; polite rather than exciting it approaches much more expensive models, but does not better them	6-15g Low, MC	R	Coll. '86
Ortofon MC3 Turbo £100	Average + Good	Not terribly subtle, but it obviously doesn't aim at that. The 3 Turbo is bright, cheerful and bouncy - take it as it comes!	10-24g Normal/MC	R	103
Ortofon MC30 Super £270	Very Good Good +	Beautifully engineered and well-balanced, it was slightly criticised as bland, though some may appreciate the lack of rough edges	5-14g Low, MC		Coll. '87
Ortofon MC3000 MkII £850	Very Good Excellent	Low levels of body resonance are a real ear-opener. Nothing to criticise elsewhere; one of the very best	9-16g Low, MC	R	84
Ortofon MC5000 £1500	Good + Good	Review sample could not be fully run-in, which might explain limited tracking ability and bright and forward sound, though imaging is excellent. Fussy about s.	12-20g Low, MC		91
Ortofon Quartz £120	Good + Good	Lively, quite detailed, and a touch bright, the Quartz has many qualities of the much dearer Quasar	3-12g Low, MC	R	91
Ortofon Quasar £300	Very Good Very Good	Many of the qualities of the MC3000, although a touch bright. Good detail and delicacy	8-15g Low, MC	R	84
Ortofon Quattro £200	Good + Good +	Undoubtedly a competent performer, the Quattro however seems a less obvious choice than the other Qs. Generally neutral, but can be edgy and bright in loud passages.	6-18g Low/MC		103
RATA RP20 £22	Average - Average	Good integration, a clear dynamic midrange and the beginnings of fine stereo imagery merits clear recommendation	6-14g Normal, MM	R	48
RATA RP40 £44	Average Average +	The '40 did a good job of sorting out the layers and complexity of the mix, with good focus, excellent stereo spread and fine scale	6-15g Normal, MM	R	48
RATA RP70 £77*	Average Average +	Clearer and sweeter than the '40 this also seemed heavier and less lively. For £99 you can have a van den Hul stylus	6-14g Normal, MM		43
Rega Bias £34	Average Average +	Difficult to mount in some arms due to its shallow build, the bias offers a gentile, refined SQ that certainly makes it worthy of audition	4-10g Normal, MM		67
Rega Elys £74	Good Good	Clearly superior to the Bias, despite their common heritage, the Elys is both more detailed, accurate and musically convincing	8-15g Normal, MM	R	67
Revolver £20	Average + Average	This modified AT-95E enjoys a very lively mid and treble even if the bass is somewhat 'slower' in comparison. A firm budget buy	8-16g Normal, MM	BB	67
Roksan Corus Black £110	Good + Good	Recognisably related to Corus Blue, but distinctly more civilised and smoother.	7-12g Normal, MM	R	91
Roksan Corus Blue £65	Good + Good	Roksan-specified modified Goldring 1012; slight harshness detracts from otherwise good sound.	7-11g Normal, MM		91
Shure M104E £36	Average - Average	Capable in many ways, but giving no substantial improvement over the 92E in our view	5-15g Normal, MM		38
Shure M105E £49	Average Average -	A slightly 'spitty' sound lacking deep bass and dynamic contrast, but can be used in virtually every system where it will perform "unobtrusively"	5-12g Normal, MM		38 Summ
Shure M110HE £60	Average Average	Sound quality was thought eminently presentable, but not exciting; smooth clear high frequencies, but a loss of bass definition	5-10g Normal, MM		38 Summ
Shure M111HE £72	Average Average	Early reviews of this cartridge complained principally of the price - which has since come down	5-10g Normal, MM		38 Summ
Shure M92E £17	Average - Average	Though lacking depth, the overall sound quality was competent, but treble was not its forte	10-15g Normal, MM		43
Shure M99E £29	Average - Average -	Sister to the 92E this is a solid but not particularly exciting cartridge	5-10g Normal, MM		38 Summ
Shure ME75ED £26.50	Average Average -	Rather bright and splashy in the high frequencies but nevertheless a competent model	5-10g Normal, MM		38
Shure ME97HE £49	Average Average +	It won't turn a sow's ear of a turntable into a silk purse, but will at least keep going and produce an acceptable result	8-20g Normal, MM	R	48
Shure ML120HE £95	Average + Average +	Quite decent sound quality and a generally fine balanced performance	6-18g Normal, MM		48
Shure ML140HE £120	Average + Good	Qualitatively the treble of this well-balanced moving magnet model was a match for many moving coil cartridges	6-16g Normal, MM		43
Shure Ultra 500 £499	Good Good	There was no doubting the accomplishments of what could well be the finest moving magnet cartridge around	6-14g Normal, MM		48
Shure V15 VMR £215	Good Average +	Initial listening gave promising results, but extended familiarity gave the feeling of a lack of energy and a "shut-in" sound	5-12g Normal, MM		38
Shure VST V £173	Very Good Very Good	Quite exceptional assurance with difficult material; very stable and clear sound. One of the best. Dynamic Stabilizer actually works!	4-11g Normal, MM	R	85
van den Hul MC One £699	Good Very Good	This extended all the positive qualities of the '10 but added greater authority and scale - worth it for the extra money	6-12g Low, MC	R	60
van den Hul MC Two £899	Good Very Good	Connected directly to any standard MM input the vdH MC Two rewards with a highly detailed yet fluid and musically convincing portrayal	6-13g Normal, MC	R	72
van den Hul MC1 Super £799	Very Good Very Good	Slight softening effect on transients was the only real flaw, but it didn't quite seem to have that special touch one expects for the money	8-15g Low, MC		84
van den Hul MC10 £599	Good Good +	A neutral balanced performer giving transparent midrange, fine depth and focus with firm extended bass. Gosh!	5-10g Low, MC	R	60
van den Hul MM1 £200	Good + Very Good	If its wooden-sounding midrange coloration could be tamed, the excellent imaging and admirable all-round security of the MM1 would make it an excellent performer.	7-15g Low/MC	R	103

The Directory

TURNTABLES

The schizophrenic split between consumer electronics and 'real hi-fi' is most obvious amongst turntables. The former are supplied simply as a means of playing vinyl in a system context. Cheaply manufactured in the Far East, these are complete players with a variety of automatic facilities, sometimes tied into system remote control. But engineering compromises severely limit sound quality, cartridge choice may be P-mount restricted, and such machines are rarely stocked by specialist hi-fi dealers these days.

Specialist turntables offer big sound quality improvements, but lack so-called convenience features (that practised users often find irksome). Such turntables at the cheaper end of the market (sub-£350) tend to be supplied with matching tonearm, and often include a 'starter' cartridge. Still better quality is found at higher prices amongst the separate motor units and tonearms. Careful partnering and set-up is essential for these individual components, but 'naturally sympathetic' combinations do exist, and the good dealer can help.

Listed separately as integrated players and as turntable motor units and tonearms, our sound quality rating is based on results achieved using a high quality system – but in point of fact the turntable is usually the limiting factor soundwise in any system. Lab performance summarises the speed stability, vibration generation and environmental isolation of turntables, along with the friction, alignment and adjustment of tonearms. The tonearm's physical characteristics also define a range of compatible cartridges.

TURNTABLES - INTEGRATED

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES ARM EFF. MASS	VALUE	ISSUE
Acoustic Research EB-101 £230	Good Good	This genuine high fidelity product offers an impressive package at a competitive price	Subchassis, manual, 13.5g	BB	48
Alphason Sonata/HR-100S MCS/Atlas £835/£550/£400	Very Good Very Good	Good sound in all areas - bass, clarity and neutrality all in the top class and bettered by very few decks. Atlas PSU expensive but worthwhile	Belt drive, suspended, optional PSU, 13g	R	79
Ariston Pro £160	Good Good	Remarkably clear and detailed for the price, very neutral. Benefits from cartridge upgrade	Manual, belt drive, 12g, cart.	BB	91
Ariston Pro Maxim/RB250 £210	Average Fair	Warm, full sound with a deep bass and solidity is partly offset by lack of fine detail in mid and top. On a suitable surface, with a crisp sounding cartridge, it easily qualifies for shortlisting	Solid plinth, belt drive, manual, 11.5g		103
Ariston Q-Deck £180	Good Average +	Well engineered and good sounding low cost package which is both easy to set up and to use	Semi-auto, belt drive, solid, inc. cart	BB	67
Dual CS-505-4 £170	Average Average	Easy to set up and to use, this is a consistent sounding and well isolated turntable with a long pedigree. It is slightly lacking in balls, but compensates with a consistently unmuddled presentation and good stereo focus perspectives.	Auto-armlift, interlocked cueing, 2 speed, pitch control	R	103
Dual CS-750 £300	Average- Average-	Attractive but lazy performance from a deck with many good ideas and which is a pleasure to use. Cartridge is past it's sell by date. Has 78rpm facility	Solid plinth, belt drive, cart. 3-speed, quartz referenced, auto lift		103
Dual CS430 £100	Average Average -	Ragged, sometimes unpleasant cartridge mixes with a modest pleasing player in a very sharply priced package	Belt drive, with cartridge, auto return, 5g	R	67
Dual CS5000 £230	Average Average +	The rare 78 facility may give grandma's collection a new lease of life but the player did not merit recommendation on price vs sound	Electronic, belt drive, subchassis, 10g		48
Dual CS-503-2 £145	Good - Average	Not wholly inspiring; generally coarse and woolly sound is at least not offensive, but easily bettered by the CS505-4. Good value in material terms	Semi auto, belt drive, 10g	R	91
Goldmund ST4 £4589	Very Good Excellent	The Studio turntable takes on a cheaper tonearm than the T3F, yet provides a similar reference standard performance at £2,000 less, in a neatly integrated though bulky package	Solid subchassis, direct drive, parallel arm, detachable h/shell	R	60
Goldring Excelda 1 £160	Poor Poor	Untidy, resonant sound, narrow effective dynamic range and lack of tracking security. The cartridge (the only authentic Goldring part) is quite nice	Manual integrated arm, synchronous motor, auto-start/stop		103
Heybrook TT2 turntable & arm £469/£269	Average Good +	A gradual process of informed evolution and a sensibly designed arm combine to make this a good sounding middle of the road package. Well supported by dealers	Manual subchassis motor with arm, R belt drive, 14g		67
JVC AL-FQ555 £170	Average - Poor	Clear midband sound but woolly bass and crude treble. Ease of use however ranks highly, and there's little to go out of adjustment	Auto, direct drive, 5.5g		67
Kuzma Stabi/Stogi Reference £995/£899	Very Good Very Good	Beautifully made in a solid oak plinth, the Stabi also sounds very clear, detailed and extended. Stogi Reference is also most capable.	Manual, belt drive, subchassis, 12g	R	91
Linn Axis/Akito £443	Good - Average +	A neat, attractive and well-made package which delivers a rather harsh sound with a 'one-note' effect in the bass, but it's well suited to mid market systems	Belt drive, semi-suspended, electronic PSU, 10g		79
Linn Basik £250	Good Average+	Strong midband analysis and imagery, clean if sharp treble is matched to a good if occasionally wooden bass. Good at the price, and requires no complex setting up or fine tuning in service	Solid plinth, inc cartridge, manual speed change	R	103
Linn LP12 Basik/Akito £599/£137	Very Good Good	Familiar Linn virtues and vices - plenty of the former though and few of the latter. Trails the full LP12 significantly, but pace, rhythm, timing etc. still in top class, and bass tauter than of old	Suspended subchassis, belt drive, R single speed, 45rpm adaptor		103
Linn LP12-Lingo/Ekos/Troika £1168/£1097/£798	Good + Good +	The classic reference is improved (at a price) by the Lingo but character remains the same - not as detailed or neutral as the best. Ekos arm, though pricey, is well made and suited to many decks	Manual, subchassis, belt drive, 9g	R	91
Manticore Mantra/Musician £340/£170	Good + Good +	Well engineered deck with satisfying sound. The arm is particularly fine and very good value	Belt drive, suspended, 15g	R	79
Marantz TT400 £160	Average - Poor	Everything one hopes a budget deck won't be; coarse, confused, muddled and woolly. Construction isn't wonderful, either	Manual, belt drive 16g		91
NAD 5120 £90	Average Average	A number of running improvements have given this player a range and tautness denied its lazier sounding antecedents.	Semi-auto belt drive, detachable armtube/weight, 9g	BB	67
Opus 3 Continuo/Decca London International (Revise) £599/£99	Poor Good	Heavyweight motor unit with many fine properties, but which needs further development. The idiosyncratic arm is a suitable (though not ideal) platform for the Decca cartridge. For all its faults though, the whole transcends the sum of the parts	Belt-drive manual, damped unipivot arm, 12g		67
Rational Audio Aura 01 £189	Poor Good	Poor lab results reflect bad rumble, but midrange and treble are very pure and clean; idiosyncratic sound and styling should be tried!	Manual, belt drive, linear tracking arm 10g	R	91
Rega Planar 2 £185	Average + Good	A remarkable product at the price, surprisingly articulate and confident	Manual, 11.5g	BB	48
Rega Planar 3 £250	Good Good	A long time leader in its price category, the '3' (with its excellent RB300 arm) sounded nicely 'musical' in a balanced and coherent manner	Manual, 11.5g	BB	48
Revoler Rebel £185	Average Good -	Quite lively and detailed but not the strongest on subtlety, with slightly lumpy bass. Motor breakthrough audible, and watch for bent motor shaft on delivery!	Manual, belt drive, semi-suspended 12g	R	91
Revox B291 * £892	Average - Average -	Sound quality ranks as below average. Subjective bandwidth is narrow and the music lacks grace and energy. Ease of use however is unrivalled	Automatic, remote controllable, direct drive parallel arm, cart		55
Roksan Radius/Tabriz zi £635	Good Good	Truly modern turntable in appearance. The design is subtle, refined and easy on the eye. Musically it offers exceptional performance with a minimum of setting up and operational fuss	Semi-suspended, belt drive, mains plug PSU.	R	103
Roksan Xerxes 33/Tabriz zi £550/£255	Good Good	Good but not exceptional sound quality from expensive package. At its optimum with a relatively inexpensive arm/cartridge unless upgrade to full Xerxes is contemplated. XPSII PSU adds 45rpm and much to sound quality	Semi-suspended, belt drive, 33rpm only, mains plug PSU, one piece arm tube, 'intelligent' counterweight		103
Roksan Xerxes/Artemiz /Artaxerxes £785/£655/£559	Excellent Excellent	Superb though costly record playing hardware, highly integrated and synergistic in nature, but suitable for use with any good MC cartridge. Will not suit all tastes, however	Semi-suspended, belt drive, quartz locked 2 speed PSU	R	103

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TURNABLES - INTEGRATED

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES ARM EFF. MASS	VALUE	ISSUE
Rotel RP-855 £200	Good Good	Great sound for the money - detailed and clear with good bass and no irritating nasties	Belt drive, solid, speed adjust, 9g	BB	79
Systemdek 1/900 £188	Poor Average-	The motor unit is derivative of the Rega Planar 2, but sounds inferior by virtue of insufficient structural integrity. Pitch stability is also far from acceptable	Solid plinth, manual speed change, no cartridge		103
Technics SL-DD33 £120	Average Average	As with the QD33 though better value	Automatic, direct drive, solid plinth, 7.5g, P-mount	BB	48
Technics SL-L20 £120	Poor Average -	A rather lightweight parallel tracker achieving a poor overall rating, with little to recommend it unless you dig facilities	Electronic, solid plinth, 5g, P-mount		48
Technics SL-QD33 £150	Average Average	The quartz speed controlled version of the DD is short on sound quality but not features. But it did have fair focus and some depth	Automatic, Quartz, direct drive, solid plinth, 7.5g, P-mount	R	48
Technics SLBD-22 £100	Average - Average -	Not bad for the price and a great improvement on the L20, it performs reasonably when not stretched	Semi automatic, solid plinth, electronic, 6g P-mount	R	48
Thorens TD 166 Mk V £240	Good Good	Classic suspended-subchassis deck with clear, stable sound of no particular character. Unlikely to make enemies	Belt drive, suspended, 12g	BB	79
Thorens TD 280 Mk II £190	Good - Good -	Legendary Thorens build quality on the cheap - slightly unobtrusive sound but eminently liveable-with and very good value	Belt drive, solid, electronic PSU, 12g	BB	79
Thorens TD 316 Mk II £250	Good Good -	Very solid deck with neat split-chassis construction. Sound is a bit insecure in the bass, but it could suit classical music lovers well	Belt drive, suspended, electronic PSU, 12g	R	79
Thorens TD-3001/TP90SF £850	Very Good Good	Excellent middle ranking esoterica, with strong all round abilities rather than excellence in particular areas. Engineering content is particularly high	Suspended subchassis, belt drive, available w/o arm	R	103
Thorens TD166 VI/UK/RB250 £270	Good Average-	Refined and articulate sound with well focused imagery, suitable for use with good MM and budget MC cartridges. The Rega arm is the best at its price, a good purist deck	Manual, belt drive, suspended, 11.5g	BB	103
Thorens TD2001 £650	Good Good -	Similar to TD320 but much dearer - why? Sound is comfortable but not very detailed	Semi-auto, belt drive, subchassis 15g		91
Thorens TD280 II/UK £189	Average Average	Excellent value for money from a built to last player which is also easy to use. Will benefit from a cartridge upgrade in due course, but has an energetic and detailed sound	Solid plinth 2-speed player, inc cartridge	BB	103
Thorens TD320 Mk II £400	Good Good	Good, consistent sounding deck with much improved (but not ideal) arm. A little expensive for performance offered	Semi-auto two speed belt drive, 14g		67
Townshend Rock Reference/Excalibur £2295/£745	Excellent Excellent	Overall the closest reproduction to master tape we've yet heard, with stunning real bass and excellent neutrality. Front end damping trough improves LF detail significantly	Belt drive, suspended, electronic PSU, front-end damping, 12g	R	79
Voyd Reference/Helios Cyalene £5414/£1350	n/a Excellent	Voyd's flagship is equipped with three of the biggest motors in the business, a Lexan platter and a real brute of a power supply (it dwarfs most power amps!). A strong contender for best turntable in the known universe	Belt drive, 3 motors, subchassis, outboard PSU, 12/14g	R	Coll. '90
Well Tempered WTAT £1690	Average Very Good	Intriguing and challenging design. Musically it is not ideal, but it has a limpid quality and a lack of artificiality that sets standards as well as turning the ear, though it's not completely uncoloured. A charmer yet mainstream enough in its virtues to be viable	Manual 2-speed, damped, suspended arm, 7.5g	R	67
Zarathustra S4/Pluto 5A Prestige/PSU £1500/£2500/£500	n/a Excellent	The very well made and finished heavy platter S4 with the superb Pluto arm make a devastating combination ranking up there with the very best	Subchassis, manual, available without PSU	R	72

MOTOR UNITS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
CEC ST930 £599	Good Very Good	A rarity - a serious hi-fi product that loses nothing to budget rivals in finish or convenience. Good clean sound, very stable and assured	Belt drive, external PSU, 78 speed inc.	R	79
CS Audio Resan kit for Rega £90	Good - Good	After-market kit to convert Rega 2 or 3 to semi-suspended subchassis style. Looks good and sounds tidier than original. Feedback is much reduced	Conversion kit, all work reversible	R	79
Michell Gyrodec £595	Good Good	Sweet and natural sounding player, well exploited by the Rega RB300 arm. Aesthetics, and the acres of acrylic, are unique	Manual, belt drive, suspended motor unit		55
Michell Syncro £265	Good Good	A happy blend of qualities endows the Synchro with a blend of subtlety and force - the mailed fist in the velvet glove. Easy on the ear in the best sense.	Manual, belt drive, suspended motor unit	R	67
NVA Senior £450	Good - Average	Very high sensitivity to low-frequency vibration, especially on NVA stand, gives strange subjective bass response and confused sound. Looks are unusual but pleasing	Belt drive, electronic PSU, two-part plinth		79
Oracle Paris £695	Good - Average	Looks good but sounds coarse, confused and uneven, with bass liable to thump	Belt drive, semi-suspended, electronic		91
Origin Live Oasis A £495	Good - Average	Rather coarse sound with lack of detail resolution - but lively presentation may appeal. Appearance is industrial	Belt drive, external mains filter, 33rpm only, suspended		79
Origin Live Oasis B £199	Average Average +	Aesthetics are not its strong point, but its lively and articulate - if idiosyncratic - sound will please some tastes. Highly resonant construction is very sensitive to feedback	Belt drive, 33Gy1/3Gyrpm only, solid plinth/subchassis		79
Oxford Acoustics Crystal Reference £2495	Very Good Excellent	This big, open and powerful sounding turntable works beautifully with Airtangent arm to give superb 3-D imagery. Recently updated to mk.II form	Manual, belt drive, subchassis, stand	R	60
Pink Triangle Anniversary £1175	Excellent Excellent	Possibly the most detailed, clear, neutral and therefore accurate deck around. Likeness to master tape is almost uncanny	Suspended, belt drive, electronic, motor on subchassis	R	91
Pink Triangle Export £676	Very Good Excellent	Basically a PT TOO with built-in power supply. Retains features of great transparency and neutrality. Review sample had highish motor noise - presumed untypical	Suspended, belt drive, electronic	R	91
Pink Triangle Little Pink Thing £392	Good + Very Good	Leads the field for clarity and neutrality at this price or a good bit more. It also looks very smart! Excellent value. Arm cut-out suits Rega or Linn style	Belt drive, semi-suspended, electronic PSU	R	79
Revolver £150	Average Average	Nicely balanced, but unimpressive timing and lightweight bass made this deck rather average for the price. Manufacturer has since made several changes, but not re-submitted for review	Manual, belt drive, solid plinth		48
Systemdek IIX/900 £200	Good Good	The Systemdek IIX is a high performance, low cost turntable which is particularly strong in the areas of fine detail resolution and imagery. Tested with Rega RB250	Suspended subchassis, metal armboard, glass platter, 2 speed	BB	103
Systemdek IIXE/900AP £358	Good Good+	A development of the IIXE/900, with a comparably detailed sound reinforced by better frequency extremes, timing etc. Needs careful setting up.	Suspended subchassis, metal armboard, acrylic platter, PSU	R	103
Systemdek IV £495	Good Very Good	The level of wow is a theoretical concern at least, but elsewhere this player shines, combining euphony, information and imaging in a polished, untemperamental package	Two-speed manual belt drive	R	67
Voyd 0.5 £3062	n/a Excellent	Based on the standard 3-motor Voyd but with upgrade options (better bearing, platter, etc) which take it half way to a Voyd Reference. Superb build and finish; colourful, dramatic performance.	Belt drive, 3 motors, subchassis, outboard PSU	R	72
Voyd Valdi £868	Good - Very Good	Recent power supply upgrade has resulted in around improvements. This Perspex plattered, two motor deck is remarkably competent, revealing and neutral	Belt drive, suspended subchassis, electronic PSU		79
VPI HW-19Mk3 £1600	Very Good Very Good	Built to accommodate parallel tracking arms, this large but elegant deck produced clean, smooth sound when fitted with an SME arm. Good bass	Belt drive, suspended subchassis	R	79

The Directory

TONEARMS

MODEL PRICE	LAB SOUND	COMMENTS	ARM EFF, MAS	VALUE	ISSUE
Airtangent 1B £1990	n/a Excellent	A complex but superbly built arm for high quality systems, giving excellent stereo and resolution	7.5g (vertical)	R	60
Alphason Delta £230	Good Average +	A highly competent design from Alphason gives good sound quality but with slight blurring and treble fizz	16g	R	48
Alphason HR100S £490	Very Good Very Good	This S-shaped arm sounds smooth, but nevertheless reproduces transients with fine attack	10g	R	Coll. '86
Alphason Xenon £286	Good Good +	A trimmed down HR100S, the Xenon has inferior bearings and a simpler finish, but sounds crisp and coherent. Fits any Linn cutout	12.75g	R	55
Audio-Technica AT-1130 £186	Good Good	Well suited to most cartridges including high compliance ones, the AT is smooth and tonally neutral, if slightly lacking in 'balls'	8.5g	R	67
Decca London International £49	Average + Average +	This uni-pivot design gives a rather rich tonal balance and some bass muddling. Could be good with Decca cartridges, but not well built	12g		48 Summ
Eminent Technology £1000	Good + Very Good	One of the best sounding tonearms around, the linear tracking Eminent delivers impressive stereo imagery, focus and transparent sound	9g (vertical)	R	Coll. '86
Goldmund T3F arm £4400	Excellent Excellent	This complex parallel tracker created an "ear-opening" experience when tested with a (since updated) Goldmund Studio turntable	16.5g	R	Coll. '87
Kuzma Stogi Reference £899	Very Good Very Good	A large, solid and well-made arm that holds the cartridge firmly, giving exceptionally clear sound with just a hint of brightness	12g	R	79
Linn Ekos £1097	Very Good Very Good	Superb, state of the art design which builds significantly on Ittok's strengths	9g	R	67
Moth Arm £95	Good Good +	The ultimate budget arm? Refined, detailed, sweet and natural - performance improves in line with the rest of the system	12g	BB	60
Naim Aro £752	Good Good -	Designed for use on the Linn LP12 turntable and Troika cartridge, the Aro is a little bright and congested.	10.5g		91
Rega RB300 £139	Very Good Very Good	Despite its modest price this sets exceptional performance standards and could be used on a number of high-quality turntables	10-11g	BB	60
Roksan Artemiz £655	Average Good	Interesting design which works a treat on the Xerxes deck. Fits Rega cut-out.	8g		67
Roksan Tabriz £165	Good Good +	Though obviously targeted at Roksan's own Xerxes, it is also a good alternative to the Rega arms in many applications. A trifle bright.	9g	R	91
SME 3009 Series III £253	Good Average +	Comprehensively adjustable and very well made, suited to MM and high compliance MC cartridges	5g		48
SME 3009 Series IIIS £182	Good Average +	A simplified less flexible (as regards adjustment) Series III with a similarly 'soft' sonic character	5g		48
SME 3009R £335	Average + Average +	A higher mass version of the Series III designed for low compliance MC cartridges	12g		48
SME 309 £568	Very Good Very Good	Beautifully made, finished and presented, this arm is fully and easily adjustable and a highly neutral performer	10g	R	79
SME Series IV £828	Excellent Very Good	Superb engineering and finish with a finely balanced sound giving impressive stereo focus and low coloration	10.5g	R	60
SME Series V £1232	Excellent Very Good	Excellent in terms of design engineering and sound quality, this arm arguably sets a new reference standard regardless of price	10.5g	R	60

VIDEO RECORDERS

For some time there's been a move to improve both the video and the audio quality of video recorders and TV sets alike as a necessary prelude to a proper integration between the two. Hi-fi video is obviously an important element in the story, and so is Dolby Stereo, the ambient 'surround sound' system.

The weak link of course is on the broadcast side. Although TV sound is well up to normal hi-fi standards, it has always been in mono and unjustly or otherwise has rarely attracted much audiophile interest. But TV sound is – or shortly will be – freed of the shackles of mono by the introduction of NICAM stereo. NICAM – an

acronym for Near Instantaneous Companding and Modulating – is the missing link that will help facilitate the much feted integration of video with audio. And then we have S-VHS, a system which does for picture quality what the other developments promise to do for the sound

VIDEO RECORDERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Akai VS-75EK £550	Average Good	Excellent performance and a slick set of controls make this recorder a pleasure to use. Good price is a bonus	Hi-fi, NICAM, programmable remote	BB	71
Akai VS-967EK £500	Average Good	Many well implemented facilities, but unsuitable for dedicated audio use due to lack of LP mode, manual record levels or audio input	Hi-fi, NICAM, on-screen programming	R	86 Supp.
Grundig VS680 £1250	Very Good Average	State of the art technology gives top notch sound with tremendous flexibility but somewhat disappointing picture quality. It's also very hard to drive	Hi-fi, NICAM, LP/SP, teletext programming, on-screen graphics		86 Supp.
Nordmende V4405K £549	Good Good	Fine basic sound and picture quality, but the RF converter introduced significant losses. An excellent model, but configured for German home market. The recorder lacks NICAM	Hi-fi, transmitter handset, digital FX	BB	71
Panasonic NV-F65 £500	Good Average	Uninspired but competent and well made deck. Plenty of features, decent sound and reasonable video ensure recommendation	Hi-fi, NICAM, LP audio only, bar code programming	R	86 Supp.
Sanyo VHR-D4890E £1000	Poor Excellent	High grade S-VHS recorder with digital effects which gives first rate screen-based results but relatively poor sound recording	Hi-fi, NICAM, S-VHS, PIP etc		86 Supp.
Sharp VC-S1000H £1000	Good Poor	Clean, accurate and stable off air and from tape, and LP modes are satisfactory — but on-screen S-VHS results are well below par	Hi-fi, NICAM, LP, S-VHS, titling		86 Supp.

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Personal Messages

Elsewhere in this issue I evaluate seven of the latest three box (satellite/subwoofer) systems. None offer any real performance advantage over the typical conventional bookshelf loudspeaker, which itself is quite capable of generating 50Hz in-room without any outside assistance. Midbassboom was the rule rather than the exception, and the opportunity to create speaker systems combining discreet presentation with genuinely wide bandwidth was completely squandered.

The evidence from this less than magnificent seven might have been enough to make me doubt the whole idea of subwoofers and satellites, had it not been for the very timely arrival of a specialist subwoofer system that really did deliver the goods.

I'd been telephonically fending off Richard Lord

Unable to escape from Subwoofer Land just yet, Paul Messenger decides to play Stentor forward this month.

of REL Acoustics for some months, on the basis that I had a loathing of boomy bass and was therefore prejudiced against the whole subwoofer species, and more likely to suffocate rather than nurture his fledgling company. However, he was both persistent and persuasive, calmly explaining that he agreed with many of my criticisms of the genus, and still wanted to travel the entire width of the country to prove his point.

His timing was immaculate. My triannual ritual of loudspeaker reviewing peaks with a long evening and morning finding grilles, removing spikes and repacking some twenty five pairs, followed by the climax of loading them all into a van bound for the photographer's studio.

Waving a thankful farewell and returning to my listening room to wind down, I'm faced with a speakerless system and a total disinclination to grapple with the immediate installation of a pair of Naim DBLs. Instead I grab the nearest decent miniatures I can find, and spend the next couple of days enjoying a pair of Royd *Sintr*as or some such, relishing the delightful agility and lack of boxiness such tiny speakers provide.

By the third day I'm really missing the bass control and bandwidth of truly big speakers, and that was the day Richard opportunely arrived with his single-box alternative.

The lover/Stentor relationship

The device in question is neither small nor inexpensive, and is unlucky enough to have been christened *Stentor*, but the rest of the news is all positive. This is a subwoofer that actually works, concentrating all its energies on the lowest audible octave (20-40Hz), so that it reproduces the signals that are beyond the capabilities of baby speakers, yet avoids interfering with and spoiling what the tinies are doing over the rest of the range. It is, in short, a subwoofer for audiophiles rather than headbangers. You can turn it

into a boom box if you misuse the controls, but set it up carefully and sensitively and it goes about its business with efficiency and aplomb — and most important of all, without mangling up the precious signal purity of your system in the process.

A thousand pounds might seem a lot to pay for what some regard as the least important ten per cent of the audio bandwidth. However, in my experience it's thoroughly worthwhile seeking that extra octave in the context of a serious hi-fi system. Genuine extension down to subsonic frequencies somehow makes a disproportionately massive contribution to the sense of reality, almost irrespective of the type of material being played.

Certainly that was the effect of grafting the *Stentor* onto a *Sintra*-based system. The miniatures no longer needed the bass boost provided by a nearby wall, and bringing them out into the room reduced boxiness and coloration and enhanced the stereo imaging.

Best of all, instead of the previously slightly boomy and disembodied character, the bass just opened out scalewise, sounding bigger with much more depth. I wouldn't go so far as to claim that such a single summed bass supplier can quite match a proper stereo pair — it doesn't drive the room modes quite so convincingly, for example, nor fill the speaker end of the room in quite the same way. But fanatics like me always have the option of using two subwoofers, and I have to admit my singleton prototype integrated remarkably well into the system as a whole.

The Stentor of attraction

Obtaining quality (and quantity) output at very low frequencies is never going to be easy or cheap, though in this case you do at least get a lot of engineering for the money. Not unlike a piano stool in shape, and with an obvious role as support for a large colour telly (though I haven't checked for stray magnetic fields), the 72litre enclosure is a handsome creation made from massive panels of solid hardwood, all properly braced internally. A substantial Volt driver points at the floor (held clear by wooden feet and spikes), and is reflex loaded to a very low frequency by a large folded port.

Built in amplification and flexible filtering is an essential and integral part of the design, allowing the output to be carefully tailored to suit the room, its siting therein, and the partnering stereo pair. Balanced Canon inputs take signals direct from the system power amplifier, being connected in parallel with the normal loudspeakers — an approach which works fine unless you're using monoblok power amps, in which case an alternative must be found.

I'm not going to suggest that REL's *Stentor* is the complete solution to awesome bass, but it has done a great deal to dispel my suspicion of the subwoofer approach. Anyone who has deliberately chosen to use high quality miniature loudspeakers, out of preference or in the interests of domestic harmony, really ought to try and get to hear the extra dimension of realism such an addition can bring to a system.

(Details from REL Acoustics, 66 Fairfield Rd, Bridgend, Mid Glamorgan CF31 3DU. Telephone: (0656) 766 093)

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