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HI-FI CHOICE

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READER DIFFICULTIES

Hi-Fi Choice welcomes any technical questions, although these can only be discussed within the pages of the magazine. Product ordering difficulties are likewise dealt with only within the magazine; however, all complaints of this nature are passed on to the supplier concerned. Regrettably, *Choice* is not in any way able to offer telephone assistance.

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Menu

Philips' Digital Compact Cassette format (DCC) is now well and truly under way and if a recent London demonstration is anything to go by, we have both good news and bad news. The good news is that it doesn't sound anything like as bad as I expected, the bad news is that the record companies are planning to make a killing on the software prices.

I freely admit to being a little sceptical before the dem, my experience of DCC in previous dems having led me to believe that it would be very easy to tell the difference between CD and DCC, with DCC being pretty much a mid-fi format.

The latest dems were held at Decca's North London recording studios and involved a prototype PASC encode/decode mechanism which was used with Decca's 20-bit digital mixing desk and a pair of massive B&W *Matrix 801* studio monitors. Decca had prepared a digital master for us to listen to and we were treated to a number of demonstrations of the pure 20-bit signal and then the same signal having passed through the PASC encode/decode chipset. I have to admit I was hard pressed to tell the difference.

Admittedly this is early days yet, and you can't draw too many conclusions on a such a demonstration with an unknown system and 20-bit source material, but there are certainly grounds for cautious optimism.

However, the software prices look like being outrageous. Prior to the DCC demonstration there was a press conference with both hardware and software manufacturers available to answer questions about the new format. The software industry was represented by one Dieter Radeiki, the Commercial Director of Polygram International.

When questioned as to the price of prerecorded DCC software Mr Radeiki enthused that it would be available at much the same price as a premium CD, although, as with CD, the price would come down as the format matured. Shrugging aside the question of Mr Radeiki's planetary origin, and thus depriving myself of a chance of visiting this far off outpost of the galaxy where CD prices have actually come down, this is, quite frankly, ludicrous.

A premium price CD sells for £11.99 or higher in this neck of the woods, and to charge the same for the tape based format is just not on. Perhaps this is just my personal view; a journalist at the press conference opined that it was only the Consumers Association that was annoyed at the price of CDs, and that the vast majority of people thought that they were fairly priced, as evidenced by the amount they were buying. Maybe that's so and maybe you've all had enough of me using this column to go on about it. Well let's find out. Do you think £12 is a fair price for a DCC, or a CD for that matter? Write to: What price DCC, *Hi-Fi Choice*, 14 Rathbone Place, London, W1P 1DE. We'll print a selection of replies over the coming months with each month's best letter winning a £15 record voucher.

Andy Benham



*Cover photograph
of the B&W
Emphasis by
Chris Richardson.*

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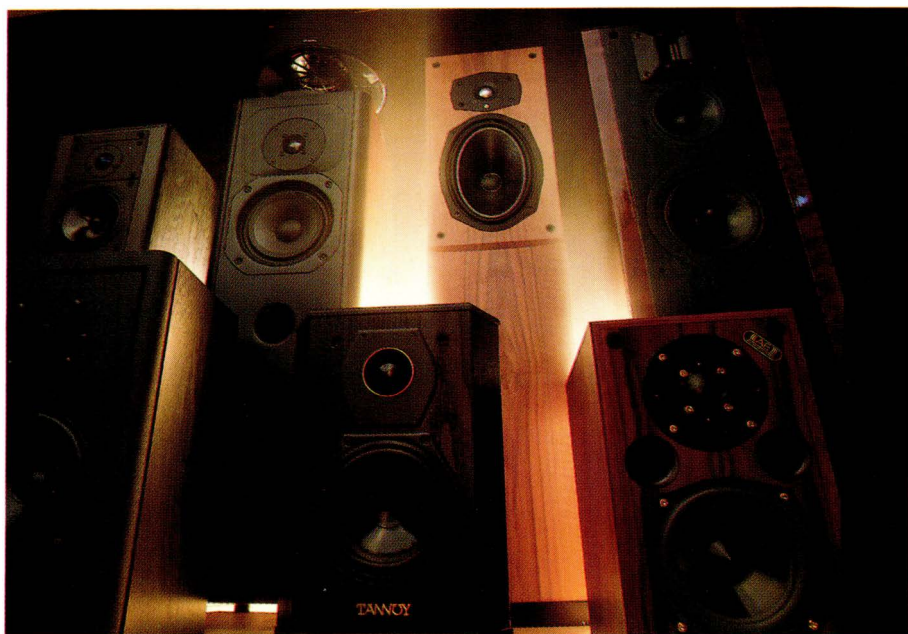
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THE CHOICE DIRECTORY

At a glance information on all the current products that we've tested in *Hi-Fi Choice*. With well over 900 entries, it has to be the most comprehensive equipment listing ever published.

Beware of cheap imitations, this is the real thing; 30 pages of detailed information including comments on sound quality, compatibility, features and value for money.



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Your chance to buy cables, interconnects and a whole host of other system enhancing goodies.

We've also collected together a fantastic selection of audiophile recordings and hard to find vinyl. Buy now while stocks last.

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PERSONAL MESSAGES

Paul Messenger brings his wit and wisdom to bear on the wonderful world of hi-fi.



Top: Enclosure encounters: just some of the 26 loudspeakers that go through Paul Messenger's mill in this month's main review.

Middle: Personal best. Get seriously small with our round up of personal cassette players.

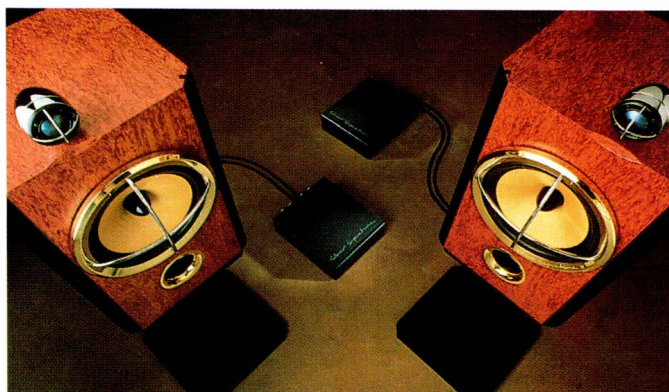
Bottom: Reflected glory. Jason Kennedy reports on brass plated components from Alchemist in Statements.



Anniversary activities

B&W's Steyning research department has been pretty busy of late. Not only has it been working on the *Nautilus* loud-speaker featured in *Aspirations* this month but it has finished a new high-end model, the *Silver Signature*, and is making good progress with a digital processor for room correction.

The *Silver Signature* is a celebration of B&W's 25th anniversary (or Silver jubilee) and is a tribute to the company's founder, the late John Bowers. Although it is about the same size as the *805* this pretty stand mount reflex design is another beast entirely, it has a new 170mm Kevlar mid/bass cone and outboard passive crossovers. Apart from the Jubilee, the reason for its name is the comprehensive use of silver wiring, not only are the supplied cables between crossover and speaker terminals silver but those inside both crossover and cabinet, including the voice coil windings, are silver as well. The tweeter is a 26mm diameter aluminium device that



The B&W Silver Signature, a fitting tribute to John Bowers.

sits in its own little enclosure atop the cabinet, resembling the side light of a Fifties sports car. The price is £3,995, including custom made slate stands.

B&W's modular digital control unit is a prototype time domain room and speaker correction box of tricks. The company has been developing it for the last four years and hopes to have a production sample early in '92. The processor contains both D to

A and A to D convertors and through the use of high speed, real time digital sound processing can provide low frequency response correction, phase correction and precise tonal correction.

As well as this it will be built with the notion of future upgradability firmly in mind, B&W is currently applying for patents on a 24-bit DAC and will have further tailoring options on offer.

Aiwa brings Dolby S in at the top

Aiwa has introduced two new high-end, Dolby S equipped cassette decks, the *XK-S9000* and *XK-S7000*. Although S type noise reduction is still rare enough to grab the headlines in

its own right, these decks also feature built in 18-bit eight times oversampling DACs so that they can be connected directly to the digital output of a CD player.

Both machines are built around three head, twin capstan tape transports, and employ stress free 6N copper in the head coils. Twin transformers are used to supply 'clean power' to the audio and transport sections while a wooden chassis base is used to reduce mechanical vibration. The heads are mounted on a die cast alloy block with a bias shield. Switchable metering and full remote control completes what looks like an extremely attractive package.

The *XK-S7000* retails for £550 and the *XK-S9000* for £700. The extra £150 gives you a four motor transport, both record and play head coils fashioned from the 6N copper, 'high quality' mic inputs on the back of the box and a gold finish complete with wooden end cheeks.



Aiwa's Dolby S decks take the strain of 3 yards of gold lamé.

Turbo nutter ahoy

Pink Triangle has announced a series of upgrades for its much acclaimed *Little Pink Thing* turntable. The first upgrade, which gives the *LPT* a *GTi* suffix (Great Turntable Improved) consists of a more sophisticated power supply based on the Pacesetter power supply used in the *Pinnk-Link LP12* upgrade kit.

The next step in the upgrade path, and one which won't be available until mid 1992, is a new top plate, which will be manufactured from the same honeycomb material used in the *PT Export* and the *PT Anniversary*.

The new power supply will be available from January 1992 and will cost £85 including fitting.

You are being monitored

You may remember that *Choice's* issue 99 featured a competition offering you the chance to win one of three pairs of Monitor Audio speakers.

A unique pair of red, piano lacquered, gold domed Studio 15s, a pair of rosewood finished Studio 10s and a pair of 5s were all on offer to anyone who could answer six simple questions and so arrange the laws of chance that their entry forms would be plucked from among the many thousands of eager entries by our patented random selection process.

Well, drum roll please, we now have the names of the three lucky winners. Third prize, the pair of Monitor Audio Studio 5s, goes to DS White of Croydon. The second prize, consisting of a pair of Studio 10s is destined for Mark James of Lewisham. And just to prove that we give prizes to people who don't have a London telephone prefix, Niall Foulis of Dunbartonshire will shortly be on the receiving end of that very special pair of Monitor Audio Studio 15s.

You can't keep a Goodmans down

Well, all right, you probably can by a simple adjustment of your amplifier, but Goodmans Loudspeakers has been beavering away in its engineering facility near Portsmouth and has come up with the *Maxim 3*.

Goodmans says that the *3* is the culmination of two years of development and the new speaker certainly arrives with an historical pedigree which sparks interest. The company itself describes the *Maxim 2* as one of the 'most successful bookshelf speakers in the UK market'.

The *Maxim 3* is a major departure from the old design, the only similarities being the exterior dimensions and the fact that it has a rear firing reflex port. The drive units have been completely upgraded with the introduction of a new metal dome tweeter using delayed



Goodman's *Maxim 3* looks set to stir things up.

resonance damping as well as ferro fluid damping, while the original paper mid/bass cone unit has been gazumped by a polypropylene fabrication. Goodmans believes that these changes offer faster transients and a cleaner sound delivery.

Other vital statistics of the new speakers include flush mounted drive units, figure of 8 cabinet braces and 100 Watts maximum output. The *Maxim 3* will retail for around £110 as opposed to the circa £90 pricetag of the *Maxim 2*.

DNM losses its core

DNM's highly respected *Rainbow* speaker cable has undergone a rather drastic revision with the removal of its distinctive middle core. The removal of the centre conductor allows the remaining conductors to be spaced further apart, which, along with increased core diameters and the use of ultra high purity copper, results in a cable which DNM boasts 'not only sounds great but has to be one of the most attractive on the market'. The cable costs £4.30 per metre.



Licensed for free

In an attempt to protect its customers from the ravages of these nasty people in the vans with huge aerials on top, Philips is offering to provide free TV licences to those purchasing its video and AV products.

The length of free viewing depends on which product you buy and ranges from three months to a year. The offer applies to Philips' new range of large screen TVs and video recorders.

The vinyl chapter?

In spite of all the press reports announcing its death, the vinyl market continues to see a spate of new turntables, the latest of which is a new variant of Thorens' old favourite, the *TD166*.

The new version of Thorens' floating suspension design comes equipped with a Rega tonearm (the *RB250*) and is described as being 'competitively priced in a shrinking market.'

Along with the Rega arm, the *TD166VI/UK* features a two speed, 16 pole synchronous motor, external power supply, galvanised steel chassis, perspex lid and wooden plinth. The main platter is a fully machined 2.7kg 'Zamak' Singalloy casting and the rubber drive belts are reportedly hand ground to high standards of accuracy and then 'aged for six months' to achieve total stability. The *166* retails for about £270.

A-T goes for flat earth cred

Audio-Technica has introduced a new range of affordable speaker cables, the wackily named Mr Cable range.

The most striking thing about the new range is its flatness, apparently it was designed with surround sound and multi-room installation in mind where discreet cable runs can be made under carpets or along walls and skirting boards. However A-T also reports that the cable's inherent toughness makes it ideal for in-car use as well.

Hi-fi buffs are lured with the promise of multi-strand, high density, symmetrical OFC conductors housed in a transparent PVC jacket for strength and flexibility.

The 64 strand variant costs £1.59 a metre, the 192 strand £2.59 and the 312 strand a still relatively affordable £3.59.

Laser Disc finds new home

If your interest in Laser Vision has been stirred by this month's Perspectives feature and you want to explore the format further then you could do a lot worse than visiting Laserworld at Stereo Regent Street, a new shop set up by Pioneer and billed as 'the home of Laser Disc in the UK'.

As well as acting as a centre for all the available PAL software titles, the new shop aims to sell the machines themselves along with all the other AV components and connectors needed to put together a top notch Laser Disc based system. Laserworld - 071 287 2458.



Look at the quality of those tellys: shoppers gaze in awe at the goodies in Laserworld.

LIKE FATHER - LIKE SON

If music plays an important role in your life then the new 500 Series from Yamaha Hi-Fi is designed for you.

Yamaha has been making music for over a century and the 500 Series system features an integrated range of quality components that deliver true Hi-Fi performance at a realistic price.

What's more, the RS Remote Unit gives you armchair control of all system functions for a command performance - every time.

If you're into good sounds then Yamaha have got just the Hi-Fi system for you - the 50 Series.

Yamaha Hi-Fi has always been at the forefront of audio technology and the 50 Series system features an integrated range of components designed to deliver the finest sound quality and value for money.

Available in Black or Titanium* and Featuring RS remote control the 50 Series system sounds every bit as good as it looks - naturally.



THE 500 SERIES

AX550

Direct Signal Path Integrated Amplifier effortlessly delivers 140 W/ch DIN music power.

CDX-550 E

CD Player featuring all new S-Bit Plus technology for pure, natural sound.

TX-550

Direct PLL Synthesis AM/FM Stereo Tuner for broadcast quality listening.

KX-530

3-Motor Amorphous Head Cassette Deck featuring *Dolby Hx Pro for maximum performance.

RS REMOTE CONTROL

Full function, hand-held unit provides total system control.

SYSTEM OPTION - TURNTABLE

Complete your 500 Series line-up with the Yamaha TT-400RS fully automatic belt-drive turntable.



THE 50 SERIES

RX-450

Stereo Receiver featuring High Dynamic Power amplifier and sophisticated AM/FM Stereo Tuner with remote control and CD Direct facility.

CDX-450 E

Quality CD Player featuring Yamaha Single-Bit technology for improved performance and natural sound.

KX-250

2-motor transport Cassette Deck featuring Play Trim facility and *Dolby HxPro combines HiFi performance with value for money.

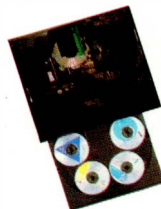
RS REMOTE CONTROL

Full function, hand-held unit provides total system control.

SYSTEM OPTION - CD MULTICHANGER

Enhance your 50 Series system with the Yamaha CDC-615 5-disc CD Player featuring S-Bit technology.

*New Titanium finish available from November 1991



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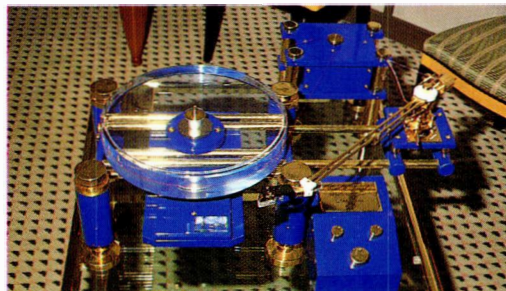
Show Report

Choice's roving show reporter roved a little further in October when I visited the Vienna hi-fi show in Austria. This was an unusual event, in Austria there aren't that many hi-fi shops but there are quite a few distributors trying to sell the whole gamut of mid and high-end hi-fi. The result is that the distributors run the shops and because there are very few indigenous manufacturers, the distributors hire most of the rooms at the show. Which means you end up with unusual (by our standards) combinations of brands being demonstrated together. For instance, the prototype of Roksan's CD transport and DAC was being used (yep, it works!) with Krell amps and Apogee speakers.

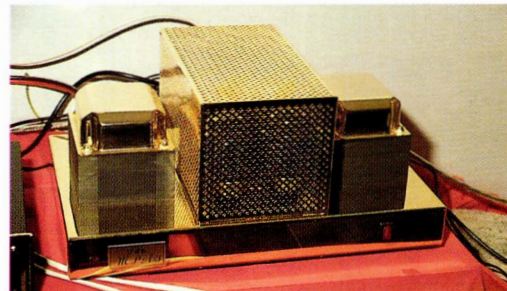
A lot of the new product I found was German or American and not yet available here, if it ever will be, but is worth mentioning nonetheless. There was an attractive Well Tempered style tonearm called *Mozart* (£1,300). Omtec, which those of you with good memories might remember from the days when Roksan distributed it, was playing a new stereo power amp along with a pre production version of its long awaited preamp. I found a large glitzy gold plate and perspex record player made by Postl & Smid (a local glam-fi company) which retailed at the same price as an *LP12/Lingo/Ekos* in Austria but looked a million shillings.

There was a sexy brand of transistor amplifiers called The End (!), some extremely glossy valve amplifiers — the *MPA 3* power amp has a gold plated case! — from a French company called DRG, and a range of valve amps from a company called Log whose cases feature composite stone fascias and 12watt single ended pentode guts, or at least that's how it translated.

There were new pre, power and integrated amps from Audio Note. The UK arm has produced *Otto*, a 12watt triode coupled integrated amp which looks like retailing for around £1,200 in these parts, while Japan released the *M7* preamp. This is a tube version of a design that was first



Postl & Smid's LP12 challenger in the flash.



French gold plated monobloks from DRG.



Burmester chunky model 917 CD player.



Yves Bernard Andre's multibit Lecteur CD player.



Son of Ongaku: the seven and a half watt Audio Note Neuro.



The Log preamp with its gorgeous composite stone fascia.

produced in 1979, it is available as either a copper or silver wired line stage or as a line and phono preamp, the price starts at £5,750. The stereo power amp, *Neiro*, is a seven and a half watt triode design that uses 2A3 tubes and follows in the *Ongaku's* footsteps with single ended output, zero feedback and valve regulation. It costs around £7k.

Another interesting tube amp, about which little information could be gathered is the Cary *CAD 300SE*, a monoblok design that uses the legendary 300B triode output tube. Reference Imports doesn't have this exact model number on its list but the *300M* which costs £4,750 and puts out 40watts a side must be a very similar beast.

There was a profusion of weird loudspeakers including a bizarre eye on a stalk design that wouldn't have looked out of place in *Barbarella*. I heard a couple of interesting American models, one diminutive floorstander called *Gamma Signature* from a company called Symdex was making pleasant noises in the Omtec room. Another, made by Lineaum, features a line source mid/HF driver that looks like a pair of small cylinders side by side, its crossover point is below 200Hz.

There was plenty of digital product around as well, I found an early sample of the YBA CD player in one room, this is a £1,500 top loader that uses a Teac transport and an 18-bit, four times DAC. It looks like Kronos

will be distributing the YBA range in the UK. Burmester had another Teac based player called the *CD917* which costs around £5k in Austria, but there was no sign of the new belt driven player from that company. On the analogue front there was a new, relatively normal version of the Rational Audio turntable, it still has the wacky parallel tracking arm but is now built around a solid Rega style flat plinth. It costs about £200 over there, but so far Audiotech hasn't indicated that it will be distributed here.

There were plenty of other unusual bits, bobs and pieces of audio equipment on dem at the Vienna show which turned out to be a very civilised and popular show.



The Pioneer A400 amplifier.

As recommended
by these
speakers.

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Best Buy Overall.

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Best Buy Amplifier.



 **PIONEER**
The Art of Entertainment

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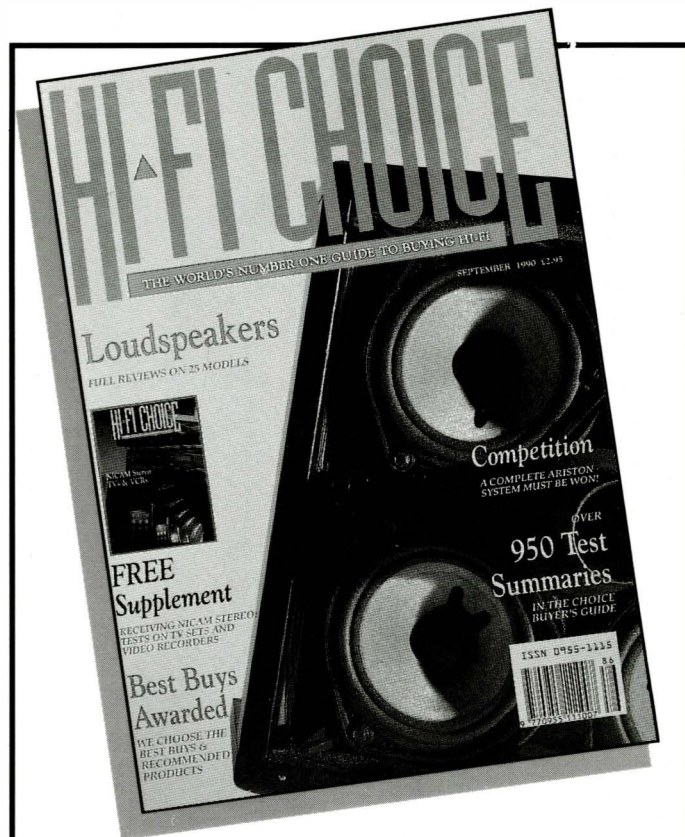
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And . . . We test digital to analogue convertors from Audiolab, Deltec, Teac and many more.

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10th JANUARY 1992



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		Clearstone Hi-Fi, Manchester	061-8351156	NORFOLK		P R Sounds, Trowbridge	0225 777799
BERKSHIRE		Hamlets Audio Visual, Ashton-u-Lyne	061-343 5127	Adcock & Sons, Watton	0953881248	WORCESTERSHIRE	
B & B Hi-Fi, Bracknell	0344424556			Martins Hi-Fi, King's Lynn	0553 761683	David Waring Cameras & Hi-Fi, Worcester	0905 27551
B & B Hi-Fi, Maidenhead	062873420	HAMPSHIRE		Martins Hi-Fi, Norwich	0603627010		
B & B Hi-Fi, Newbury	063532474	Bryants Hi-Fi, Aldershot	025220728	NORTHAMPTONSHIRE			
B & B Hi-Fi, Reading	0734583730	Cristavision, Fareham	0329288660	H.G. Rapkin, Northampton	060437515	YORKSHIRE NORTH	
Frasers Hi-Fi & Video, Slough	0753520244	Now That's Hi-Fi, Portsmouth	0705811230			Maxwells, Northallerton	0609 773535
Frasers Hi-Fi & Video, Wokingham	0734 794998	Now That's Hi-Fi, Portsmouth	0705864756	NOTTINGHAMSHIRE		Scarborough Hi-Fi Centre, Scarborough	0723 374547
		R. Upfields Radio & TV, Botley	0489787558	F.L. Smith Electrical, Mansfield	0623 655684	Vickers Hi-Fi, York	0904 629659
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B & B Hi-Fi, High Wycombe	0494535910	Sinclair Youngs, Basingstoke	{ 025628623	Forum Hi-Fi, Nottingham	0602622150	Superfi, Sheffield	0242723768
			{ 025621307	Nottingham Hi-Fi Centre, Nottingham	0602786919		
CAMBRIDGESHIRE		Southampton Hi-Fi Centre, Southampton	0703 228434	Parker High Fidelity, Nottingham	0682476377	YORKSHIRE WEST	
The Hi-Fi Company, Peterborough	0733 341755			Superfi, Nottingham	0602412137	Amrik Electronics, Bradford	0274 722530
University Audio, Cambridge	0223354237	HERTFORDSHIRE				Amrik Electronics, Leeds	0532752285
		Chew & Osborne, Bishop's Stortford	0279656401	OXFORDSHIRE		Eric Wiley, Castleford	{ 0977 553066
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		ISLEOF WIGHT			0952613818		
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ETS Electriccentres, Helston	0326573285	Tunbridge Wells	{ 0892537288				{ 0232451381
ETS Electriccentres, Penzance	073664274	Kimberley Hi-Fi, Bexleyheath	081-3043272	STAFFORDSHIRE			
H.B.H. Woolcotts, Bude	0288352269	Panatec Sound & Vision, Gillingham	0634573141	Active Audio, Hanley	0782214994	CO. ANTRIM	
Truro Hi-Fi, Truro	082729809	Panatec Sound & Vision, Maidstone	0622661488	Active Audio, Tamworth	082753355	LRG Sound & Vision, Lame	0574 272757
		V J Hi-Fi, Folkestone	0303568660	Purkiss Hi-Fi, Hanley	0782265010	Nicholl Bros, Ballymena	026649616
CUMBRIA		V J Hi-Fi, Margate	0843226977	SUFFOLK			
Kenneth Gardner, Barrow-in-Furness	0229820308	Whitstable Tele-Radio, Whitstable	0227272028	Avalon Audio Vision, Ipswich	0473281922	SCOTLAND	
Peter Tyson, Carlisle	{ 022846755			Peter Watts, Bury St Edmunds	0284 703045	GRAMPIAN	
	{ 022846756	LANCASHIRE		System Sound, Sudbury	078772348	Autosonic, Aberdeen	0224573777
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Parker High Fidelity, Derby	{ 0332 385185	Norman Audio, Preston	{ 077253057	Tru-Fi, Leatherhead	{ 0932 851753	Bill Hutchinson, Edinburgh	031-6672877
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Radford Hi-Fi, Plymouth	0752226011	Stuart Westmoreland, Melton Mowbray	0664 411511	SUSSEX WEST		WALES	
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	{ 0202721983	Brians Hi-Fi, W1	071-6311109			GWENT	
		Covent Garden Records, WC2	071-3797427	WARWICKSHIRE		Hi-Fi Western, Newport	0633262790
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A C I Radio Services, Grays	0375374666	Karla Electronics, W1	071-3232747	The Hi-Fi Company, Leamington Spa	0926 888644	Owens, Bangor	0248362951
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Chew & Osborne, Epping	037874242	Myers Audio, E17	081-5207277	WEST MIDLANDS			
Chew & Osborne, Saifron Walden	079923728	Spatial Audio, W1	071-637 8702	Bridge Hi-Fi, Walsall	0922 640456		
Peter Foulkes, Chelmsford	0245491479	StereoRegent Street, W1	071-2872458	Coventry Hi-Fi, Coventry	0203 440529		
Peter Foulkes, Colchester	0206767428	Superfi, NW1	071-3881300	Naam Hi-Fi Vision, Birmingham	021-633 4944		
Peter Foulkes, Maldon	0621 853148			Naam Hi-Fi Vision, Coventry	0203 632086		
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Christmas shopping



Definitely not a coffee table. Despite its rather industrial appearance, the Mana range is arguably the best sounding support equipment on the market and is ideally suited to Linn/Naim set-ups. Prices start at £200.

On the level. Once you've got your table, set it up with the fabled Mana spirit level. Les' favourite at a mere £25.



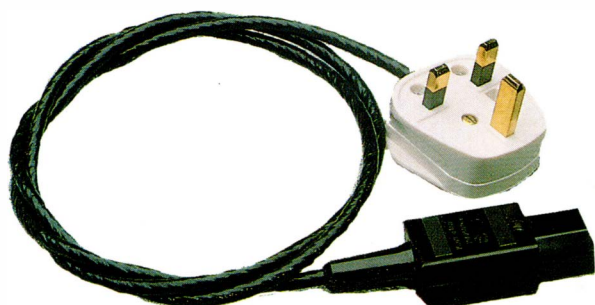
Perfect sound forever they certainly ain't. The occasional wipe with an AM CD cleaning tissue will keep your collection in the best possible condition. However, if you want the perfect sound we suggest you buy a record player!



Green ink round the edges of CDs makes them sound better? Don't take our word for it, try it yourself, and then try explaining it to your friends. £9.99 by mail order.



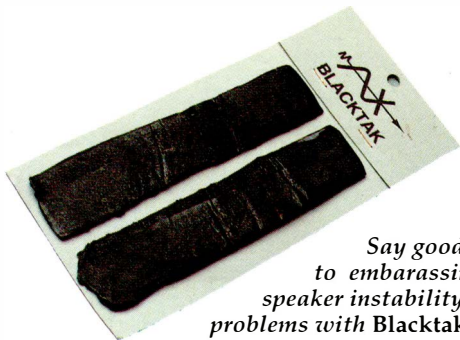
Look after your discs by fitting them with CD Xtracts, a simple little device that lifts the disc out of the jewel case without bending it. £2.99 from Design Logic.



The choice of mains cable can also make a surprising difference to the sound of a system. We've had some very good results with this Sonic Link cable. £42.50 from good dealers nationwide.

Christmas is a time for giving presents, so why not treat your hi-fi system to one of the tweaks featured on these pages, or better still, leave the magazine lying around in a strategic position and hope that someone else takes the hint and buys it for you.

Don't know what to buy your system for Christmas? Here are a few of the more tweaky products that have impressed us over the last year or so.



Say goodbye to embarrassing speaker instability problems with Blacktak.

OK, it might remove the odd bit of veneer when you move the boxes, but it sticks better than the blue stuff. £3.00 from Axhorn.



Give your CD player a tune up, or rescue debilitated Ghetto Blasters with Audio Technica's CD lens cleaner. £16 from good dealers everywhere.

Spikes make a nice present and can dramatically improve the sound quality of your system into the bargain. We were particularly impressed with this set from Goldring. Prices start at £18.

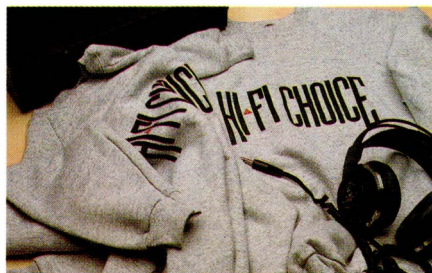


Cabling is a vital part of any system and we've had some very good results with the Furukawa range. You can even have them delivered direct to your door by turning to page 132. Prices start at £37.

Yes, it's the ultimate fashion statement. Can you afford to go shopping without a Hi-Fi Choice sweatshirt on? Order yours now by turning to page 132.



You may have won one of these in last month's competition, but if your luck didn't hold up why not talk someone into buying one for you? Stunning good looks and excellent sound for a mere £240 with glass shelves.



The ultimate crumble prezzie? Do you love someone enough to give them an Audio Note Ongaku? A bargain at a mere £34,000, but then again, it is the best amp in the world.

A quick straw poll in the office also yielded the following goodies although space prevented us printing all the pictures. The Shure pressure gauge (£14) came up on just about everyone's wish list, and along with the Audio Technica stylus cleaner, would be an ideal prezzie

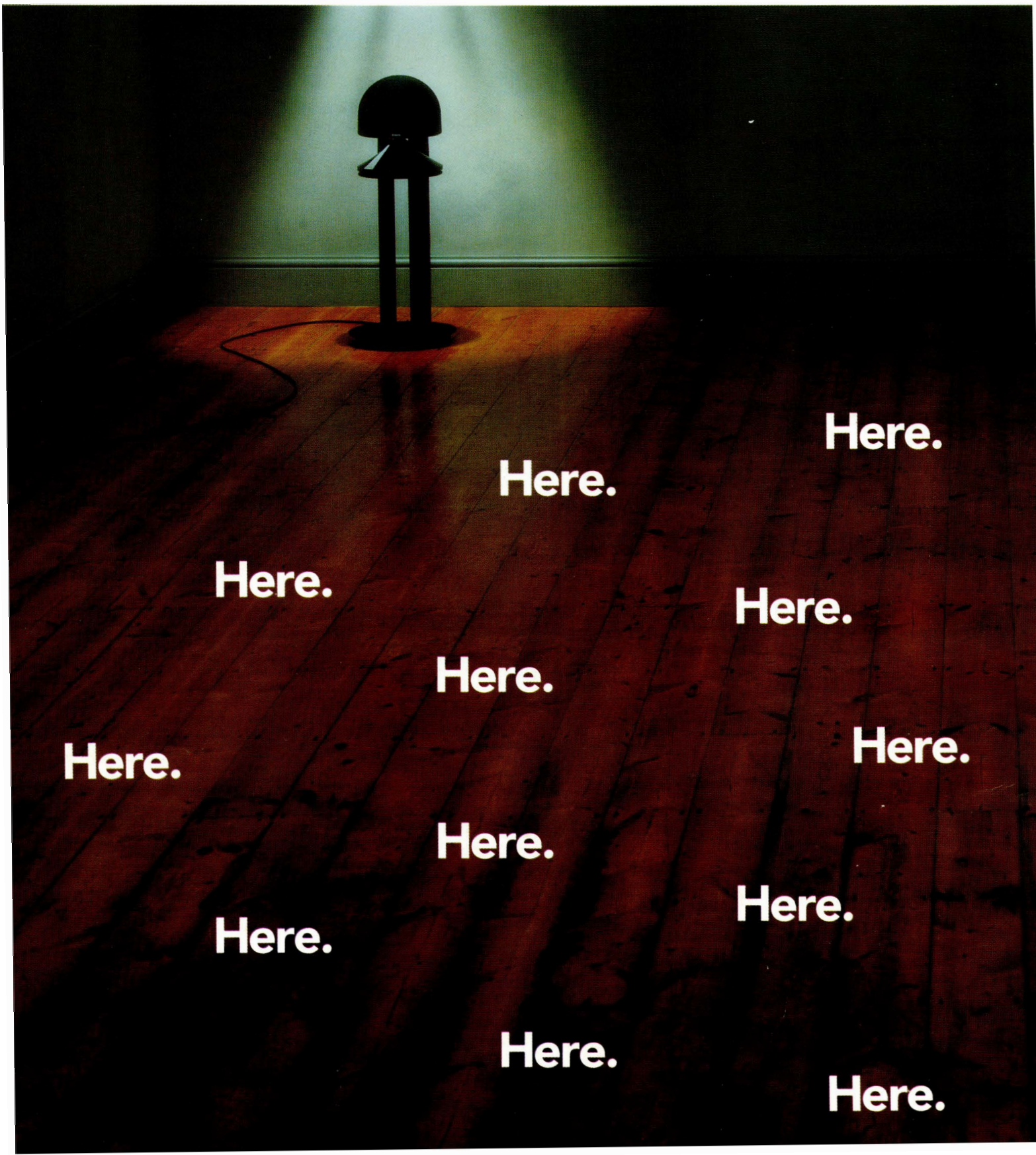
for vinyl lovers everywhere. Sticking with vinyl, Nagoka's inner sleeves are another nice idea that are fairly cheap but give your records that little extra bit of protection.

On the CD front: if you don't want green ink all over your CDs why not try

AT's green rings, much the same effect but removable.

Obviously these are just a few ideas, and don't forget rechargeable batteries for that personal or walkthing, Memorex do a nice line that you can get in Woolies and Sainsbury's, to name but two.

Where can you hear from a pair of Can



Here.

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Here.

Can you hear true stereo sound on S50 speakers?

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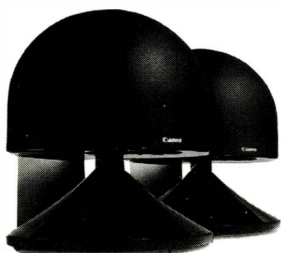
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Choice Sessions

You ain't seen nothing yet II

Fancy your holiday snaps up there on your TV, and a chance to play your favourite CDs as well? Kodak's Photo CD system looks like being a real winner, as Andy Benham reports.

Regular readers of *Hi-Fi Choice* will have seen an article last month about Aiwa's research aimed at providing still video from DAT, and may even have seen a passing reference to Kodak's Photo CD, a system which aims to achieve much the same thing from Compact Disc.

Well, those nice people at Kodak obviously saw the feature as well and no sooner was the magazine on the shelves than Kodak were on the phone with the irre-

This month Andy Benham

looks at Kodak's Photo CD

system while Victoria

Cooper bemoans the

visually intrusive

equipment support.

prints or slides. At best the prints then take up a lot of space, are seldom looked at and eventually degenerate into an unidentifiable dog-eared mess. At worst they simply disappear without trace, joining the instruction booklet that came with the video and your car insurance documents in that unlocatable place that you only discover when you come to move house.

Get the picture?

With the new system you take your film into the processor in the normal way but as well as a set of prints you also get a Compact Disc containing a digital version of your holiday snaps. That way the next time granny pops round you can play her the snaps on your TV screen rather than having to search out the album.

Each disc holds up to 100 pictures and you can go back and add extra pictures to an existing disc at a later date so that you don't have to shoot three films at a time to get a full disc.

The technology behind the project is based around the Philips CD-R mechanism that got such a favourable review in last month's *Choice*. Your pictures are developed in the conventional manner and are then scanned to produce a digital image, in much the same way as the pictures that you can see on this page have been scanned to enable us to print them in the magazine. Each image is made up of some 18million pieces of information, more than enough to give a far better picture than your average TV, and still four times better than the proposed HDTV format, with which the system is compatible. These digital images are then recorded onto a CD-R at the shop and it is this disc which is then given to the waiting would-be David Bailey. The £400 home unit is not a CD-recorder, merely a player capable of playing both conventional CDs and Photo CDs. Obviously the picture-only Photo CDs will not play on a conventional CD player.

Although the player we examined was only a prototype, and thus couldn't really be assessed in terms of sound quality,



Kodak's Photo CD comes with a handy 'index print' on the cover of the jewel case.

sistible offer to bring a prototype Photo CD player down to the *Choice* offices so that we could have a quick play.

The concept behind the machine is actually quite simple. The player itself will cost between £350 and £400 when it is launched next summer and will play both conventional CDs and Photo CDs. The machine is being built by Philips and will use the latest Bit Stream chips. Kodak promises that sound quality will be a major consideration in the design of the

player, indeed the photo side of things is totally disabled when the machine is playing a conventional disc. Kodak sees the system as a good quality standalone CD player which just so happens to play your holiday snaps as well.

So what's all this about playing holiday snaps? The concept is actually very simple. At present when you've been out taking pictures with your Box Brownie, or whatever, you nip into a processing shop and get back a wallet containing the

seeing your favourite snaps up there on the TV screen is a really nice way of viewing them. Granny is going to be seriously impressed. Not only can you view the snaps, in any order you want, but you can also zoom in and out and rotate the images as required, and all by means of a natty little remote control that is so simple to use that even the editor had no problem getting the machine to perform its digital tricks.

However, I've kept the really good news for last and that is the price of the CDs themselves. Amazingly Kodak has set a price of £11 or £12, and that includes the processing of the film, the CD and a set of prints as well, not to mention a miniature set of prints that come printed on the inlay card so that you can see at a glance which disc contains which image.

On the basis of our brief play with the system it looks like a real winner, and the fact that it is being marketed by Kodak means that there should be no shortage of shops able to turn your prints into discs.

Hey good lookin'

Sonically capable equipment supports needn't be aesthetic disasters. Victoria Cooper has been looking and listening.

Generally speaking I'm pretty tolerant of the indignities (I won't mention the cases of pure lunacy) visited on my home in the name of sound reproduction. I've seen the floors pulled up, mere furniture banned from the 'sitting room' (now there's a misnomer!) and the installation of cabling which would be more at home on the Atlantic sea bed. Through it all I've endeavoured to retain some semblance of aesthetic sanity.

Being a lover of large speakers, stands for those have never been an issue. Racks for the rest of it are quite another matter. Sorry, Target, Apollo, Sound Org et al. . .



Stand by me? Frameworks offer stylish support for your audio components.

I reckon your tables look awful. I know they sound nice, but I wouldn't want to use them for the magazines in the outside loo. A ray of hope at the end of the tunnel came in the far-from-light guise of the *Lead Balloon* and its near perfect match to the oh so practical Sound Factory *Tripods*. Trouble is, said *Tripods* have a pole up the back which rather interferes with the connection of such domestic delights as a Cogan Hall *Intermezzo* - a cause of much colourful language from my less than patient husband.

Long standing defences

In the current climate of Mana-mania I feared the worst. My long standing defences were in danger of defeat by the ugliest pile of angle iron yet.

But no. With my darkest hour upon me, a saviour appeared, in the unlikely shape of John Choong - industrial designer, hi-fi nut and tasteful person (he must be - he drives a Carmen Ghia, and yes, I am jealous).

Being a designer type person he was pretty fed up with the available options, support-wise, and decided to build his own - hence Frameworks, a range of

rather elegant tables for objets d'art, deco ashtrays, and, if you must, hi-fi.

The recipe is familiar - all metalwork and spikes - but the execution isn't. For a start the four uprights are tubular which makes a huge aesthetic difference. It also means that you can fill them with sand if you so choose.

They stand on really heavy duty spikes which are easy to level and lock up tight. The normal array of horizontal bars holds the whole thing square, but is backed up by diagonal braces which make it really rigid. Each shelf sits on three small spikes and can be independently levelled. The shelves themselves are ei-

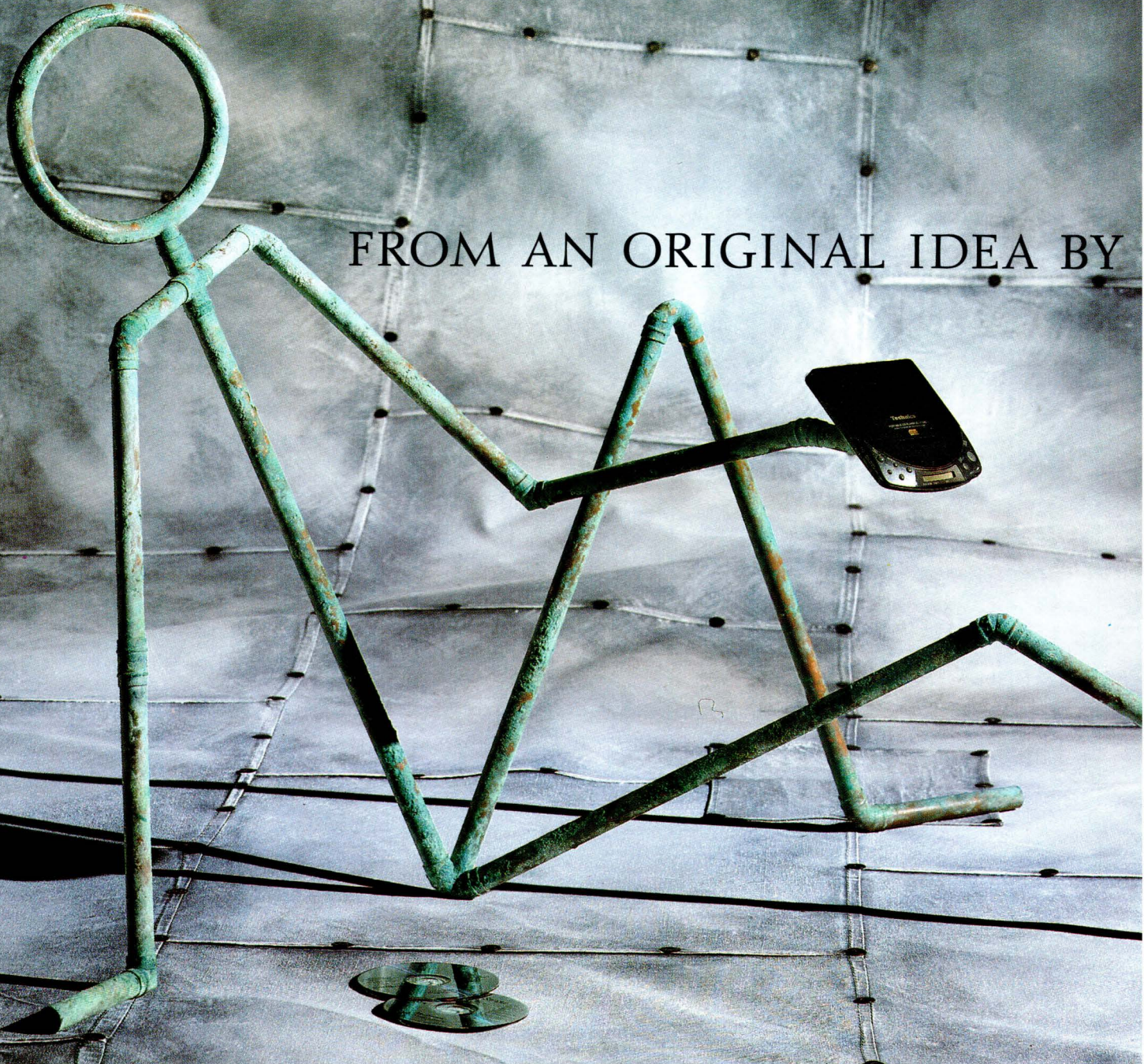
ther black MDF or glass. You get the option of two shelf, low three shelf or tall three shelf tables, the latter being a collapsible but still extremely rigid framework. Cost varies according to size and shelf type, but the two shelf table with MDF costs £149, the tall three shelfer with glass £299. The rest lie in between but you'll pay about £25 a shelf for the glass option.

Tabling a decision

The picture is worth a thousand words but I reckon the looks are spot on. Fortunately they do the sonic business too. The sound of various amps and turntables was crisper and clearer on the Frameworks table when compared to 'another leading brand'.

The glass shelves are worth the extra, especially in more expensive systems, where they give noticeably better focus, dynamics and welly. I can't say whether they sound better than the Mana products, after all I've banned them from the house. However in the pursuit of musical nirvana I might let my arm twist far enough to allow a quick comparison. In the meantime I'm just glad that my house doesn't look like the last resting place for an unwanted shipment of warehouse racking.

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*Paul Messenger lends an ear to the surreal
Dali Skylines while Jason Kennedy goes
looking for gold with some Alchemists.*

Statements

When not masterminding the development of the Danish hi-fi industry, Dali Svengali Peter Lyngdorf loves flying aeroplanes. Which maybe explains why this exceedingly striking and ambitious loudspeaker is shaped like the wings of a little acrobatic monoplane and known as a *Skyline*.

Assessing a hundred or so pairs of speakers a year for *Choice* is excellent training for guesstimating the price of any given pair. Apart from the occasional overpriced rip-off, I don't usually get it far wrong, but considering the near 50kg mass, the size and the engineering involved I was amazed to discover that *Skylines* sell for only £1,600 per pair. Whatever profit Dali may make isn't going to make much of a contribution towards those landing fees.

No speaker more than five foot tall, resolutely — even relentlessly — finished in a combination of matt black and brushed aluminium, and needing to be kept well clear of room boundaries, is ever going to slip neatly and discreetly into the domestic environment. The *Skyline* will always look big and obtrusive, so it's as well that it's also very elegantly shaped. The tapering in several planes from the massive base up to the delicate top is particularly effective, both visually and mechanically. Indeed, of all the panel speakers I have encountered, this one shows the greatest inherent mechanical integrity, and has proper spike coupling with a decent three-legged footprint to boot.

Any dipole bass — driven here by a single massive 15inch driver — certainly requires a fairly substantial width down at the base. But the reason for the *Skyline*'s great height is a different but equally classy selling point, namely a damn great ribbon tweeter that's over a metre long, slightly horn-loaded by baffle and trim chamfering, providing line-source treble of the sort of quality that causes audiophile toes to curl up. Between the bass and the ribbon, a pair of small paper cone units handle the midrange and serve as some-

thing of a halfway house between the point and the line source distributionwise.

The starting point for this design clearly involved throwing away the rule-books. Attempting to integrate three such different types and shapes of drivers is the sort of task the wily and experienced speaker designer wouldn't even contemplate.

Banishing boxes

Only by experiencing a large full range dipole system can one appreciate the wonderful feeling of release that accompanies the replacement of the boxy qualities that invariably afflict even the best enclosure loudspeakers by a lovely transparent open quality. The whole business of sound reproduction seems somehow



Cosmic audio experiences ahoy, Dali's Skyline is a dipole with an attitude.

less forced and strained. The speakers seem almost inaudible, just spreading out superbly convincing stereo images between, behind and in front of themselves.

This lack of forcefulness is, however, a weakness as well as a strength. The transparency of the whole affair seems somehow associated with a certain lack of substance. There's plenty of bass output in the listening room to be sure — arguably a little too much in fact — but go out into the hall and all you can hear is

midrange and treble, which is a little odd.

The bottom line for dipole bass — and ribbon tweeters for that matter — is that although both work rather well in their own particular way, both also place some restrictions on where you must be to enjoy the sound. For the most part the ribbon supplies nice airy detailed and delicate treble transparency, but your ears must always be somewhere between half and one and a half metres off the ground.

I've saved the best bit to last. Dipoles and panels as a breed are full of delicacy, subtlety and cerebral stimuli, but they don't know the meaning of terms like boogie. The *Skyline* does a pretty effective job of tickling the cerebellum too, but it also moves air. Sensitivity is a solid 90dB (albeit 4ohm rated), and power handling is quoted at a substantial 220-250W. I didn't test the latter, but even with more modest power, and especially when bi-amped, they certainly went loud and shook the floor in a pretty convincing and 'clogging' free fashion.

There's still a certain lack of speed and get-up-and-go about the whole proceedings, but that's perhaps a fair price to pay for an experience that's essentially relaxing and undemanding. The better box loudspeakers may do a more effective job of grabbing your attention and delivering the musical message, but they always seem to do so in a comparatively assertive and even acerbic way. The Dali dipoles bathe you in their free, easy and open soundfield.

The *Skyline* must be judged a success. That dipole transparency is always tantalisingly inviting, despite being a little warm and rich. Maybe not quite consistently purist enough to qualify as a genuine audiophile speaker, it nevertheless delivers the dipole/ribbon experience in a supremely practical package from the point of view of design and performance, and there can be no quibbling over the good engineering value for money, even at £1,600.

Dali is distributed by CSE. Telephone: (0423) 528537.

Paul Messenger

The Alchemist Freya and Genesis bask in a nice moist reflection of their glory.

bles are used; apparently some smaller speakers sound better with the little bit of LF roll off that the HF output offers.

Audio Note silver cable was used to connect the *Genesis* to Audio Note *AN-J* and Kef *Q90* speakers, front ends were: Voyd/SME *IV*/Audio Note *Io* and JVC *XL-Z1011*/Micromega *Duo BS*.

Listening to this set-up and comparing notes with my earlier experience of the *Genesis* amps it seems that a subtle change of character has come about. The originals sounded almost tube like, but somewhere along the line this fluidity has been replaced by a subtle forwardness that's less well suited to speakers like the *AN-J* with its slightly exposed mid/treble and which will harden up without much provocation.

However, there are plenty of good things to say about these amps. They've got plenty of power and they can resolve information, especially in midrange, very effectively. Probably as effectively as most of the alternatives - comparisons were made with the Rotel *Michi* phono stage and power amp, which sounded a bit more laid back and full at low frequencies but at the same time a little less 'detailed'.

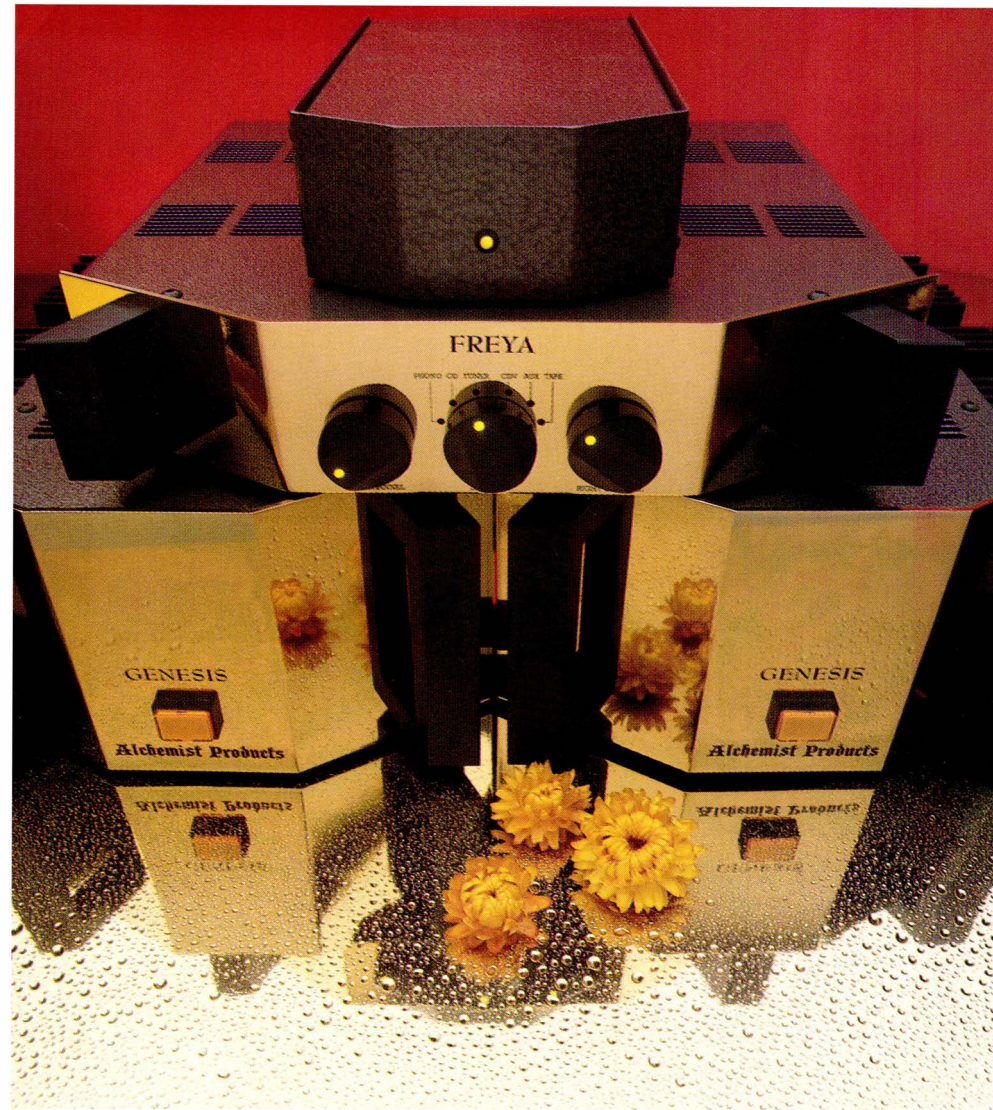
Tracks like Joe Walsh's *The Confessor* came through with serious vitality and the steel strings really zinged. Rock tracks in general benefitted from the Alchemist set-up's power and fleetness of foot; however, tracks with a lot of timbral detail sounded a bit lacking in body compared with the Second Audio tube amps. (But then again, they do cost about twice as much.)

The Alchemists also have a fairly dry bottom end, it goes right down, but when combined with a martiniesque loudspeaker the end result is bass shy balance. Basically the *AN-J* isn't the right speaker for these amps, a much more suitable partner is Kef's *Q90* which has a far more complimentary character. This combination boogied along in an entertaining and relatively relaxed fashion that proved much more enjoyable in the long run.

The Alchemist *Freya*, *Bragi* and *Genesis* is an interesting amplification set-up, it won't suit everyone but it will appeal to many if incorporated into a sympathetic system.

If you've been considering investing in Musical Fidelity or Naim then these well built, chunky little beasts deserve some attention and time.

Jason Kennedy



This review has been a long time coming. To cut a tome short, Alchemist Products is a small British company whose first creation - the *Genesis* monoblok power amplifiers arrived in my living room early last spring. However, because the company was thrown by a large export order and because it realised that May isn't the greatest month to launch a new product or brand, the review was held back.

These early production difficulties have now been sorted out so here we have an assessment of the *Freya* line preamp (£1,020), a pre production *Bragi* phono stage (£495) and *Genesis* monobloks (£1,525 per pair).

Freya and *Bragi* share the same case styling and power supply, the latter occupying a smaller, less exotic though similarly shaped case that supplies current via a fairly long umbilical cable. *Freya* is a dual mono affair with irritating left and right volume knobs and also input socketry arranged horizontally - right on one half, left on the other - which means that bonded interconnect cables will have to be peeled apart.

There are six inputs and two sets of outputs and as with *Bragi* the select and volume controls have amber LEDs set

into them. If this had been a Japanese product these lights would have flashed as you operated the remote volume control, but here they just glow seductively. There is no remote.

Bragi despite its slavish name is an MM/MC phono stage which optionally derives its power from and transmits signal to *Freya* via a chunky umbilical fitted with XLR style connectors. Alternatively you can use a separate power supply and your choice of interconnect between it and the preamp. Apart from accepting both types of cartridge it can tailor the impedance that the cartridge sees across a five strong range that spans 30ohms to 47ohms.

Genesis is a 60W bi-polar monoblok power amplifier of unpretentious scale; a pair placed side by side will sit atop a Target table. Its technical claim to fame is that there's just one 10mF capacitor in the signal path which reduces the overall capacitance of the circuit and is supposed to improve midrange transparency.

Externally, each amp has an extra pair of speaker terminals for bi-wiring, which because of the choice of internal wiring, are marked LF and HF for low and high frequencies. Apart from the obvious bi-wiring option, they allow a degree of tailoring to the speaker when single ca-

The life of Brian

When we heard that the 37 year old chairman of B&W Loudspeakers was using a pair of the snail-like *Nautilus* loudspeakers at home we leapt at the chance of an exclusive preview. Occasionally, and covertly, referred to as Brian, the *Nautilus* follows on other recent B&W designs which aim to fit superb-sounding components into a cabinet which has the appeal of a limited edition print of some rare work of art.

The Design Museum has already featured the *Emphasis* loudspeaker, the stunning creation shown on this month's cover. The style is reminiscent of a saxophone and was the brainchild of Morten Villiers-Warren, a student who approached B&W to see if it could be made to work. After a couple of years research it could, and production of the *Emphasis* has just begun.

Visual Wizardry

Meanwhile Morten's eye for striking design has been applied to the *Solid* range of loudspeakers, and to a prototype *Solid* satellite which uses three telescopic legs and a conical mushroom shaped cabinet.

B&W has used industrial designers since 1976, and its Bauhaus style brochures reflect the influence of such visual wizards as Kenneth Grange, celebrated for the lines of Kodak's Instamatic and the Inter City 125 train.

But it is more recently that design has departed radically from the square box shape which has so dominated loudspeaker style. The man ultimately responsible for this is Robert Trunz, who took over the chairmanship of B&W when John Bowers died in 1987.

Robert Trunz, the chairman of B&W loudspeakers, takes the time to show Dan Houston a few of his hi-fi systems.

B&W was 25 years old in 1991 and Trunz believes that it is now important to take loudspeaker design into as many new areas as possible. "If we have to depend on just the traditional hi-fi dealer, and if they have to depend on us, then there won't be any more dealers in ten years' time. I want to go out there as wide as possible, into different markets altogether," he says.

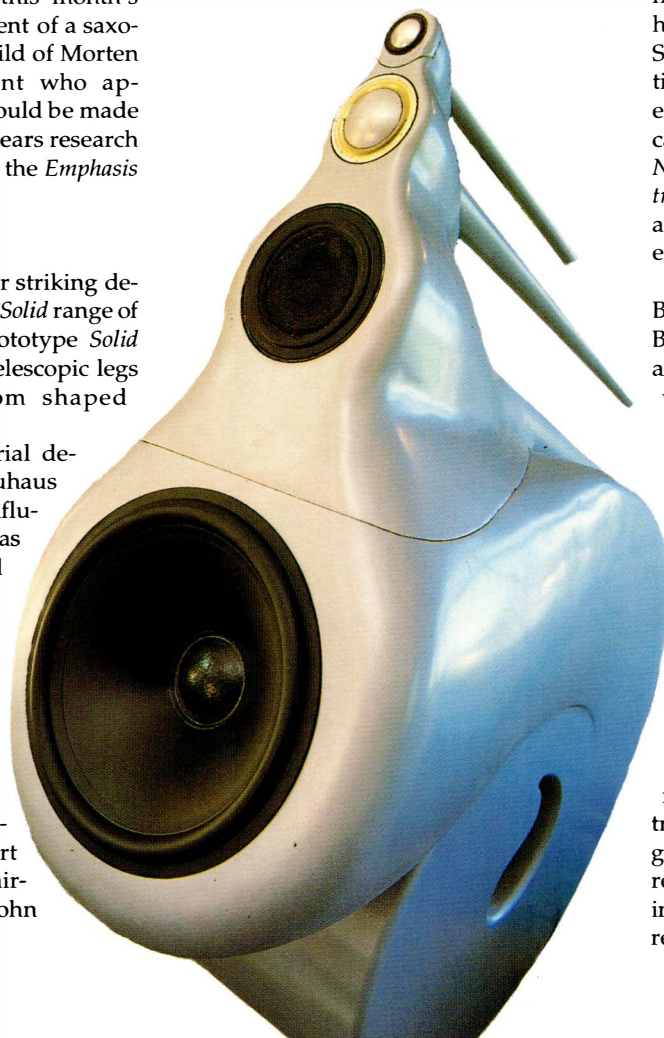
Highway to shell

The broad direction of the company reflects the diverse taste of the chairman himself. His house near the scarp of the South Downs in West Sussex is a collection of rooms containing no less than eight different hi-fi systems. B&W's best can be found here — you can listen to the *Nautilus*, *Emphasis*, *Silver Signature*, *Matrix 801*, *Solid*, *Concept 90*, *CM1* and *CM2* and a hybrid electrostatic design from the early Seventies called the *DM70C*.

The house reminds me a little of a B&W brochure, or more correctly the Bauhaus theme, with its outlandish sofas and chairs. All the rooms are painted white, but this is a reference to his days as a tour operator in Barcelona Trunz tells me. "When we moved here from Worthing four years ago it looked like a normal English house, it was very dark with flowery wallpaper and dark wood everywhere."

It's a house that reinforces his image as an arbiter and proponent of modern style. He lives here with his Italian wife and a curly haired water spaniel. . . a poodle.

Trunz joined B&W in 1981, following experience as a hi-fi distributor and retailer in Switzerland, his mother country, during the Seventies. He's multi-lingual and quickly established his reputation as a globe trotter, taking B&W into new markets and forging a lucrative reciprocal link with Nakamichi in Japan.





"When I joined the company 40 per cent of our business was from the United States. We've been seeing what interest rates can do to companies recently and it scared the hell out me to rely on one market so much. So I tried to spread the business more — now we do 25 per cent of our business in the States." The exports elsewhere have increased to the point where B&W only makes four and half per cent of its product for the UK. Germany and Hong Kong (which sells through to mainland China) are now the largest markets, he reveals.

Make a jazz noise

Consolidating the export base earned Trunz a place on the board as Marketing Director and he also began to take the B&W name beyond the hi-fi business. The most significant venture was partial sponsorship of the Montreux Jazz Festival which the company took on in 1986. "I am a friend of Claude Nobs, who started the festival 25 years ago," Trunz relates. "There was always just the one venue at

Wacky furniture ahoy; one of Robert Trunz' many listening rooms, this one featuring a pair of Matrix 801s and a Philippe Starck candlestick.

Montreux, and we suggested that we run another. I had helped organise jazz events before so Nobs agreed. At first it was just a small part of the festival, with room for 500 people and a sort of jazz club atmosphere. But now its established itself as a regular venue."

B&W's involvement has now ceased, but one of the spinoffs of sponsorship was recording some of the musicians who played the second venue, and Trunz took a mobile studio to Montreux. "There are three B&W CDs already released with a further four or five to come," he says.

Another spinoff was meeting the stars who play at the prestigious event. Trunz can do more than just name-drop about the likes of Gil Evans, Miles Davis and Herbie Hancock. In his main music room he has one of Miles' drawings, propped behind the speakers. Herbie uses 801s in

his Los Angeles home, he says.

"I'm a jazz freak," he qualifies and his record collection in the main listening room certainly confirms this, although he also has more classical and contemporary rock albums than most serious collectors. There are eight cases for CDs holding enough discs to make counting a pointless task.

The *Nautilus* loudspeakers are an arresting sight. They look like giant snails, with the horn enclosure curling rather than folding into itself. The 'cabinets' are made of spun fibre glass which has good qualities for resonance and can be shaped to minimise defraction.

On top of the main enclosure, which houses the 12-inch bass unit three other mid and high frequency drivers are used. These all feature tapered 'antenna', pointing rearwards which functionally dispose of the rear radiation, but which also look like the tentacles of the prehistoric cephalopods which the design resembles.

Each driver has been designed to work in its own frequency band and the system

is a true four-way design, with active crossover — requiring eight channels of amplification if you like stereo.

Curiously this product has not been designed by an architect or visual artist. "It really comes from sheer function," Trunz assures me. It certainly sounds as though function has led the form, and playing a series of CDs through the *Nautilus* one becomes gradually aware of its awesome capabilities, beyond its immediate greeting that it is firmly in the high end of the audio league.

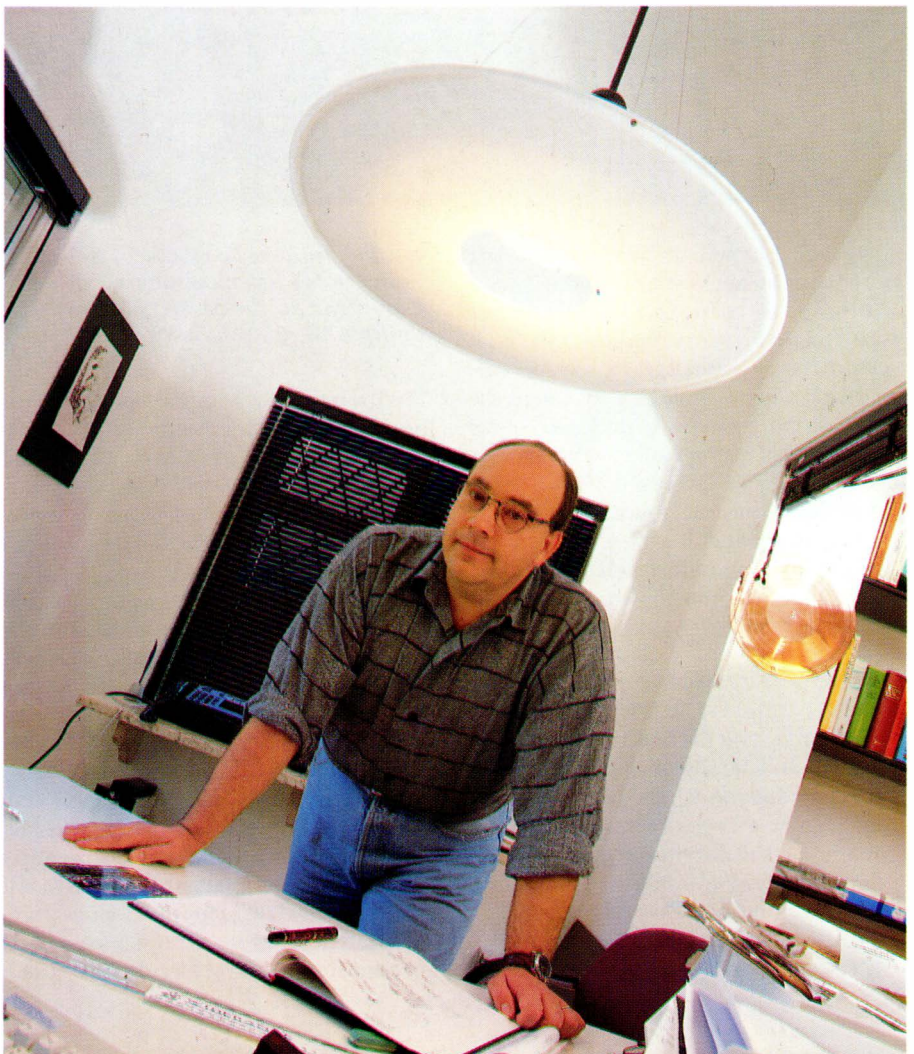
So what else is there? Well, unsurprisingly six out of the brace of four monobloks here are B&W designs — yes the company makes amps too! Namely the cuboid *MPA1s* which sit upon the meatier lines of *Krell MDA300s*. The main source is also Krell — £10,000 worth of *MD1* and *SBP 64 X* outboard digital to analogue convertor. This and a Nakamichi *DAT 1000*, *1000ZXL* cassette deck,



Above: the office system includes the Silver Signature speakers. Above right: molluscs at bay. Right: the man himself, jazz afficianado Robert Trunz.

Tandberg tuner and Sony 55ES DAT machine are all routed through a Rotel *Michi* passive preamplifier (*RHC10*).

Churlishly I demand of Trunz why he has no record player, and learn that he is expecting his new deck, an *SME30*, at any moment. He is obviously quite serious about hi-fi; the *SME30* is a £10,000 final statement on vinyl's capability with the likes of Nakamichi's *DAT 1000* costing around £5,000. What is the price of the *Nautilus* then? Trunz is non-committal. "I think these are the sort of speakers where if you have to ask the price you won't be





able to afford them," he comments while I dug my hands in my pockets to make them seem a little deeper. "It's very important to have products that people will want no matter what the price," he adds.

The death of Brian

With such an array of high-end sources I asked Trunz whether he would not find it easier to have installed a link up system to his other rooms along the lines of Audio Access say. He looks shocked: "No way would I have one of those systems. I want to be able to choose my own amplification for each room and anyway, I like gear, and I'm changing these systems the whole time. I swap stuff with other people in the industry, and if I had one built in system then it wouldn't work.

"Each system is also different — people often ask me what is the best system but that's impossible to say because it's a matter of taste and applications. As far as I am concerned the best loudspeaker is this *Nautilus* . . . but then I would say that, wouldn't I?"

I can't deny this, and ask him how the speaker was named. "Oh we wanted to call it Brian," he answers, alluding to every child's favourite slow moving TV animal on *Magic Roundabout*. "But the BBC said we couldn't call it that so we came up with *Nautilus* . . . it's a bit futuristic, a bit Jules Verne."



A tour of the other Trunz rooms only just confirms that the one we were in is the best in terms of sound quality. On the ground floor next to the main room he has a Meridian fronted system, with a 206 CD player and 201 preamplifier, playing through B&W *MPA1* monoblocks and the *DM70C* speakers. In his second lounge which contains the dining room in an open plan arrangement there is a top of the range Marantz *CD12* and outboard DAC - *DA12*. These are combined with a Burmester 877 preamplifier and 878 monoblocks.

He uses a pair of white *Emphasis* loudspeakers in his bedroom, again powered by *MPA1s* with a vintage Nakamichi 600 cassette deck and matching 630 tuner/preamplifier. A Sony *Discman* completes the equipment which is installed in a cabinet beside the bed.

The office contains a pair of the new John Bowers *Silver Signature* loudspeakers — a gorgeous design which is silver wired throughout, with a tweeter mounted on top of the cabinet looking like the sidelight of a Fifties sports car. There are also two Sony DAT machines here, a Sony 701 *ES* CD player and more video equipment, all handled by a Burmester 877 preamplifier and pair of Jadis *JA80* valve monoblocks.

Most of these combinations would be enough in themselves but Trunz likes to

Pipe dream: Morton Villiers-Warren's stylish speaker design has been turned into a functional product by B&W, which has dubbed it the Emphasis.

have different references. He tells me that he could never afford expensive hi-fi until later in life, and this may be part of the reason why he now holds such a hardware hoard.

Aside from hi-fi Trunz says it is music that most appeals to him. "It had always been my dream to work in a place where music is being made or reproduced. I find the business side terribly boring, and I would find it impossible to sell baked beans because I couldn't associate myself with that. When John Bowers was alive things were done his way, and he was an engineer first and foremost."

Trunz is adamant that the engineering aspect of B&W is still the *raison d'être* for the company, and says that the plan is to branch into a new range of electronics using digital signal processing (DSP) technology which will consolidate the first 25 years and continue to take the company forward.

Trunz himself is not an engineer, but rather a visionary stamping his love of modern and abstract art upon products which are all too often seen as boring and functional. After the *Nautilus* and *Emphasis* one can only wonder, what next?



You drop it. Sony DAT will pick it up.

It picks up heavy metal as well. In fact, a Sony DAT player will record anything you like. Perfectly.

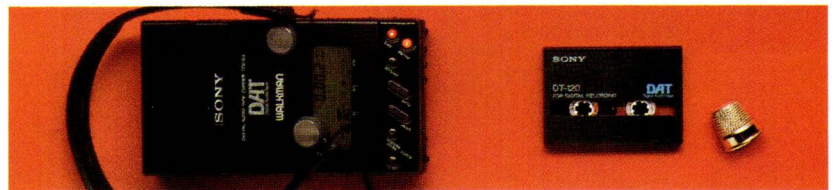
It's the difference between numbers and bumps. Whereas standard recording leaves an imprint on a metal tape, digital DAT technology records sound as an indelible numerical code. The imprint loses its edge. The numbers come up true every time. In short, you've got a CD quality recording machine.

A Sony DAT deck, for example, enables you to record and preserve all your non-digital material, as well as making digital compilations from your CD or tuner.

That's four faultless hours of your favourite music on a cassette the size of a matchbox. The Sony DAT Walkman® personal stereo is another pocket-size piece of perfection.

It'll record from any of your equipment and play back through headphones, your hi-fi or car stereo.

Like the deck, it'll fast forward at 200 x



playing speed and pre-select tracks in any order you want.

So have a listen to a Sony DAT. You'll never pick up anything else.

SONY.
Why compromise?

Dan Houston visits Cardiff,

home of Deltec Precision

Chips with everything

Audio, and investigates the

company's plans for the fu-

ture of digital audio.

DAC7 is the third of Philips' Bit Stream digital to analogue converters to be developed and, a little predictably, it's being hailed as the ultimate chip of its kind. The Dutch-developed convertor (DACs 3 and 5 were created at Philips' Southampton research facility) will theoretically put the final nail in analogue audio's coffin with its ability to retrieve low level information, although only time will tell just how successful it will be.

Significantly, the electronics giant hasn't introduced its own DAC7 CD players yet, but two British firms have beaten the Dutch firm to the market and are selling standalone digital to analogue converters based on the new chip. Meridian has already introduced DAC7 variants of its acclaimed 203 and 606 convertors while Deltec Precision Audio has a number of designs on the market including the *Bigger Bit*, *PDM Two* and *PDM One Series 3*.

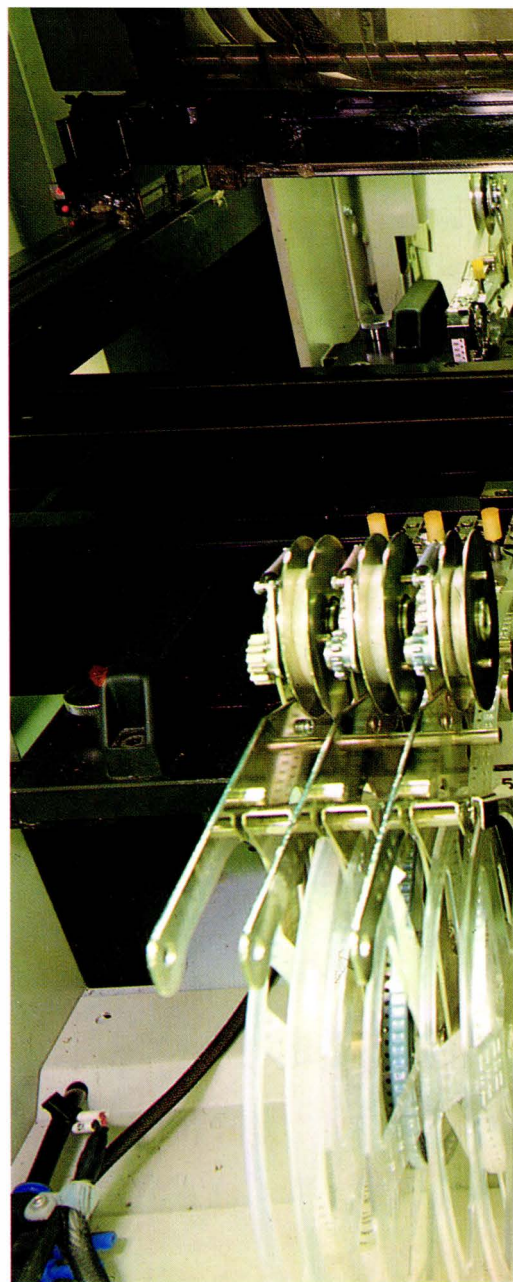
The story of Meridian is a well-thumbed dossier of design and engineering excellence, but Deltec has maintained

a fairly low profile since it was founded just over ten years ago. It's run by Robert Watts, who decided to make Cardiff his home after reading an electronics degree at University there. He started Deltec at the age of 20 while still at University, describing himself as 'a mad hi-fi enthusiast who couldn't afford to buy a decent system so I built one myself'.

Shaping a destiny

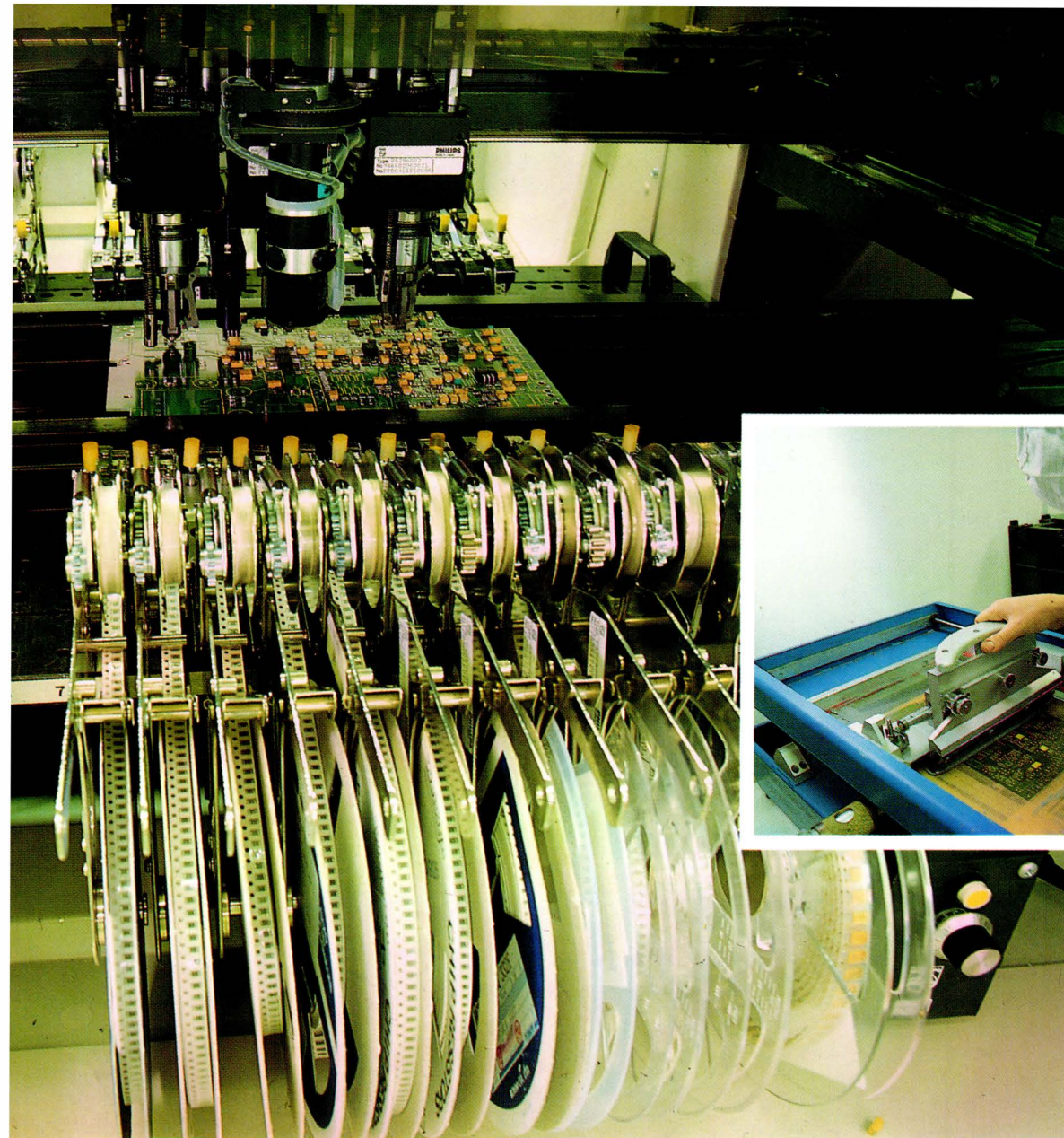
Deltec now boasts a turnover of 'just over £1M', and employs 23 people making a range of amplifiers and digital to analogue conversion units, the latter being sold as upgrades for existing CD players or for use with a standalone CD drive. Like Meridian, Deltec uses distinctive design to give it some wheat-from-chaffness and the lozenge-shaped components have found appeal with deep pocketed minimalists, whose ears demand the best.

We wanted to ask Mr Watts how a small and esoteric company gets access to the latest Philips technology, and to find out where Deltec is coming from.



The journey took us into the heart of Cardiff's redeveloped docklands, to one of those light industrial units which seemed to symbolise the proliferation of small businesses in the Thatcher years — Deltec moved here in April 1989. Inside, there's the main assembly space with work benches for putting together and testing the amplifiers and DACs, a longish office with the computer aided design (CAD) work station, a canteen, listening room and the board stuffing room — which is a semi dust-free environment.

All of Deltec's products begin on the computer, which is used for both mechanical and PCB (printed circuit board) design. The most significant reason for having CAD is that it cuts design time by months. Watts says that to implement the DAC7 chip in a convertor took him just ten days. "It would have taken four or five months without the computer," he assured me. You might ask why the programme took ten days; after all this computer does all the power supply and ground routing itself. The clever part of



The circuit boards, shown above, are stuffed by the very latest surface mounting machinery (main picture) the components being provided off a roll.

using CAD, according to Watts, is knowing how to place the layout of a board so that components don't react to each other — and that has to be done manually.

On screen designs become reality in the semi-clean room. Before entering this, staff (and visitors) don boiler suits, overboots and headgear. Watts explains that the suits are for his quality control ratings rather than our health: "It's really for stuff like bits of dandruff," he adds, a little rudely I think. "If we get that onto the boards then we're in trouble."

Screen test

Bare boards are first placed in a silk screen solder machine which lays out the tracks for the signal paths. It's a manual operation requiring a skilled operator; if the board is run across the tray at too high a speed then not enough solder will pass through the silk screen.

From the computer, data is supplied to the 'pick and place' machine which stuffs the semi-dry boards with surface mount components. This machine can turn out

100 boards a day, equivalent to nearly half Deltec's entire monthly output. Learning how to use it was a little tricky, it promises to place things within a thousandth of an inch but then gets temperamental. It was gently spilling components inside itself while we talked about it!

"This high technology stuff isn't as easy to operate as the manufacturers would have you believe," Watts relates resignedly. "There are a lot of bodes before you get it right."

When the boards are finished they are sent through a reflow oven which dries off the solder solvent before heating (to the solder melting point) in a nitrogen-rich atmosphere. "That stops the board from oxidising, you can hear the difference," Watts says matter-of-factly. While sonic performance is better, it's also obvious that long term reliability is improved.

From the clean room products are assembled in chassis that are built by a subcontractor to Watts' own design. After assembly each product goes through a test procedure — the results of which are

packed with it before dispatch. The computer driven measurements give a Deltec DAC owner a printout of their unit's performance over 16 different tests.

Quality of life

Quality control is vital to Watts, and the automation of his operation has allowed Deltec to spend more time on it. "In the last two years this company has grown by 2000 per cent," he tells me, "and that change has been brought about largely by quality assurance. We now spend 60 per cent of our time on QC, and listening to our products."

This last function is carried out in the listening room, where various sources are put through Deltec DACs and amps and Acoustic Energy AE2 loudspeakers.

In spite of all the computerisation and automation Watts is a musical cove, and says that he first became interested in hi-fi while 'listening' to the performance of different types of solder or cable. "My goal is to listen to a hi-fi system and get emotional and excited by the music; foot-

tapping stuff, that sort of thing.

"Sound stage, detail, bass resolution are all rubbish — they're only important in allowing you to move in a certain direction. The most important thing is 'involvement', and you can clearly listen to one resistor and make a judgement on whether it's more emotionally involving than another."

This sounds good — how many audiophiles do you know who listen to the timbre of their surface mount devices? Watts adds that while musicality must affect the motor-neurons to his feet, the main hi-fi ingredient he looks for is variation. "In order to be better something has to satisfy me in all these respects: It has to have variation in space, variation in timbral qualities — the difference between a bright trumpet and a rich clarinet, variation in dynamic resolution and variation between the different instruments. I think if a hi-fi system can express this variation then it's possible for the music to be emotional."

Watts tells me in all seriousness that he applies these parameters when choosing components: "We can do 100 listening tests just for a mains filter," he says.

In looking at what affects variation he has come up with several design parameters. For instance Watts thinks there are three main areas which affect resistor design. "First, radio frequency performance. If it generates RF then a noise modulation floor will be added to the music. Second,

the internal quality of the contacts. And third, when a music signal goes through a resistor it heats it up which affects the 'dynamic discrimination' — the gain of the resistor is changing with the signal. This can be heard down to -140dB, and we're talking about changes in temperature of about one thousandth of a degree Celsius!"

It seems a little tiresome to go into everything in such detail, but for Deltec the approach is obviously paying off, and it does sound impressive. Was Watts always such a stickler for the effects of component difference in electronic design?

It seems he was. In fact he admits that

Top: Deltec's main man, Robert Watts. Bottom: Newly built DACs undergo a rigorous test procedure before despatch to the client.



he became so stridently scathing of contemporary amplifier design whilst a student, that friends more or less dared him to make and market one himself.

In 1983 together with his partner, Adrian Walker who left last year, he began design on a pre and power amplifier which saw the light of day in 1984, priced £660 and dubbed the *CTA 80*. He only sold 15 units, but adds, a shade egotistically, that it sounded better than an Audio Research. "Dealers said it sounded great but they wouldn't take it on because we had no reputation," he recalls, describing the classic *Catch 22* for fledgling businesses.

There were two important lessons to be drawn from that early experience, as Watts relates. "First I realised that if you're going to make a £600 amplifier then it shouldn't take you three days to build it. And second, it shouldn't look like a piece of test equipment — which it did."

Deltec then concentrated on sourcing dedicated hi-fi cables, and became known for the *Black Slink*, *Black 16*, *Mains Filter* and *Power* cables which were introduced between 1985 and '87. But work on amps carried on with a thick film hybrid amplifier, launched as the *DH 0A32* providing the springboard for the brand-design of the *DSP Series 50S*, a pre and power combination launched at the Penta hi-fi show in 1987.

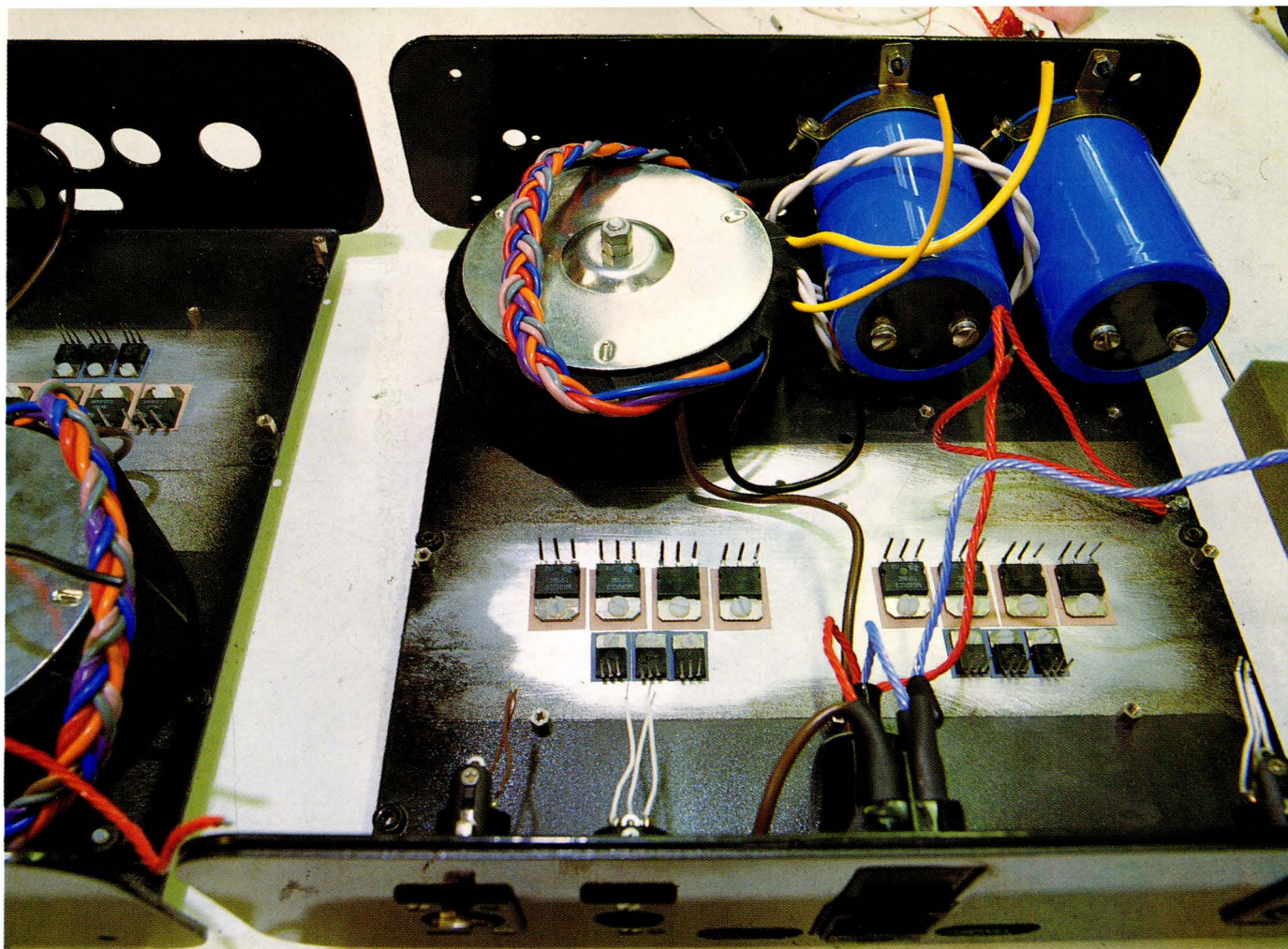
It was the use of thick film hybrid designs which affected everything that Watts did subsequently, and instead of the Queen he has a photograph of one of these boards hanging in his canteen.

The kiln fields

The boards carrying the laser cut 'thicker film' resistors, surface mount components, and conductor tracks are all fixed onto a ceramic substrate. It's then heated to 800°C — effectively fired — by a kiln. "That melts the metal and the resistor which are turned into a solid body," Watts says.

The advantages are several: "Most importantly there are no metal to metal contacts, so signal flows better. Normally resistors are bonded to the board with end caps, under pressure. You might spend £1,000 on gold connector plugs when inside you have these cheaper end caps which seriously degrade the sound quality." The design uses feedback, which Watts describes as useful when approached properly, and gives sweeter and





smoother treble characteristics. "The issue isn't the level of feedback but whether it starts at high frequencies or not, and whether RF makes a difference." Watts' designs use the same level of feedback throughout the audio spectrum, which he says gives better results than no feedback at all, and partially corrects RF problems. Indeed he says he uses feedback to cancel high frequency distortion.

In 1989 Watts relates that he was very anti digital, but took part in one of the *Hi-Fi Choice* panel tests at Paul Miller's house listening to CD players and DACs. "One of the products was a Sony Bit Stream digital integrated amplifier which sounded better than Paul's reference Musical Fidelity *Digilog*. Later that night we connected it to his preamplifier and I was amazed at how good it was. It didn't sound fatiguing, but it did sound emotional."

He bought the chip, a Philips 7320, and set about applying hi-fi principles to Bit Stream DACs. Working at a 'furious pace' of design he had the *PDM One* ready for launch at Penta three months later. Others also bought the chip, and it turns out that Philips was happy to see its new technology implemented, especially in high-end audio. After all it was originally developed for personal stereo!

Watts describes Bit Stream sound, as opposed to multibit, as being less grainy or aggressive, and warmer, like a valve amp compared to solid state. The chip

Power supply design forms the heart of Deltec's design philosophy.

was improved with the second generation 7350 in September last year. "That allowed us to use different digital filters, like Yamaha's model, which is warmer and smoother," Watts recounts.

In February this year DAC7 arrived, which Watts had incorporated into his two-box £2,195 *PDM Two* by May. "The problem with Bit Stream is the distortion with low level signals, anharmonic distortion, which is worse than harmonic distortion, and which can be heard. It's caused by digital noise. With a DAC 7 you can split the digital Bit Stream code chip from the analogue converter.

"It removes the part that generates the distortion from the analogue section. With two separate chips we did the obvious thing and put them in two boxes, connected by an optical lead, and with their own power supplies. We can achieve zero distortion at -60dB, and a fundamental linearity to within 0.02dB at -90dB, which is extremely accurate." The £650 *Bigger Bit* is less OTT, but also removes the DAC7 from the 7350 digital chip with earth plane screening.

Watts adds that only now is the D/A converter linear enough to produce the sort of low level information which tells him the variation between a Stradivarius and another violin. He concedes that the 16-bit standard for CD is still a 'bottle-

neck' as far as audio bandwidth, limited to 20KHz, is concerned, but adds that this is blamed for CD's harsh sound when really it is other matters such as dynamics. Making the 16-bit signal linear down to levels of -90dB or -110 dB (he claims infinite resolution of detail is possible) is done by using dither — where low level noise is added to the digital signal to randomise the quantisation noise which otherwise leads to distortion.

Transport policy

A super DAC, using six boxes for dual mono operation, digital processing and powersupplies is the ultimate aim, though before that Watts hopes to have his own transport mechanism produced (hopefully by December).

He reveals that he is now involved with a project at the University to develop an A/D converter for use in recording studios, which he claims will better the current state of the art 20-bit chips there, though Philips has a 7360 A/D Bit Stream chip imminent.

Both Philips and Watts maintain that the capabilities of DAC 7 aren't yet realised. "In two years time the Deltec DACs will look like the Wright Brothers compared to what will happen," a Philips technical spokesman said.

I'm doubtful, but if it's true then all of us LP users, listening to our Lear Jet equivalent systems, may soon be buying a digital ticket to ride.



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Laser Disc has had more comebacks than Status Quo. Seeing as it's relaunch time, again, Hi-Fi Choice looks at the chequered history of the format and considers whether it has a future. Dan Houston reports from Tokyo and Andy Benham investigates from Los Angeles.

Walk into any record shop in Japan and you'll be greeted by shelves full of . . . vinyl LPs? No. End-on they may look the same and they even weigh about the same as a good thick record, but these are Laser Discs; big CDs with video thrown in. The shelves display a comprehensive choice of titles, ranging from Mozart to Madonna for music buffs, with thousands of feature films for sale. There are three formats of laser disc at present, all now using digital sound with analogue picture technology. The full (two hour film type) version is 12 inches in diameter and readable on both sides. There are also one-sided 12 inch discs and one sided 8 inch (20 cm) discs giving 26 minutes of sound and vision — mostly for pop videos.

The long and winding road

The technology certainly isn't new; Philips demonstrated Laser Vision — an early analogue sound version of Laser Disc — as long ago as 1972, but was never been able to market it successfully. However in Japan, where one in ten homes now owns a Laser Disc player, LDs are the boom business; sales of CD players are levelling out as people opt for a Laser Disc player to play both their CDs and their feature films.

The Japanese, American and some other markets have grown steadily over the past ten years since Pioneer and the American record company MCA got together to 'develop' a system in 1977. MCA teamed up with IBM to form DVA, which was to make the software, while Pioneer was to make the machines. Things didn't work out and Pioneer started its own software factory in Japan in 1981. By 1982 DVA had sold its Los Angeles pressing plant to Pioneer and the company was practically alone.

Ten years on we have seen Philips' embarrassing flop with CD-Video here

while Pioneer has quietly cornered the market there. The company claims 50 per cent of the software market and 70 per cent of the hardware market worldwide. Now the firm is making PAL (the European TV format) LDs from its plant in Los Angeles to foist upon the British public, and *if* we can all be persuaded to add a Laser Disc player to the already space-consuming midi hi-fi, TV and video then

a new LD software plant may be built in Wakefield, Yorkshire. Others are joining in; Sony Classical is pressing a limited number of PAL standard discs, of concerts and operas, from its new plant in Austria as I write.

But that 'if' is very big indeed. It's true that LD can offer better sound and picture quality than video tape, with a degree of longevity which may allow the user to



Whatever happened

take his disc collection into the next world. But it isn't recordable, and users will have to sacrifice one of the VCR's strongest selling points in favour of the aforementioned subjective qualities.

Philips estimates that Pioneer will need to launch the product with an available catalogue of at least 500 titles, and a promise of 200 to 300 new titles a month — covering the whole spectrum of film and music video — in order to whet the appetite of those in a position to buy. This was something, a spokesman admitted, that the Dutch electronics giant had never been able to achieve. The problem with the UK market, according to Philips, is that the film industry would never give it backing, unlike the situation in the more affluent markets of America and Japan.

Experts pour more cold water on Pio-

neer's ambitious plans by suggesting that the Laser Disc medium may soon become obsolete with new technology using data compression methods. This will effectively reduce the size of a 12 inch Laser Disc to just 5 inches — the same size as a CD.

But with all this against it Pioneer is still keen to establish LD here, pointing out that projects aimed at achieving full motion video from a 5 inch disc are still in their infancy and claiming that LD will be around well into the next century. In mid 1991 Pioneer formed a new company, the Laser Disc Corporation of Europe (LDCE) with a view to promoting PAL software to the European consumer.

Although there are still comparatively few titles available in the PAL format, there is, of course, a huge number of titles

available from America, although they are in the incompatible NTSC television format used in both the USA and Japan.

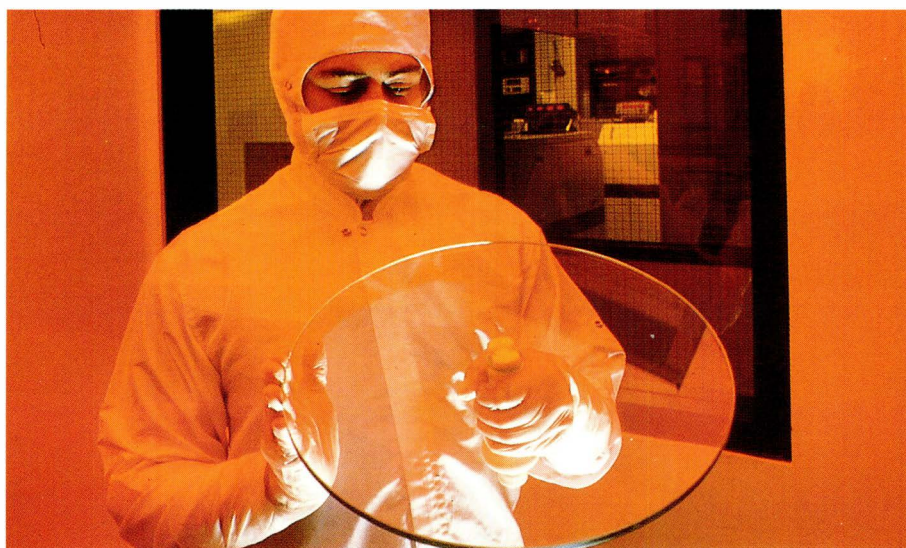
Double standards

Although Pioneer has hardly been shouting the fact from the roof tops, for the last couple of years it has been selling a dual standard player in the UK, the £499 CLD-1450, which will play both PAL discs and NTSC material imported from either America or Japan. Indeed several shops are now reporting quite considerable levels of business with imported NTSC discs; London's Covent Garden Records, for example, sells some 350 or so discs every month.

Although Pioneer wouldn't dream of saying so the message is quite clear: either the film companies co-operate with

Left: A Laser Disc player can cope with conventional CDs as well as the LDs themselves.

Right: A Laser Disc undergoes final inspection before leaving the factory. Below: A polished glass master disc is prepared for polymer coating at Pioneer's Kofu factory.



to Laser Disc ?

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launching PAL feature films or the hardware companies will start to push the dual standard players. Pioneer is not the only manufacturer with a dual standard player on its books. Sony, for example, had two dual standard machines on display at the Berlin Funkaustellung, although it refused to be drawn on whether the machines would be introduced to the UK market. Philips also has a dual standard machine, the *WD6000*, although again, at present, this machine is not being sold in the UK.

On the question of software prices all concerned admit that Laser Disc won't be cheap. Even when the large scale PAL production facilities are in full swing Sony estimates prices of upwards of £35 for a single-sided disc. Pioneer, with its ten per cent stake in Carolco (the company responsible for *Terminator*, *The Doors* etc) was hoping for blockbusters at £19.99. If current prices are anything to go by, a PAL feature film will set you back around £30, with the music videos being slightly cheaper.

However, many people involved in the market see it developing into a premium product of interest to the serious collector. Covent Garden Records boss Howard Woo thinks that in the long term there will be a viable PAL market dealing with limited edition collectors discs and points out that this is already happening in America. A good example would be the Laser Disc release of the Disney classic *Fantasia*. The standard disc is on sale at \$34, but there is also a special collectors item disc on sale for \$89 which includes

How the discs are made

The plant is at Kofu in the Yamanashi Prefecture 80 miles to the south west of Tokyo. It's in one of Japan's few wine-making regions, and on a clear day the colossal snow-covered cone of Mount Fuji appears above the mountains which ring the flat lands around Tokyo and Yokohama.

The buildings are ten years old and near the main pressing plant there is also a mastering facility.

Discs are mastered on a production line which turns a pre-master magnetic tape into the finished stamper which will be used to make up to 20,000 individual discs.

The whole process is computer controlled in a 'dust free' atmosphere where technicians wear clothing to protect the machinery from them, rather than vice versa. Entrance is via futuristic airlocks and filtered air is constantly being passed through the production area.

The process starts with a glass blank which is first polished — to optical lens quality — and cleaned with pure water before being covered with a photo-sensitive layer of polymer which is just 0.00015 mm thick.

The latest developments

The disc is then sent on a conveyor belt to the laser beam recorder where, on a platter, it will be spun while a series of pits are created in its surface. The photo sensitive layer softens on contact with the laser beam. The pits are the clever bit — each 12 inch disc has 54,000 grooves of them, with each groove having the equivalent storage space to a page in a dictionary.

Each pit is . . . uh, little: "Assuming the laser disc is the size of a baseball field each pit is equal to one grain of sand," our guide told us phlegmatically.

The glass master then travels to a developing stage where the photo-sensitised 'pits' are washed away. The master is then hardened in a baking stage before metallisation where a 300 angstrom-thick layer of metal is applied to the polymer side of the master.

One of the big problems with any new format is persuading the software companies to produce the software needed to convince sceptical consumers of the merits of the new development. With Laser Disc Pioneer has decided to cut out the middle man and produce the discs itself with a massive plant at Kofu in Japan and another plant currently being enlarged at Carson, just outside Los Angeles. Dan Houston visited the Kofu site just after it had produced its 100 millionth disc, the plant having produced no fewer than 10,000 different titles.

This is effectively the stamper but it is so thin that a further 30 micron layer of nickel has to be electro-plated onto the back before the metal can be peeled off the glass. The back of the finished master is then highly polished to eliminate irregularities before it can be taken down the road to the production line.

A pressing question

In the main plant six presses produce an average 2.7 million discs a month — with a capacity for 3.0 million. Engineers tend their machines in 'dust-free' atmospheres wearing suits which also make them look like a space age surgical team. The factory is kept open 24 hours a day and during our visit they were planning to double production with six extra lines; Pioneer sees Laser Disc as the medium of the Nineties, estimating a growth rate of 43 per cent a year with 8.5 million players sold by 1995.

Production takes place in a huge space, about 100 by 50 metres hung with polythene screens to protect those areas where dust levels are more critical. The smell of glue pervades everything, and it's easy to imagine the technicians getting hooked on the stuff.

Each disc is made by a four step process: moulding, metallising, bonding and labelling. Each side of the disc goes through an identical

process before bonding.

The master disc we met earlier gets put into a moulding machine where molten acrylic polymer (at 240°C) will be injected at 220 tonnes of pressure. This polymer is kept in pellet form up to now, the last four hours spent in a drying barrel; every effort being taken to remove impurities such as water droplets which would make the finished disc unreadable.

The polymer half-discs leave the moulding machine for metallising in a vacuum. Here thumb-nail sized pieces of aluminium are placed on electric diodes a few inches in front of the rows of discs. When current is passed through the diodes the aluminium flies off inside the vacuum and coats the back of the disc. Both sides of the disc are then glued before being stamped together.

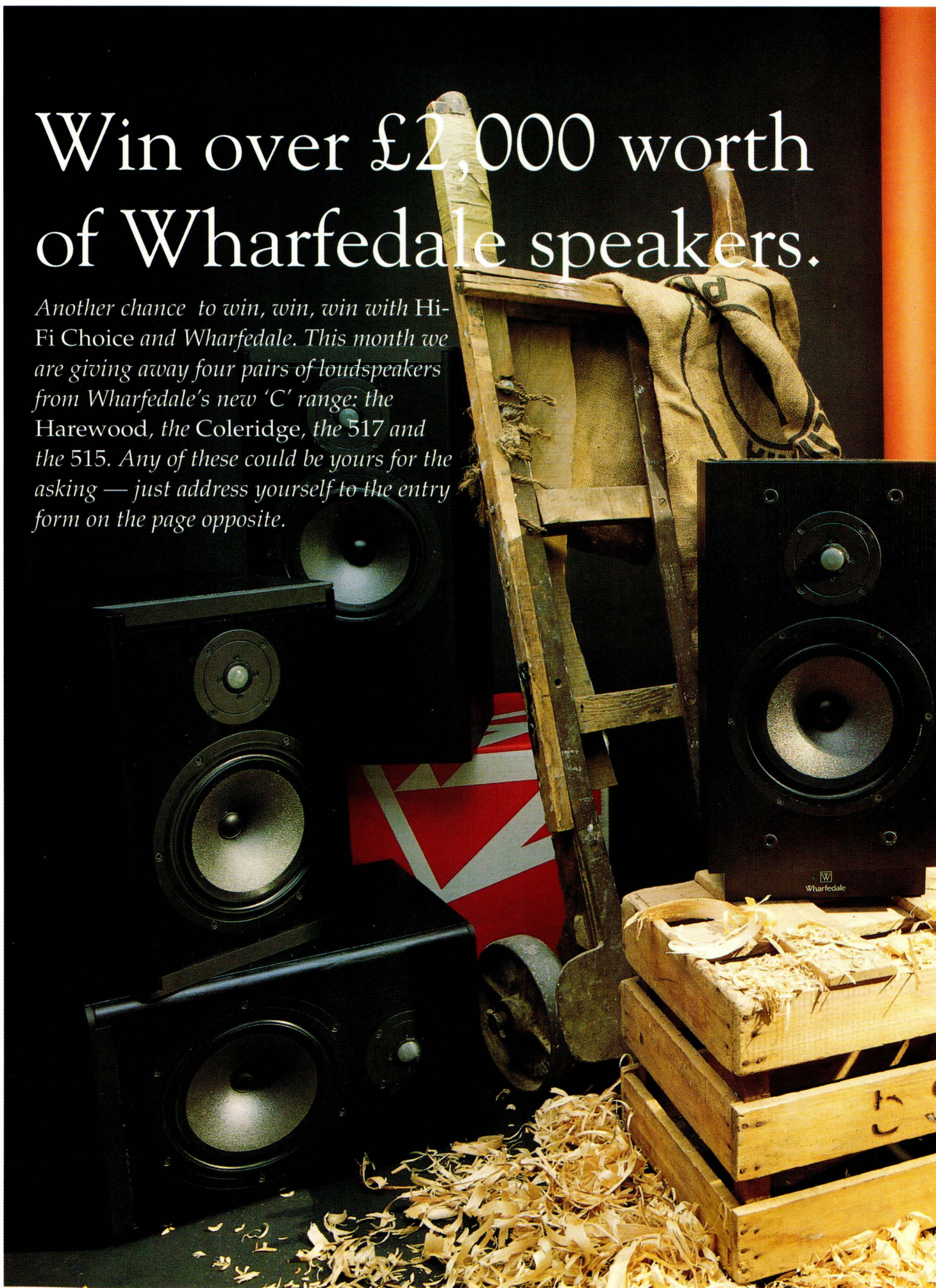
The last stage is one of the more complex, and gave Pioneer some trouble to perfect. As it is our guides refused to talk about the nature of the glue or pressures in the stamping stage. However they pointed out that they had managed to get their throw-away rate down to eight per cent (when they started it was more like 80 per cent), and hinted that the most critical stage was the bonding and that this has now been sorted out to everyone's satisfaction.



Completed discs leave the metallising chamber complete with their reflective surface.

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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 and send it to the address shown in bold type at the bottom of the form. Mark your envelope **Wharfedale Competition**.

The Prizes

The first correct entry drawn from our mailbag after the closing date will win a pair of Wharfedale *Harewood 'C'* speakers (which retail for £999). The second correct entry will win a pair of *Coleridge 'C's* (£599). The third correct entry will win a pair of *517 'C's* (£399). The fourth wins a pair of *515 'C's* (£259).

The Questions

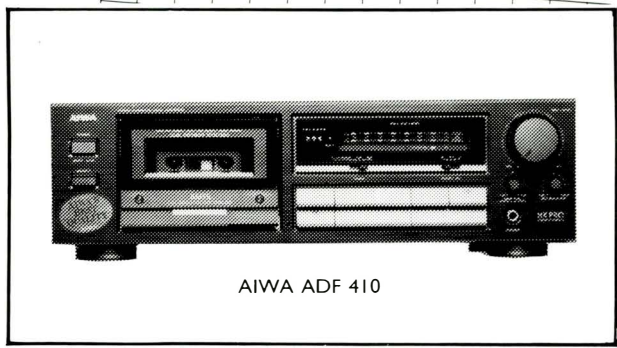
Please write your answers in the space provided on the entry form.

1. What speaker manufacturer has recently formed a *Sextet*?
2. Where in Japan is Pioneer's Laser Disc plant located?
3. Who designed the distinctive *Emphasis* loudspeaker?
4. *Freya* and *Bragi* are new components from which small British company?
5. Deltac sold only 15 units of its first amplifier. What was this little beast called?
6. Which Danish hi-fi company shares a name with a surrealist painter?

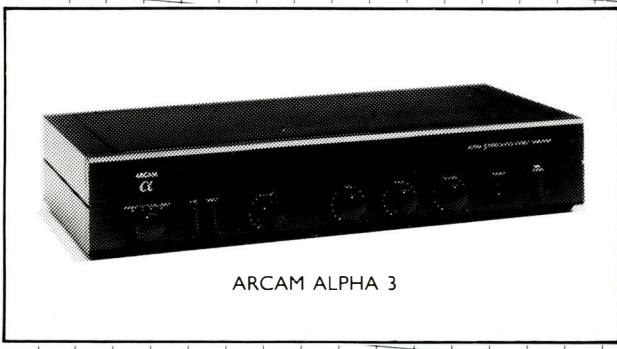


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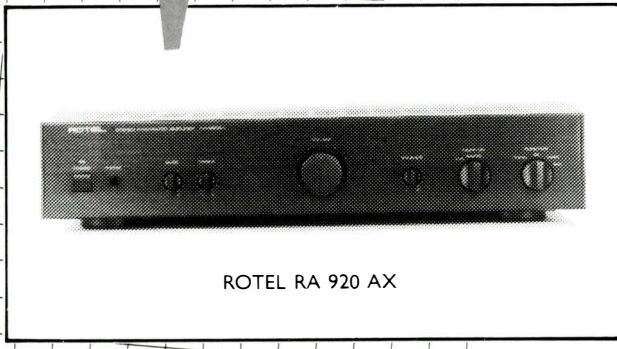
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396.95	412.95	444.95	460.95	484.95
420.95	436.95	468.95	484.95	508.95
348.95	359.95	396.95	412.95	436.95
364.95	376.95	412.95	428.95	452.95
388.95	399.95	436.95	452.95	476.95
332.95	344.95	379.95	396.95	419.95
356.95	368.95	404.95	420.95	444.95
372.95	384.95	419.95	436.95	459.95
412.95	424.95	459.95	476.95	499.95
388.95	399.95	436.95	452.95	476.95
419.95	432.95	468.95	484.95	509.95
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70 add £95.00	

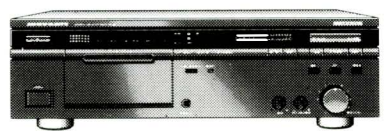
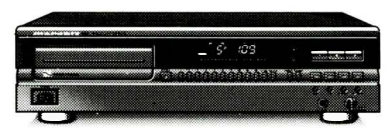


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MODEL	DESCRIPTION	PRICE
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ZO 32	STACKABLE STARTER 269mm HIGH	56.00
ZO 33	ADD ON UNIT 169mm HIGH	35.75
ZO 33 A	ADD ON UNIT 254mm HIGH	35.75
ZO 34	SELF ASSEMBLY THREE SHELF RACK	67.50
ZO 34 AD	ADAPTORS 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
TRISKOM		
264/16 HFS	5 GLASS SHELF RACK 960mm HIGH	179.90

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DENON

Choosing and Using . . . Tape Personals

It may be hard to believe but the personal stereo has been with us for just over a decade now. Since Sony introduced the format with its *Stowaway* in 1979 growth has been rapid and striking, with the little music boxes proliferating and mutating like some highly successful virus. The players provide an alternative to mundane reality, offering relief from the tedium of everyday life on buses, trains, planes and even at Genesis concerts.

Although the personal of today often bears a close resemblance to its early ancestors, the players have actually undergone radical change. The original *Stowa-*

Want to cut out the sounds of the planes, trains and automobiles and annoy your fellow passengers at the same time? Have a personal chat with Andrew Cartmel.

way retailed at just under £100. Now at one extreme, budget models are being given away free in high street shops, bundled with blank tapes, while at another you can obtain industry benchmarks like the Walkman *Pro* for over twice what the *Stowaway* cost, buying yourself considerably over twice the performance into the bargain.

Along with price, size has also changed beyond recognition. Early personals were beefy creatures and while the cheaper models of the Nineties are much the same, a slight increase in your spending gets you tiny creations resembling stylishly austere jewelry boxes or art deco cigarette cases, hardly bigger than the cassettes they play.

As size has shrunk the sound from the players has been both boosted and improved — not necessarily the same thing. Even the cheapest models in this survey boast some sort of widget intended to give your music more presence and immediacy, rather like the loudness switch you used to find on some integrated amps.

These gizmos are mostly various kinds of bass expanders, although the Aiwa *PL707* also provided a midrange enhancer. It's a shame that the manufacturers don't just concentrate on offering a single, optimum sound on tape playback. But that would reduce the button count on each box and in the feature hungry marketplace this would not be perceived as a good thing.

The other feature which would seem to be indispensable is auto reverse. Although reverse play machines are said to have a shorter lifespan this is probably one of the most user friendly features, saving you the need to delve into the shadowy recesses of your clothing to flip the tape. However, this technology can also lead to rage, confusion and possible savaging of the remote control when you're not getting any sound out of your player and you have no idea whether you're at the end of a side, the beginning of the side or in the middle of chewing your treasured cassette of the *Joe 90* theme into ravaged ferrichrome

oblivion. The better remotes and earphones offer some kind of signal or display to tell you what is going on, but ease of use varies considerably between different players.

Sound quality on the models tested had a predictably close relationship to the cost of the players, although there were a number of surprises along the way. Nor was it simply a matter of good versus bad sound quality.

Players from the same manufacturer often seemed to share certain sound characteristics and comparing different makes was sometimes a case of a good sound being put against an equally good, but different, sound. Hence the Panasonics seemed to tend towards a warmer, richer musical reproduction while the Aiwas scored on clinical precision. I started the test by listening to the original music source, then the cassettes copies on a robust non-personal cassette deck, then onto the personals.

If you're planning to listen continuously to a personal for long periods I advise you to try out which kind of headphones suit you best. If you're using the player at rest in one place then you're definitely better off buying a decent full size pair of phones (see our issue 99 for some guidance). But how many people buy a portable tape player with no intention of travelling around with it?

On the move you can either become an object of ridicule by wearing full size phones with a suitable adaptor, or you can opt for the sort of compact portable phones which come with the machines. These fall into two categories, the traditional on-ear phones on a plastic or metal arc that sits across your head or the tiny, dangly, in-ear models. Like any kind of headphone, these compacts can be uncomfortable in prolonged use.

Personally I find that the dangly phones are preferable, providing you manage to put their little woolly socks over them so that they don't feel like miniature cheese graters boring into your ears.

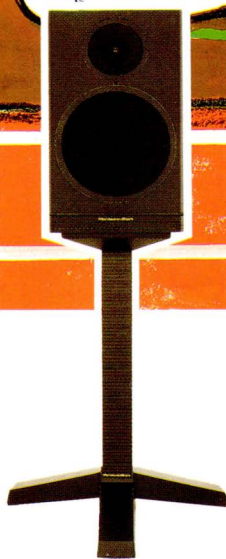




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Aiwa HS P505MkII

AIWA (UK) LTD, UNIT 5, HEATHROW SUMMIT CENTRE, SKYPORT DRIVE, WEST DRAYTON, MIDDLESEX, UB7 0LY TEL 081 897 7000



Aiwa HS-PL707

AIWA (UK) LTD, UNIT 5, HEATHROW SUMMIT CENTRE, SKYPORT DRIVE, WEST DRAYTON, MIDDLESEX, UB7 0LY TEL 081 897 7000



At £70 the P505 comes with a rechargeable battery and the ingenious Aiwa charger which doubles as a mains adapter. It also has a rather iffy instruction booklet, which makes it somewhat difficult to puzzle out how to operate the unit. The 505 lacks the PL707's nifty feature whereby you can charge the battery while listening, taking power for both these functions off the mains adaptor — but then it's about half the price of the 707.

Other value for money points about the P505 are Dolby B, autoreverse, an effective bass enhancement system called 'DSL' and its size - it is genuinely compact, although somewhat chunkier and less stylish than its nearest priced rival, the Panasonic RQS15.

If you don't want to use the flat rectangular rechargeable battery Aiwa thoughtfully provide you with an attachable battery pod which accommodates two R3 batteries - not the R6s which are standard on most personal stereos.

This Aiwa comes complete with the miniature in-ear phones which are the mark of the more serious personals, and a remote control. The phones make a good sound and are reasonably durable in the ears when you cover them with their little fabric discs, but like all the phones in this test, I wouldn't make any claims for

long term comfort.

Be warned that the headphone connection on my sample was temperamental, occasionally losing a channel when the lead was not teased around to its favourite angle. And the same complications that the JX705 (see page 51) suffered with remote control were at work here. I don't know what the gremlin is, but it seems that Aiwa has made things over complicated somewhere. The Panasonics, in contrast, were a straightforward pleasure to operate.

Back to the good news. Sound quality is very good on this machine, more robust than the 707 although without the same tremendous detail. What you lose in subtlety you gain in warmth and impact, indeed it's possibly a better bet for straightforward rock and pop than the more upmarket 707.

There are some negative points to this machine, virtually all of them to do with Aiwa's weakness in terms of user friendliness. But there's no ignoring the excellent features and accessories which are on offer for £70.

Combine these with the outstanding sound quality and you get a Best Buy.

Bass enhancer	Yes
Auto reverse	Yes
Rechargeable battery & charger	Yes
Remote control	Yes
Typical retail price	£70

This player immediately impresses with its small, cleverly engineered aspect and the reassuringly expensive precision machinery sounds it makes as it obediently responds to the press of the buttons.

At £135 the PL707 gives you all the usual range of features plus a mains adapter and a further sound sweetener called the 'BBE High Definition' system.

On the move the 707 proved a little sensitive to vibration, definitely making it a candidate for the shirt or jacket pocket rather than clinging to swinging hips. And there were the same nuisances associated with the remote control as I found on the other Aiwa models; make sure that the headphone jack is firmly inserted otherwise the remote may not be able to communicate with the player.

However I'm quite willing to forgive these drawbacks in view of the performance on the listening tests. The PL707 is a tiny handful of sculpted black metal and the steely minimalist beauty of its construction is reflected in its sound. This player reproduces music with a smooth precision that kept me listening above and beyond the call of duty. It provides accurate percussion with a real bite to it and the performance seems to be occurring in some kind of clean space instead of emerging from the sort of thick acous-

tic soup that infested some of the other personals.

Despite having little metal buttons inserted into my ears and a thin plastic wire dangling under my chin, I found that I was actually aware that I was listening to something called music.

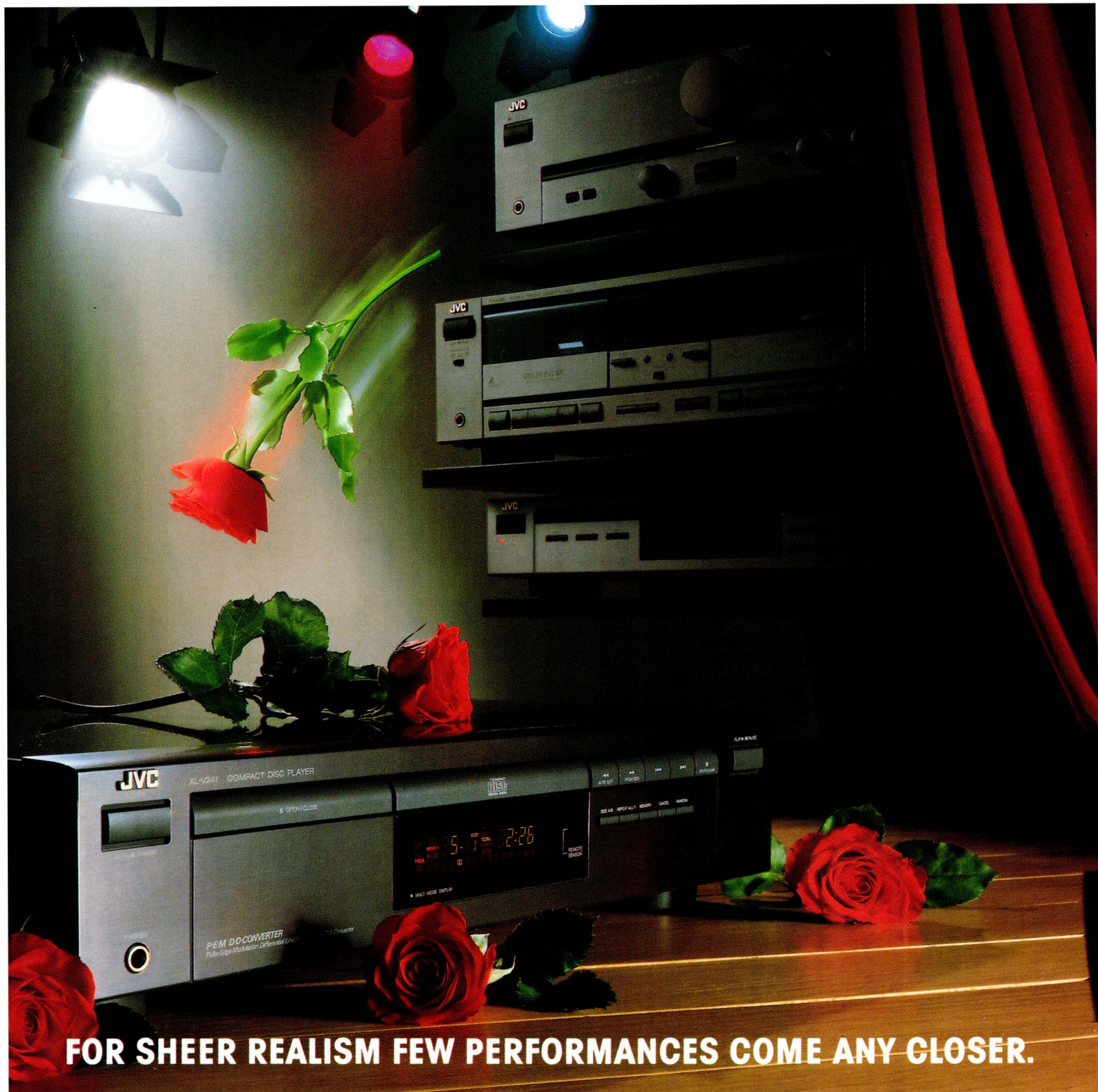
Accuracy is the dominant feature of the 707's sound; it's exceptionally good at rendering the timbre and subtleties of instruments. The surgical accuracy of the player is accompanied by a somewhat cold sound that might begin to tell on you in the long run, although personally I didn't find any problems with prolonged listening.

If you are looking for high quality reproduction of classical music, this is easily your best bet among the 14 models tested here.

In fact, for any kind of music the 707 has a beautiful sound, outclassing some other machines which cost almost twice as much. Even without its wide range of features and accessories the 707 would definitely be Recommendable.

Be warned, however. If ease of use is your main obsession you might be better off with the Panasonic S65.

Bass enhancer	Yes
Auto reverse	Yes
Rechargeable battery & charger	Yes
Remote control	Yes
Typical retail price	£135



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provides a very high signal-to-noise ratio, close to the theoretical upper-limit.

All of this means you can sit back and enjoy the subtle caress of the most delicate nuances, or suddenly be shaken by the most stirring musical crescendo, with a total sense of realism.

Recommended as an ideal partner for this player is an amplifier such as the JVC AX-A341. Providing up to 85 watts per channel, there's also a 'CD Direct' switch to make sure your ears receive the ultimate in sound purity.

Completing the line-up is a range of matching tuners, cassette decks, and other hi-fi separates. Each component, a polished performer in its own right. Together with the right partner, definitely a class act.

JVC

Aiwa HS-JX705

AIWA (UK) LTD, UNIT 5, HEATHROW SUMMIT CENTRE, SKYPORT DRIVE, WEST DRAYTON, MIDDLESEX, UB7 0LY TEL 081 897 7000



At £220 the JX705 is the second most expensive player in this test and your money certainly buys you a serious personal stereo. All the usual features and accessories are provided, plus an FM/AM radio and a microphone so you can record yourself screaming obscenities when you try and operate the remote control.

The three Aiwas I listened to were all excellent machines, but the instruction booklets were about as much use as raspberry flavoured dynamite and the build of the 705 alternated between superb precision engineering and maddening clumsiness. For example, the outboard battery pod locks on to the machine with a death grip and god help you if you attach it before you insert the rechargeable battery.

On the other hand, a very positive aspect of this machine is the ten minute quick charge facility, and the mains adaptor (which is a feature unique to the three Aiwas) is another real bonus.

The remote control is another useful accessory, or at least it ought to be. Unfortunately the Aiwas all shared problems with their remotes. This was either to do with memory loss when you unplugged the headphones or some kind of weird sensitivity in the headphone jacks. What it means to you is that the player

can forget that it's supposed to be obeying the remote.

However, there were also a lot of good things about the JX705, notably the sound quality on tape playback. Classical selections in particular performed better on this player than they did on the budget Aiwa, the HS-P505, though at three times the price they certainly ought to. There were some audible flaws, notably a frayed quality to woodwinds but overall it gave a very pleasant sound which compared well with most of the Panasonics and Sonys, but fell well short of the second Aiwa, the very lovely sounding HS-PL707.

If you want a personal that offers you a radio without sacrificing good tape reproduction then the choice is really between this and Panasonic RQV520. Of the two this player endears itself to me by not having the word 'digital' splashed all over it, and by offering a generous bundle of accessories and features (battery charger, mains adaptor, a microphone record facility).

Even so, it is hard to justify the £120 price differential between this model and the Panasonic.

Bass enhancer	Yes
Auto reverse	Yes
Rechargeable battery & charger	Yes
Remote control	Yes
Typical retail price	£220

Panasonic RQS15

PANASONIC UK LTD, PANASONIC HOUSE, WILLOUGHBY ROAD, BRACKNELL, BERKS. TEL: (0344) 862 444



Panasonic really has got its act together. With the RQS-15 we have now gone over the £50 price mark, and with personal stereos this is like crossing the tracks separating the leafy side of town from the nightmare industrial ghetto.

When you start lashing out sums such as £85 (as in the case of this player), you begin to get quite a lot for your money. Features such as sound enhancement and auto reverse are standard and the lucky buyer receives an array of serious accessories - some might say a baffling array. Fortunately, Panasonic also provides you with a clearly written set of instructions.

The RQS-15 comes in sensible packaging, a plastic box with neat compartments for stowing the player, charger and headphones. The box is intended for storing the components and it's sufficiently well designed that you might even be tempted to use it. Someone at Panasonic clearly knows what they're doing.

Now that we're in the land of over 50 quid you'll notice a physical difference in the players. All of the more expensive personals assume that small is beautiful. In the case of the RQS-15 you get a thin, sculpted black box with silver trim. Contained in that attractive box is a reverse play mechanism, an easy access rechargeable bat-

tery, Dolby noise reduction and effective bass enhancer (called 'S-XBS').

This player is a stylish well made item which is also easy to operate. The control panel on the box is sparse and intelligently laid out and the remote control on the headphones cable is efficient, useful and simple to learn.

And on top of everything else, this player sounds very good indeed. Admittedly, it's less articulate and coarser than the Aiwa 707 (which rapidly took the high ground in the sound quality tests), but there was more presence to the music and a lot of power and immediacy.

The main weak spots in the S15's sound were things like raggedness on high saxophone notes and loss of accuracy on piano music.

Compared to other models in the same price range, I'd say that this player gave a better sound than the Sony DD33 (at £90) but ultimately not quite as good as the Aiwa HS-P505 (at £70).

If you are attracted to the ease of use and well thought out design of the Panasonics, then this is certainly excellent value for money.

Bass enhancer	Yes
Auto reverse	Yes
Rechargeable battery & charger	Yes
Remote control	Yes
Typical retail price	£85

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Panasonic RQV520

PANASONIC UK LTD, PANASONIC HOUSE,
WILLOUGHBY ROAD, BRACKNELL, BERKS.
TEL: (0344) 862 444



The three Panasonics sampled on these pages were all relatively well designed and easy to use, with worthwhile accessories, useful features and adequate documentation.

Having said that, the RQV520 is probably the weakest of the trio. It has a good feature count, with autoreverse, bass enhancement and Dolby included. But there are fewer groovy accessories - no rechargeable battery and a less detailed manual than the other Panasonics.

On the other hand this is a very compact machine considering that it houses a radio (or a 'Digital Synthesizer Tuner' as Panasonic would have it) and it has the same good build as the RQS15 and 65.

This means, for a start, that you can actually get cassettes in and out of the housing with relative ease despite the size. With a lot of the pricier, smaller machines you can find yourself wrestling with the clever mechanisms when trying to insert or retrieve your tapes.

Although the accessories and features are fairly thin on the ground here, the 520 does come with an excellent remote control. For those of you who haven't used a Walkthing in recent years, the remote control is not a separate handset but instead a dangly node on the headphones cable. They only tend to be included with

the more sophisticated in-ear phones. The remote on the 520 is less elaborate than the one that comes with the RQS65, not featuring luxuries like a display to tell you which way the tape is playing. Nonetheless it's very well designed and simple to use.

The 520's sound quality on tape playback is very much characteristic of the Panasonics. It offers very good reproduction but with a loss of accuracy on high notes, a sort of slurring, which doesn't compare well with the Aiwa's rendering of the same music. However, there's more warmth and power to the music than on the Aiwa and if you're less into classical and mainly playing rock, soul or R&B then this or another Panasonic could be a good bet.

Essentially what Panasonic has done here is to offer a radio equipped machine without sacrificing tape playback. Instead it has economised by stripping down accessories such as the battery charger and rechargeables.

If this doesn't bother you, and you are looking for a portable radio along with good tape reproduction, the 520 is well worth a look.

Bass enhancer	Yes
Auto reverse	Yes
Rechargeable battery & charger	No
Remote control	Yes
Typical retail price	£100

Panasonic RQ-S65

PANASONIC UK LTD, PANASONIC HOUSE,
WILLOUGHBY ROAD, BRACKNELL, BERKS.
TEL: (0344) 862 444



The RQ-S65 embodies the best things about the Panasonics. Like the company's other personals it has useful features and accessories, built with the notion that a human being may actually have to operate them.

For your money the S65 gives you in-ear headphones, a rechargeable battery and charger, and an attachable battery pod.

Probably the most important adjunct to your personal stereo is going to be the remote control, and the S65 comes with a brilliant piece of technology dangling from the headphones. The remote control is shaped to fit the hand, has a single easy to use button to control most functions and, best of all, features a small screen display showing you what the hell is happening to the tape in the distant player. Sheer bliss to use.

The only quibble I'd offer is about the volume control, a spinning dial which is recessed and sometimes a bit difficult to get the fingers around.

The same qualities applied to all aspects of the S65: splendid workmanship, well thought out and user friendly design. The player itself is a sturdy and well made item which scores on both ergonomics and style.

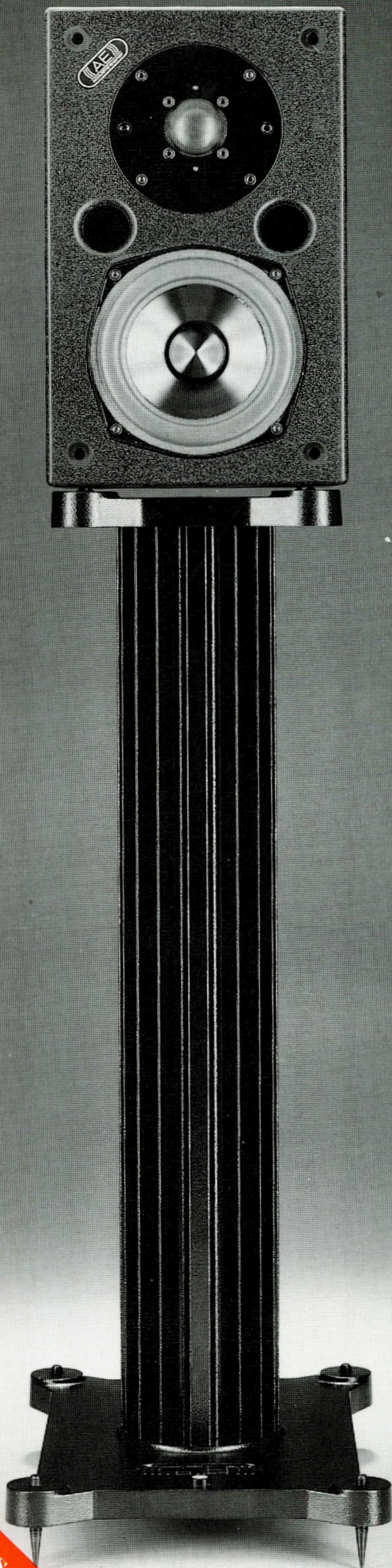
Of course, none of these other factors would matter a bit if the sound quality was

poor. But the S65 proved to be by far the best of the Panasonics and came close to offering the best sound of the whole group. In some circumstances it even beats the Aiwa HS-PL707. It can reproduce music in a way which sounds more solid, fatter, warmer and happier. For example, the heavy duty R&B/Blues of Taj Mahal were better served by this machine than the Aiwa. Percussion also sounds particularly nice on the S65.

But in the long run this player just barely loses to the Aiwa, due to some small distortions, like that raggedness or slurring on the reeds in small combo jazz which would seem to be characteristic of all the Panasonics I tested. Similar distortions can be found on the Aiwa, but it's not nearly as pronounced and you really have to go looking for it.

For £130 this player offers you a remote control which is second to none in the test, good build, nice styling and very user friendly design. The sound quality is excellent, though I would say that it's surpassed by the £135 Aiwa, especially if you're going to listen mostly to classical tapes. Nonetheless, definitely Recommended.

Bass enhancer	Yes
Auto reverse	Yes
Rechargeable battery & charger	Yes
Remote control	Yes
Typical retail price	£130



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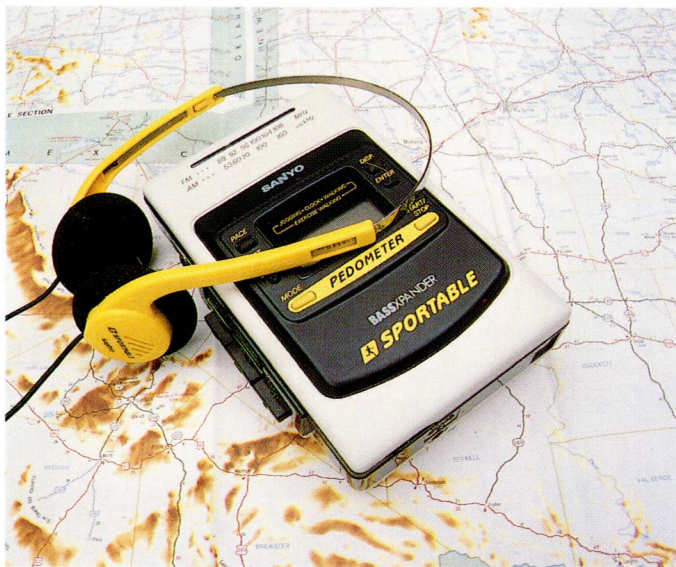
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Sanyo SPT1000

SANYO MARUBENI (UK) LTD, SANYO HOUSE,
OTTERSPOOL WAY, WATFORD, HERTS WD2 8JX.
TEL: (0923) 246 363



Also known as the 'Sportable' the SPT1000 comes in three different colours with Liquorice Allsort black and yellow earphones and has something called a built-in 'Pedometer', so you can probably sense that we're not exactly in high-end territory here.

However, I did decide to use this particular Sanyo as a kind of reference model for my listening in these tests. If you think about it, it does make a rather twisted kind of sense. The Sanyo offers a basic sound which is a reminder of where the personal stereos came from, and which is possibly better than that of the first Walkmans.

It served as a constant reminder of how far the technology has come, providing a benchmark. And it wasn't bad in itself, giving the best tape replay sound of the three Sanyos, despite the presence of the onboard 'Pedometer' unit. (As far as I can tell, this latter feature is aimed at people who voluntarily take part in some kinds of activity called 'walking' and 'running'.)

Not having listened to personals for a while I was startled to discover that even this modest contender pulled some subtleties of information off the recording which I had never noticed on the source when listening over speakers. This wasn't necessarily always a

good thing, though. I doubt if Yusef Lateef really wanted me to hear each slobbering intake of breath between phrases on the tenor sax.

Essentially this player provides a rough model of the music and predictably performed much better with hard driving selections where there was a lot happening. Slow quiet passages inevitably got slaughtered by the general muffledness, loss of high frequency information and poor timing.

Piano is tinny and slurred and you can kiss your string quartets goodbye. Wow and flutter abound and on the basis of this sample the SPT1000 seems rather more vulnerable to vibration than a cheap and cheerful portable ought to be, which is a shame since the machine is aimed at active souls, particularly with that pedometer function.

With rockier selections the music was robust enough with the 'Bassxpander' causing some strange reverberation but also making the sound much more upfront, providing a little more muscle for your ears as you jog or (given the sensitivity to vibration) skateboard along.

Bass enhancer	Yes
Auto reverse	No
Rechargeable battery & charger	No
Remote control	No
Typical retail price	£40

Sanyo MGR401D

SANYO MARUBENI (UK) LTD, SANYO HOUSE,
OTTERSPOOL WAY, WATFORD, HERTS WD2 8JX.
TEL: (0923) 246 363



Like the rest of the models clustering under £50 this is a traditional fat box with the familiar dimensions of the original personals. In return for your £40 it will offer you auto reverse play, a primitive remote control, Dolby B, a graphic equaliser, Sanyo's nifty futuristic eject mechanism (see the review of the MGR580 on page 57) and a 'stereo radio', as opposed to the more grandly designated 'digital tuner' that you get with its £50 big brother, the 580.

The phones on the 401D are the traditional on-ear variety, but they do feature a remote control. All the remote will do for you is turn the volume up or down, but it is nonetheless an unusual feature at this particular price point and it works in a straightforward way, unlike the mind destroying complexity of some of the more serious remotes.

Generally this machine is fairly easy and pleasant to use; the only serious demerits it gets are for the difficult to load battery trap with its equally difficult to open trapdoor. Less placid souls might find themselves shrieking with rage in a cloud of tiny plastic shrapnel before they even get the 401D powered up.

Having survived the ordeal of the Sanyo battery trap I found that this player presented the best basic sound of the three Sanyos, marred by the worst

wow and flutter (at least on the sample I had for review). This is a shame because the 'graphic equaliser' is a fun toy and the idea of a slider controlled bass expansion system is actually an interesting one, far better in some respects than the two or three setting switches offered elsewhere.

The MGR401D shares the problem of the 580. A radio has been grafted onto the tape player, presumably with the intention of making this a more attractive product in the marketplace. But what it gains in features it loses in sound quality. Thus the outrageous 'Sportable' S1000 ends up with a more listenable sound than either of the radio paired Sanyos.

The 401 has a good underlying sound marred, here at least, by wow and flutter that made it unpleasant to listen to. So, like the 580, this is a good bet only if you want a portable with radio as your primary source. This player has a good assortment of features and is worth comparing with the 580. Especially if you're on a limited budget and you're looking for the modern equivalent of the transistor radio to haul around with you.

Bass enhancer	Yes
Auto reverse	Yes
Rechargeable battery & charger	No
Remote control	Yes
Typical retail price	£40



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Sanyo MGR580

SANYO MARUBENI (UK) LTD, SANYO HOUSE,
OTTERSPOOL WAY, WATFORD, HERTS WD2 8JX.
TEL: (0923) 246 363



With the MGR580 we're approaching a critical price point for personal stereos. Halfway to the hundred pound mark interesting things begin to happen in terms of the facilities that are available.

For your money Sanyo is providing you with some quite useful features, such as autoreverse and, while it has no bass expansion or sound enhancement, the MGR580 does come fitted with an onboard radio.

The build's big and clunky but the fascia has a neat sequence of controls with a computer/calculator/mini CD look, and indeed the tuner has the magic word 'digital' on it.

These budget Sanyos are rather nicely built, conveying the feeling of being solid and sturdy. They have no-nonsense loading mechanisms which are refreshingly easy to use after fiddling with the ingenious puzzle devices on the more expensive miniatures.

But the Sanyos also feature some cheesy cheapo aspects, one of my favourites being the 'Eject' mechanism, which consists of an arrow embossed on the fascia, indicating where to put your finger when you lift the lid.

The sound from the 580 is cleaner, more well rounded and more precise than that of the cheaper SPT1000. In comparison the 580 is more refined and

far better at reproducing instruments like pianos, thanks in part to a much more stable tape speed. But this player lacks the immediacy that Sanyo's 'Bassxpander' system provides on the 1000 and as a result the music is much less upfront.

The reproduction is decent but it does have that feeling of a party happening in the room next door.

The radio you get on this model seems to be provided at the expense of the bass boosting facility, so the player is probably aimed at someone who wants to listen to radio on the move, with the tape sound quality as a much lower priority. If it's a tape only machine you're after then at £50 this isn't particularly good value. Not when an additional twenty pounds will net you the Aiwa 707.

But if you're after a player which combines tape facilities with a radio, then this Sanyo MGR580 is a slicker, more hi-tech alternative to the Sharp 510. The improvements you get are about commensurate with the higher price of this machine compared to the Sharp, so it comes down to a matter of how much you want, or can afford, to spend.

Bass enhancer	No
Auto reverse	Yes
Rechargeable battery & charger	No
Remote control	No
Typical retail price	£50

Sharp JC-510

SHARP ELECTRONICS (UK) LTD, SHARP HOUSE
THORP ROAD, MANCHESTER M10 9BE.
TEL: (061) 205 2333



As a budget beast the 510 boasts an impressive list of features. It offers you auto reverse, a radio and the seemingly indispensable bass magnification facility, all for about 30 quid.

There is no remote control so you're at the mercy of the buttons on the main box; fortunately these are decently configured so you won't have much trouble telling play from fast forward while you're trudging along delving in the pockets of your German airforce greatcoat. If you don't have a German airforce greatcoat you might have a bit of problem accommodating the 510 because it's a fairly large player.

If you buy the Sharp 510 you'll also find yourself dealing with one of those old fashioned battery hatches which involves a plastic trapdoor designed to be broken or lost at the earliest opportunity. (Don't assume this is a stigma solely attached to cheaper models, though. Sony offers you the same thrill on its £150 model) Loading tapes can be a bit of a pain, too.

Other small problems you'll encounter on the 510 will be the somewhat confusing auto reverse mechanism. There is a tiny section of window which allows you a tantalising glimpse of moving cassette, but without some kind of direction-of-play indicator you'll

never be quite sure which side of the tape you're dealing with.

Speaking of music, the 510 offered a considerably cleaner sound on test than our other budget wonders, Sanyo's SPT-1000 and MGR401D. But the sample I listened to suffered from levels of wow and flutter considerably worse than both the Sanyo's (and of course this player doesn't give you that pedometer to monitor your jogging, either).

Without the X-bass system engaged the music seems to be going on in another room so I'd just leave this button permanently fixed in the On position. Build quality was solid enough and the 510 stood up to vibration well, playing its music smoothly despite frenetic abuse.

At this price you are not going to get outstanding sound quality, but the 510 performs well enough and incorporates a surprising clutch of features for such an inexpensive model. If you're on a very tight budget and you want a radio player, then go for it.

Bear in mind, though, that another 30 pounds will provide a quantum leap in reproduction of the music and ease of use.

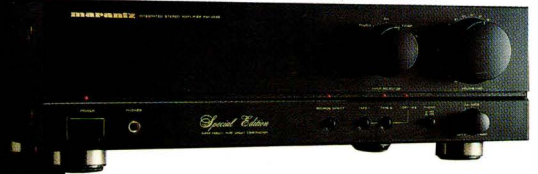
Bass enhancer	Yes
Auto reverse	Yes
Rechargeable battery & charger	No
Remote control	No
Typical retail price	£30

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TEL: (061) 205 2333



For the last decade the evolution of personal stereos has seen steady advances on three main fronts: improvement in sound quality, proliferation of features and, above all, reduction in size.

This has been the saga of the incredible shrinking personal. However, there is an obvious limiting factor operating here, the size of the cassette itself. So Sharp has decided to begin exploring a new evolutionary path for its players - reduction of weight.

The K99 is Sharp's 'extremely lightweight' model. My first reaction on taking it out of the package was oh-oh. The machine is indeed very light, so much so that it has the sort of feel one associates with cheap, ephemeral plasticky things.

However, the Sharp is nothing like that. It's well made and elegant with a delightful minimum of buttons on the outside of the main player. Most of the functions are sensibly relegated to the remote control on the headphone cable.

The cable in question is a strange two component affair which plugs together at the remote control, presumably to allow Sharp the flexibility of upgrading its phones or its remotes separately. However, this odd configuration did nothing to interfere with the effectiveness of the remote,

which was straightforward and easy to use despite the number of functions it handled (control of the 'X-Bass' bass enhancement as well as stop, start, forward and backward shuttling, direction of play and volume).

In terms of sound quality the K99 was very much a mixed bag. The music from this player displayed some severe distortion on strings and piano and at its worst it tended towards a rather tinny, synthetic sound. But it could also be very pleasant and easy to listen to and I found myself using it in preference to some of the more accurate machines while outpounding the pavements on the walking tests.

In the end I'd say that the 99 has a very pleasing sound, despite all the flaws. It was fun to listen to and easy to use, and it certainly represents some kind of record in lightweight personal technology.

If you are listening to heavier, rockier music (which disguises the worst of the distortion) and you are attracted to the notion of a featherweight machine, then this will be great for you. Personally speaking, though, I think the price is well over the odds for the sound quality on offer.

Bass enhancer	Yes
Auto reverse	Yes
Rechargeable battery & charger	Yes
Remote control	Yes
Typical retail price	£160

Sony WM DD33

SONY UK LTD, SONY HOUSE, SOUTH STREET,
STAINES, MIDDLESEX.
TEL: (0784) 467000



This machine is chunky, very well built and very resistant to vibration. But it's also fat, heavy and uninspiring and, unbelievably enough for a 90 quid machine, it even lacks a remote control. And if you're hoping for a rechargeable battery and charger you're also out of luck.

When I was testing the Sony players I kept wondering about their life span. I felt that something had to justify the high prices being charged, and the build quality of all three Sony machines suggested strength and longevity. They give the impression of being the kind of heavy duty technology that might provide solid service for a long time. But an impression is all I can offer.

And there is a down side to the Sony engineering, too. In common with the DD9 on the following page, the DD33 has its battery hatch inside the body of the player and the hatch is sealed with one of those dreaded plastic trapdoors. The one on the DD33 is as fragile as any, but don't worry; the thoughtful people at Sony have made it so easy to lose that you'll probably never get the chance to bust it.

Changing batteries is a complex, intricate business, too. Perhaps you can get your brain surgeon brother in law to help you put them in. They're even more difficult to get out.

Despite being chunky, the DD33 is one of the more visually attractive players in this survey. It fits neatly in the hand and the controls are carefully placed for ease of use.

Like the DD9 there's a generous window on the door of the player so you can get an idea of what is going on. This isn't as important as on the DD9, though, because this model doesn't offer auto reverse.

There is a bass enhancer on the machine, Sony's 'Mega Bass' which does indeed lend the music more weight and gives it more of a foreground quality. In general I found the music on this player smooth and hiss free but quite seriously muffled. If my sample was anything to go by, forget about using the DD33 for classical music.

There are two headphone sockets provided, so you can run two sets of phones off the machine. I suppose this makes it an ideal gift for a couple who listen to heavy dance music and have a nostalgic fondness for Sony technology.

For anyone else, the low feature count and unexceptional sound make this a very poor deal at £90.

Bass enhancer	Yes
Auto reverse	No
Rechargeable battery & charger	No
Remote control	No
Typical retail price	£90



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Sony WM EX80

SONY UK LTD, SONY HOUSE, SOUTH STREET,
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TEL: (0784) 467000



The Walkman *EX80* is the smallest of the Sonys and, in many ways, the best equipped. As with the other two, it has Sony's variant on the inescapable bass enhancer and auto reverse play. After battling with the other models' lack of user friendliness, it's nice to report that the *EX80*'s remote is excellent, the only one in the survey that matched up to the superb control system on the Panasonic *RQS65*.

As with the *RQS65*, there's an LCD display on the remote to let you know which side of the tape you're playing, or shutting through.

The *EX80* again features one of Sony's stupid battery trapdoors which are breakable, difficult to operate and easy to lose - though otherwise wonderful. The battery under the trapdoor is rechargeable and this player comes with a first rate recharger for it, one of the best accessories in the test.

How do you make a recharger interesting? Simple. Just equip it with a flashing light which tells you whether the unit is in the early or middle stages of recharging, and which lets you know when charging is complete. Neat and extremely useful. I'm almost willing to forgive them for that battery trapdoor.

Other interesting features on this player include a very unusual headphone connection

which looks more like the tongue on a computer bus cable than an ordinary jack, possibly to handle some of the more elaborate communication between the remote and the player. The player itself is a fairly boring black box, but it's sturdy and compact and easy to use.

When playing back music the *EX80* provided a bright and detailed sound which on some occasions showed rather more wow and flutter than I would have liked. But this machine was also less vulnerable to distortion due to external vibration than some of the other players I tested.

The *EX80* lacks the detailed presence and stability of the Aiwa *PL707*'s sound but the general quality of reproduction was very high and it provided pin drop accuracy on some of the classical selections. And if you get bored listening you can always watch the animated Walkman logo walk across the LCD screen on the remote.

Other than the slight wow and flutter that I encountered, this was a good player to listen to. It's nicely made and comes with an excellent collection of features and accessories. Grudgingly Recommended.

Bass enhancer	Yes
Auto reverse	Yes
Rechargeable battery & charger	Yes
Remote control	Yes
Typical retail price	£150

Sony WM DD9

SONY UK LTD, SONY HOUSE, SOUTH STREET,
STAINES, MIDDLESEX.
TEL: (0784) 467000



Sony's *DD9* Quartz comes with some impressive features and accessories. Best of all, the outrageously wonderful headphone container. Headphone storage is one of the big problems with the more serious personals. All of the expensive machines come with compact in-ear phones which have thin, fragile cords which end up tangled in baffling knots that are both difficult and dangerous to untangle. Dangerous because these tiny cables are very easy to break.

Sony has come up with an ingenious solution, a flat tear drop shaped case which looks like a contraceptive device out of *Aliens*. You put the 'Turbo' phones into the recessed chamber which is shaped to hold them, then you spin the dimpled circular plastic window around and the slack cord is magically spooled up inside the case.

But of course, the spooler only functions if you don't have a bulging remote control unit attached somewhere along the length of the phone cord. And that's symptomatic of the problems with the *DD9*. Any company which is retailing a £240 personal without a remote control must be a little out of touch with the current market.

The *DD9* scores on good build quality and ergonomics (the buttons on the main body of the player are easy to use).

But the solid build means that player is big and fat and heavy, sort of a compact with gland problems and I don't think that anyone who tries the Panasonic *RQS65*, the Aiwa *HS-PL707* or the Sharp *JC-K99* is going to regard this as anything but a throwback to a previous age.

It behaved better under induced vibration than many of the others, including the Aiwa, and it gives you nice design and engineering, plus features like Dolby B and C. But unfortunately you also get the unimpressive Sony battery storage system.

Worst of all, you don't get that great a sound out of the player. The *DD9* performed decently on the classical selection and it gave an acceptable rendition of the blues and R&B. It was certainly less muffled sounding than my sample of Sony's *DD33*. But it still was not particularly exciting - and for money like this you expect quite a lot of excitement.

On top of all that, the sample I was listening to developed the extremely irritating habit of switching itself off in midplay, almost as if to say, right, lad, that's the end of this listening test.

Fair enough, I say.

Bass enhancer	Yes
Auto reverse	Yes
Rechargeable battery & charger	Yes
Remote control	No
Typical retail price	£240

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21st Century Fox

I know very few people, come to think of it none, who can afford to fly Club or First Class on their own money. Everyone I know flies Tourist Class, unless they are lucky enough to be on a business trip paid for by someone else.

On long-haul flights the airlines provide in-flight music entertainment and a movie projected from video tape onto a wall screen.

For many years the headphones were horrid acoustic stethoscopes. They pipe sound from tiny transducers buried in the arm rest. The airlines then started giving Club and First Class passengers electromagnetic headphones, similar to those you would use at

This month Barry Fox talks about the acoustic stethoscopes the airlines provide for passengers so-called entertainment. Heavy turbulence ahead . . .

home when trying to listen to your hi-fi system and yet cause minimum disturbance to the other members of your household. Nowadays most tourist class passengers get electromagnetics as well. The airlines used to give them free to Club and First Class passengers, while charging Tourist class a few pounds each. Now most airlines loan everyone headphones free, collecting them again at the end of the flight. Virgin simply gives them away. It believes that the collection, cleaning and repair that would be necessary is more trouble than it is worth.

In craft entertainment?

The video source in an aircraft has until now been either VHS or Video 8, with audio entertainment coming from modified cassette decks with DBX encoding. Now the airlines are going over to S-VHS and Hi-8 for video, with plans to use CD or DCC for audio. DAT was never seriously used. The format was judged too risky in the extremes of temperature and humidity, and the dusty desert environments, which planes suffer.

In general both the audio and video source sound quality completely outstrips the quality of the sound distribution system and the headphones. For distribution around the aircraft, many channels of sound are multiplexed together and fed down a single cable. Multiplexing is either by stacking analogue signals in different frequency bands, or by using coarse digital coding and interleaving the bits in a single stream.

The electromagnetic headphones loaned or given to Tourist Class passengers are bought by the airlines in bulk for 50 pence a pair, or less. The diaphragms are small, and the foam ear pads flimsy.

This means you get poor bass, and a lot of ambient aircraft noise from the jet engines drowning out the wanted sound. The multiplex system adds hiss and distortion. Bandwidth of the multiplex system seldom exceeds 10kHz. Ironically, a good acoustic stetho-

scope can produce better sound than some of the horrid electromagnetic headphones foisted on passengers.

The obvious solution seems to be for passengers with an interest in audio to take their own headphones and try plugging them in.

The first and obvious problem is that the airlines have not standardized on a common headphone socket. Some use a miniature stereo jack. Others use a ganged pair of mono jacks. But it is not difficult to make an adaptor which copes with either.

Annoy your fellow passengers — a game for all the family

But you then face a not-so-obvious problem. Airline audio systems are designed for use with high impedance (300 ohm) headphones, because this lets the amplifier cope with a large number of phones at the same time - like a public address system which drives a large number of loudspeakers. Domestic hi-fi headphones are of low impedance, around 30 ohms. If more than a few people plug low impedance headphones into a high impedance system, then it 'drains'. Anyone with high impedance headphones - in practice that means all the other passengers! - will hear very little sound.

Also, a low impedance phone will play very loud and exaggerate the noise generated by the multiplex decoder.

The simple answer, which astonishingly no-one yet seems to have thought of or adopted, is for a hi fi headphone manufacturer to offer a high impedance airline model. This would have large, good quality diaphragms and large ear pads to give good bass and cut down on ambient noise.

High flying impedance

Anyone with an interest in good sound would buy themselves a pair of airline headphones, and carry them on all long haul trips. The airlines would lose nothing, because they no longer charge for the loan of low quality headphones. In fact they would gain because they would save on collection, cleaning and losses. (Around one in ten loaned airline headphones is stolen anyway). Because the hi-fi airline headphones would be of high impedance, there would be no drain on the airline system.

The only problem, I am warned, is that good headphones might show up the deficiencies of the low quality multiplex systems still being used on many aircraft. But higher quality digital multiplex technology is now available (from Matsushita's airline division for example) and these are now being fitted to some aircraft. If passengers used their own good quality headphones, this would be an incentive for airlines to upgrade their multiplexing.

Perhaps Virgin Atlantic can lead the way. Virgin has already adopted a policy of blitzing passengers with an almost endless menu of both video and film materials. Although the sound from them is tolerable, under no circumstances could it be described as good. I wonder which headphone manufacturer will be first to offer a high quality, high impedance model.

The one-bit to look for



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Readers Write

CHOICE ANSWERS

A bit of solidity and muscle

My present system comprises a Marantz CD50SE, a Dual CV5600 amp and a pair of Cyrus 781 speakers on Sound Organisation stands. The interconnect I use is from the Chord Co and the speakers are bi-wired.

I basically enjoy the sound quality of the system especially the Cyrus 781s (which I bought after noticing that your magazine has frequently recommended them). My problem is that I would like a more detailed and transparent presentation from the system. Should I change the amp or add a DAC like the *Little Bit* to achieve better sound quality? If I were to change the amp I would like one with tone controls that could take two sets of speakers. My budget is £300.

W Yie, Manchester.

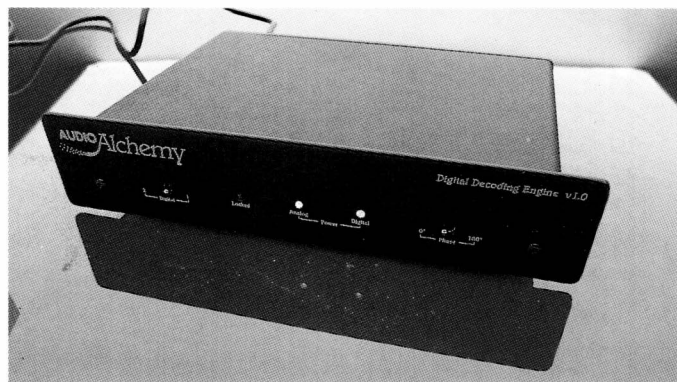
We found the Audio Alchemy Digital Decoding Engine somewhat superior to the Little Bit, but at £376 it's a tad above your quoted budget. The Digital Decoding Engine separates the

different strands of music superbly and draws out details previously buried in the mix. If you are looking for a single upgrade to provide this kind of refinement, it might be just what the digital doctor ordered.

When it comes to upgrading your amp, few will give you a significant improvement and cover your other requirements within your budget. We haven't recommended any sub £300

amps with twin outputs, the closest option in our experience being the £380 Harman Kardon H/K 6500.

The real problem with your system is that it is good enough to get you hooked on hi-fi and show you just what can be achieved with a decent system. Adding the DAC would certainly improve things, but to go any further you will have to think about increasing your budget.



Turbocharge your old CD player with Audio Alchemy's DDE.

Time for change

About the only advantage the elderly have over their younger colleagues is experience. For years there has been a latent dispute between the lovers of the LP and the CD. Apparently there are people willing to spend thousands of pounds on record players, people who look askance at the CD. Yet before the CD came along, most music lovers complained bitterly about the poor quality of the LP pressings. Now that they are offered a much better alternative, they reject it.

Remember the introduction of the LP in 1950? HMV, for one, refused to press it, alleging the vinyl 78 was much superior. So Decca had the market to itself for some time. Only much later was HMV convinced.

And so it goes on. The passing of time brings progress, but progress is rejected by a handful of enthusiasts, who long to cling to the past. The time has now come to put away LPs and concentrate on CDs, until something better comes along. Peter Woodhead, Porto Alegre, Brazil.

But what if so called 'progress' brings with it a reduction in standards? Are we supposed to sit back and say a new medium is superior because it cosmetically improves the standard which it's replacing?

As self appointed defenders of the faith we feel it is our duty to tell you what we think of new technologies. The majority of Choice's contributors agree that at the very top end of the market vinyl offers a higher level of fidelity than the alternatives as they stand.

However, most of our contributors would also agree that for the man on the street, with a limited budget, CD represents the best compromise in terms of sound quality, ease of use, and longevity of the software.

Certainly record decks will be around for some time in the future. CD will undoubtedly win in the end, if only because vinyl software is becoming increasingly hard to find, but Choice won't be pressed into abandoning vinyl just because CD happens to be the trendier format.

Dutch style bi-wiring alternatives

Many things have been written about speaker cables and bi-wiring options. But no one has mentioned (as far as I know) cross connection of bi-wiring cables. To do this just connect cable A to red on the tweeter and black on the woofer and cable B to black on the tweeter and red on the woofer.

With my system, using Audiolab Hi-Flex cable, this resulted in slightly tighter bass, but considerably more sparkling high frequencies. More detail can be heard over the

whole frequency range and the sound is less boxy; depth and width are also improved.

The explanation might be the change of

cable capacitance, which must be significant. I haven't done the same test with other speakers or cables, but it is so

easy to carry out for everyone that it should be worth a try. Rene L van Es, Alphen aan den Rijn, Netherlands.

Presumably Audiolab Hi-Flex is a Naim/QED type cable which has both positive and negative conductors bonded together by the dielectric. If this is the case then, as you mention, the capacitance would be decreased by swapping plugs around on a bi-wired speaker.

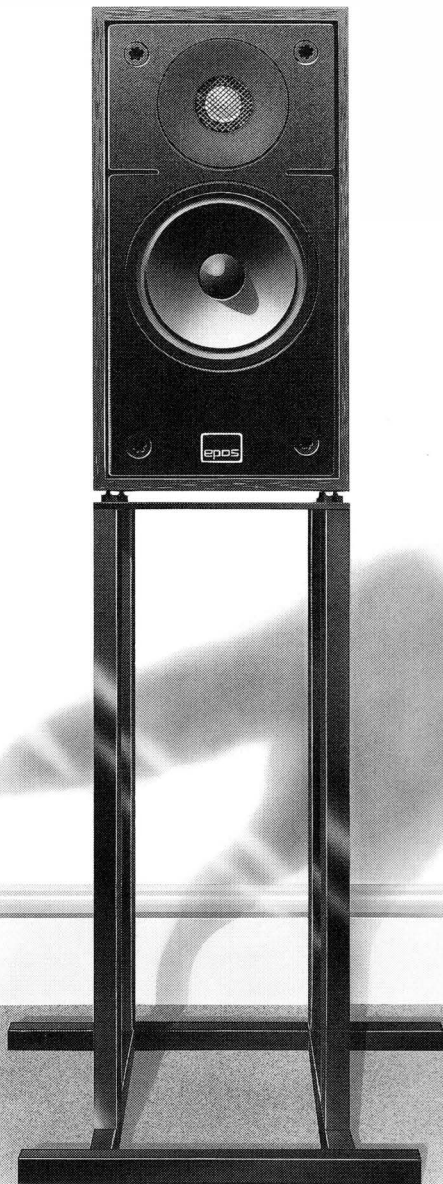
However the series inductance would go up, increasing the reactive component of the impedance at high frequencies. With high resistance cables this could result in treble degradation. I'm surprised that the effect is so pronounced, but as you say it is extremely easy to experiment with, and bi-wirers that use this style of cable could do a lot worse than giving this idea a try.

Just a word of caution, under no circumstances should you try this experiment with bi-amped systems as this would be very dangerous and at best could damage your equipment and at worst could damage you!



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Looking for some real differences

I have budget of up to about £1,200 and I want a CD player, amplifier and loudspeakers. The dealer I visited recommended the following components; the Arcam Alpha or Arcam Delta 70 (new bitstream version) CD player, the Arcam Delta 60 or Exposure X (end of range price — £399) and Linn Index II or Royd Sapphire speakers.

Having auditioned the two CD players I could hear no

before purchasing.

When auditioning, I could not convince myself that any difference I was trying to hear was real, rather than an imagined difference based on comments from the assistant. I was sure that if real differences existed they would be obvious. One problem may be that as I have spent most of my life listening to music on cheap 'cassette-radio' equipment, all

Ian Robinson, Barnstone, Nottinghamshire.

Perhaps you should spend some more time listening to these components. Try out a variety of different discs and listen to different combinations until one stands out as being the most appealing. The differences between similarly priced components isn't usually gross but whole systems tend to have a more obvious character. Get a couple of dealers to play you the same discs on their favourite £1,200 systems and go for the one that's most enjoyable.

We haven't tried the Exposure X (the company wasn't too keen to lend us one) but by reputation it's a turntable oriented beast and thus probably not your optimum choice. The Delta 60 however, did well when we last tested it. And we rated the Index II (on its Ku-stone stand) a shade higher than the Royd Sapphire.

With your budget we would suggest you combine a Best Buy CD player with a similarly commended amplifier and buy some relatively expensive speakers. Something along the lines of Arcam Alpha CD player and amp (Mk3 version), Pioneer PD8700 CD and A400 amp or Rotel RCD-965BX CD and Marantz PM40SE amp with speakers of the Castle Chester, Kef Q90, Sendor SP2/2 or Rogers LS3/5a ilk.



Pioneer's PD-8700 is a real go getter of a budget disc player.

difference between the Alpha and the Delta and so decided on the Alpha. I then auditioned the two amplifiers and again had trouble hearing a difference between the two, although the assistant assured me that the Exposure was much better. When I also had trouble hearing a difference between the speakers (the assistant said that the Royd Sapphire sounded better), I became thoroughly confused and decided to seek further advice

quality hi-fi sounds so much better to me that I am not very discriminating.

How do you rate the Exposure X relative to the Arcam Delta? How do you rate the Royd Sapphire relative to the Linn Index II? Can you recommend a specific combination of amp and speaker or should I be considering some other make? I did not want to audition too many models as I feel I would become even more confused.

More amplification options

My current system comprises Meridian 200/203 CD player, Cyrus 2 amplifier and Kef 103/3 loudspeakers. It has been my intention to upgrade the amp by adding the PSX power supply, but before I go ahead can you tell me if you think I could do better by spending up to £750 on new amplification?

Thanks for a great magazine. C J Dangerfield, Bristol.

You should be able to significantly improve on the Cyrus combo for £750. Try the Hafler SE-100/SE-120 combo or, using short lengths of interconnect, combine a

passive preamp with one of the better affordable power amplifiers like Denon's POA-4400 monoblocks, Musical Fidelity's P150 or Linx's Vega power amp. All of these cost around £500 and a good passive from Rothwell or Audio Innovations can be had for about £200. As long as you take care in matching short interconnects into the system they can give excellent results.



Passive preamps like this Audio Innovations model are inexpensive and can sound superb in the right system.

Daunting stuff

I have decided to finally rid myself of a midi system and delve instead into the daunting world of separates. My budget extends to around the £1,200 mark. My main source will be CD, probably the Arcam Alpha and to a lesser extent a single transport tape deck.

I am basically unsure as to how to divide my money between the amplifier, speakers and tape deck. I would also appreciate any suggestions for these components. The speakers, though not miniatures, should not be huge as space is fairly restricted.

My final query is how much money should be spent on cables and stands. Nicholas Mitchell, Farnham, Surrey.



JRT's AD1: a fine sounding and discreet loudspeaker.

There is a list of suitable set ups for about £1,200 in the answer to another letter this month (top left). Basically go for Best Buy electronics and the most highly rated speakers you can afford. Good unobtrusive examples include the Audio Note AN-K, JRT AD1 Micro and the SD Acoustics SD3.

As for how much you should spend on cables and supports, with a system like this it would pay to get a good two tier table which start at about £70 and speaker stands of similar quality - about £60. Speaker and interconnect cables can be had for roughly the same amount but obviously the more you are able to spend the better results you are likely to achieve.



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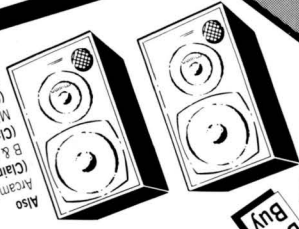
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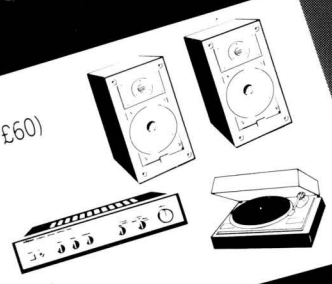


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Nad 3229PE	316.95	328.95	348.95	359.95	379.95	396.95	436.95
Nad 3020 I	316.95	328.95	348.95	359.95	379.95	396.95	436.95
Marantz PM 30SE	299.95	312.95	328.95	344.95	359.95	379.95	419.95
Rotel RA920AX	356.95	368.95	388.95	399.95	419.95	436.95	476.95
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 Marantz CD72
 Nad 5420
 Nad 5425
 Nad 5440

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TURNTABLES

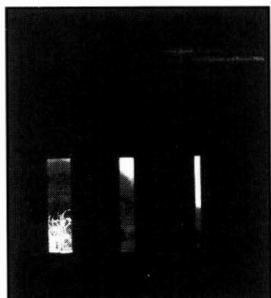
deduct £15
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91 REVISITED

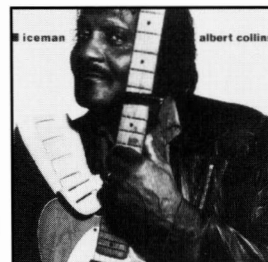


91

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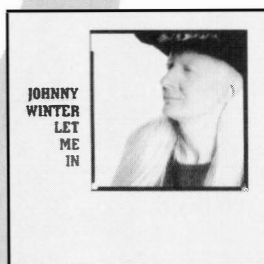
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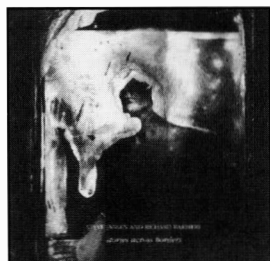
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91

JOHNNY WINTER

"LET ME IN"



91

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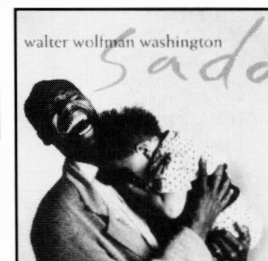
"STORIES ACROSS BORDERS"

Active-ambient sounds from the former Japan rhythm section; also featuring Mick Karn.

91

WALTER "WOLFMAN" WASHINGTON

"SADA"

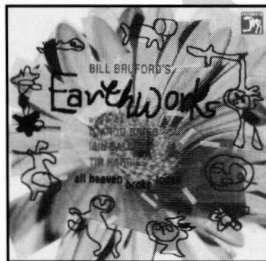


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"ALL HEAVEN BROKE LOOSE"

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91



91

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91

THE GOLDEN PALOMINOS

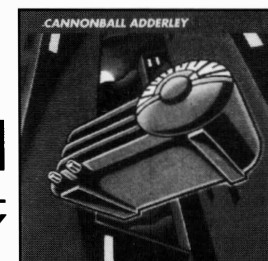
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Choosing and Using . . . Loudspeakers

The first step on the road to choosing your loudspeakers is to specify your personal and particular requirements. It is possible to do this on a basic level checking the price, size and intended location. But there are real benefits for those prepared to take a little more trouble. With a little care, the assistance of the data in this issue, and (hopefully) the cooperation of a skilled retailer, the end result can be that much more worthwhile.

Those buying just loudspeakers will have a pretty good idea of the money they have available, which as ever is the fundamental bottom line of any purchasing decision. But there is - and always has been - controversy over the proportion of a budget that should be devoted to loudspeakers, vis a vis that spent on the other components.

Thinking of buying some speakers but don't know where to start? Let Paul Messenger guide you through the maze of loudspeaker selection.

When setting the loudspeaker budget, it is vital to allow sufficient funds for a decent stand or support, and good quality connecting wire. From £200, for example, one should probably allocate £140 for the speaker itself, £50 or so for stands, and maybe a tenner for the cables.

While a magazine can assist in presenting the alternatives that are available, it is only through skilled demonstration that an individual can be confronted with the different but equally valid options to make an educated choice for himself. At the time of writing I am temporarily living with a £1,000 system which suits me very well, but which certainly represents one extreme. It consists of a £600 turntable with £200 amplifier and £80 loudspeakers on £100 stands. At the other extreme, another audiophile could enjoyably combine a £500 remote control multisource midi system with £500 worth of high performance, low coloration loudspeakers and stands. But unless one actually has the opportunity to hear the difference between these two very distinct approaches, how can one possibly have any basis for making a choice?

The site chosen for loudspeakers is often as influential as the choice of loudspeakers themselves. Over the years I have used open stand locations, both with conventional box speakers and panel types, and also stand-mounted wallbacked designs. Each has its own strengths and weaknesses and imposes its own characteristics on the sound, so again personal preference enters into the equation.

Having chosen the siting, one may then choose the loudspeakers and stands to suit. Alternatively, choose the speakers you like in the shop and then move them around at home until they sound to your taste.

The end result comes from a complex interaction between the loudspeaker, its support, its site, the

acoustics of the room, and the general characteristics of the driving system. That is rarely entirely predictable. For those intending to spend a fair amount of money, it is not unreasonable to expect the luxury of a home demonstration, and/or the option to return and change a pair which do not suit after a day or two.

For any given budget there is an obvious choice between large or small loudspeakers. One instinctive reaction is to favour the big one, particularly if it has lots of drive units, but others will plump for a miniature or compact on aesthetic grounds. In fact the differences and trade-offs are more far reaching.

Bass extension

Fundamentally, the larger the box the more extended the bass is for the same specific loudness. Ultimately a good big'un is going to beat a good littl'un on loudness and bass extension, hands down. But it is also going to cost a great deal more. The large enclosed volume remains the route to extended bass, and this in turn adds 'weight' and 'scale' to the sound. But it can also reveal the low frequency inadequacies of the sources, be they the equipment or the recordings themselves.

Big speakers suffer from several innate disadvantages. Large box enclosures are expensive to build and ship, and represent an undesirably large surface area of unwanted radiation, which can colour the sound and blur stereo precision. Extra drive units do increase power handling, but bring problems of crossover complexity and unit integration.

Little speakers can prove more fragile if used for the occasional party, and are certainly not at their best when trying to recreate the power and drama of rock or a full concert hall acoustic.

Given the excessive number of different models competing for attention, manufacturers are inclined to make much of the uniqueness of their particular brew. As a result the industry has become riddled with buzz words to describe any single type of engineering solution, and this leads to the sort of stereotyping which entirely misses the point of loudspeaker engineering.

Examples are legion, from the bextrene bass/midrange cones of the early Seventies through to the latest metal dome tweeters which are currently springing up everywhere. The result is that people talk of a 'metal dome sound' as something desirable (or not) per se, whereas in fact there will be a whole range of different metal dome sounds, in all probability some distinctly more 'equal' than others.

The underlying axiom is that great loudspeakers are not created by adopting a quick technological 'fix'. Indeed, history has often shown that the 'radical innovation' is a mere flash in the pan, with benefits in one area more than offset by unforeseen penalties elsewhere. Technology has steadily improved the performance of loudspeakers over the years, and some innovations have proved decidedly worthwhile. But the whole is much greater than the apparent sum of the parts, and the buyer would do well to bear this in mind.

The KICK INSIDE

In a comparison test in Hi-Fi World's November issue, the Creek 4140 was regarded as the best of a group of amplifiers from six manufacturers. Some of them world heavy-weights.

Best? How can one define best in fidelity?

What made the 4140 outstanding in comparison to products by Pioneer, Marantz, Arcam, Musical Fidelity and Sonic Link, was, we quote, it's "pace and life", while being "detailed and coherent in presentation" it never sounded "out of control or nasty" on moving magnet or CD.

Probably the most telling comment was "It is one of those amplifiers that has an almost in-built sense of rightness to it that provides a strength the others lack."

What truly makes an amplifier better is its ability to convey the composition, the musicians and their performance. This test proves that this capability belongs to Creek.



Creek 4140 s2 Integrated Amplifier.



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It's some years since *Choice* evaluated this ground breaking loudspeaker. Back in issue 59, Alvin Gold referred to 'the most awesomely articulate and dynamic miniature ever made', a statement which has kept Acoustic Energy in Chinese takeaways ever since. But times, companies and products all change. The AE1 was radical and innovative in its day, but other manufacturers have noted its success and responded. Just how well does it stand up to the class of '91?

Though I've never sampled a 1 before myself, the package follows the same basic principles as AE's large models in engineering terms, though the cosmetics of my particular samples couldn't have been much more different. The original pro-look rugged crackle finish grey case-work made the unequivocal design statement that these were hi-tech loudspeakers, and not to be confused with chunks of tree. When I unpacked this particular carton, out came something finished in delicious quality rosewood veneer, further embellished by gold coloured fixing screws.

Although I understand there have been a number of minor evolutionary changes, the main outline of the design is just as it was. This is a tiny two-way loudspeaker built to the highest engineering standards throughout, so as to do justice to AE's proprietary all-metal diaphragm drivers — and also the extravagant £767 price tag. To do justice to the speaker itself, there's an attractive, tall, heavy cast aluminium stand, with a lead shot filled pedestal, that costs an additional £305.

Luxury price demands luxury finish, and that is certainly the case here, and the engineering content achieves a similarly high standard. Or should have done. To AE's great credit I received a phone call a

few weeks after delivery asking me please to check the tightness of the driver bolts, as a batch had gone out with some not properly tightened. I duly checked, and found several loose-ish bolts on one of the pair — but the blind listening tests had all finished several days previously.

The grille is as unhelpful as ever, and should be immediately discarded if you can tolerate the gold teeth. The drivers share the front panel with a pair of tiny 'gas flowed' reflex ports, tuned to 55Hz. MDF panels more than 20mm thick ensure the carcass stays rigid, while the sides are further damped and reinforced by an extra lining of a plaster like material, and the space is fairly well stuffed with wadding.

Classy bi-wire terminals feed the heavy gauge hardwired crossover, and hence via thick cables soldered to the drivers. The main unit has a small 90mm metal cone with foam surround, fitted into a pressed steel frame with a hefty magnet. The tweeter's 25mm metal dome lurks under a quite dense protective mesh.

Test report

The price of miniaturisation is extracted in full here, with nothing much in the way of in-room bass extension below 50Hz, and a well below average sensitivity rating of 84dB. Quite why the latter should be 4dB lower than that found in 1988 remains obscure: certainly the latest figure is entirely comparative with the data for a couple of hundred other loudspeakers, and is based on real-room bass/mid averaged relative loudness measured in the far field (at the listening position).

The response is clearly optimised for siting a foot or two away from the wall, whereupon it delivers an impressively smooth and balanced response from 50Hz

up to around 2kHz. So far so good, but the final decade is less happy, output falling several dB into a crossover notch just below 3kHz. Output recovers somewhat up to 7kHz but rolls off early and gently thereafter.

Sound quality

Whatever the influence of the loose driver fixing bolts, my subsequent sighted listening, with drivers properly tightened, served largely to confirm the panel's findings, if not perhaps the '1's reputation.

The general lack of bass power, extension and scale is perhaps inevitable in one so small, but dynamics are unexceptional too, which is something of a disappointment. The real strength of this speaker lies in its fine clarity, focus and detail, the midrange sounding very open and inviting. However, there's more than a touch of glare and brittleness, and voices sound perceptibly slowed and time-smearing. It simply doesn't sound as lively and agile as I expected. One panellist aptly coined the phrase 'a carpet slipper product'.

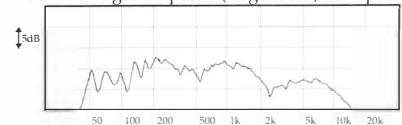
Conclusion

Though undoubtedly still one of the best miniatures around in some respects, notably the superb midrange focus and detail, there's no avoiding the performance limitations elsewhere. Serious loudness and bass cannot of course be expected, but the relative lack of speed and agility at normal listening levels is a reminder that the market has moved on somewhat since the AE1 first appeared.

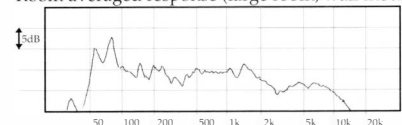
TEST RESULTS

Size (hwxwd)	29.5x18x25cm
Recommended amplifier power	25-150W
Recommended placement	stand 1-2ft from walls
In room averaged response limits 50Hz-10kHz	+/-5dB
Large room/space LF rolloff (-6dB ref midband)	48Hz
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)	84dB
Impedance characteristic (ease of drive)	very good
Typical price per pair (inc VAT)	£767

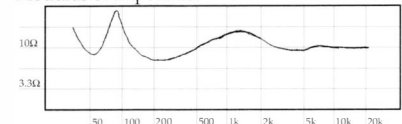
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



Modulus of impedance



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'Best Buy' was awarded.

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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.'



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me and gave the 110 a very cordial reception.

And when I brought them in for a little hands-on listening, I was quickly brought round to their point of view.

The overall balance is very impressive, and the bass is quite lively and bouncy with good extension, a measure of authority and even a suggestion of power, yet remains thankfully free of boomy effects. The slightly exposed mid-forward character brings an attractive openness and lack of boxiness. However, it can get a little oppressive on some close-miked material, and seems a little inclined to clog up and compress information when driven hard, while slight treble slurring and smearing leads to a touch of aggressiveness.

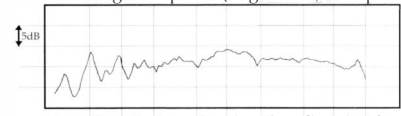
Conclusion

Although it doesn't look a very prepossessing speaker for the £220 asking price, and I do wish Allison (or its British agent) would do a more professional job on the driver fixing arrangements, the proof of any loudspeaker comes in the listening, and here the AL110 is vindicated. It's probably the best balanced of the four ALs so far assessed, and delivers better bass energy and authority than most speakers at the price, so Recommendation is clearly appropriate.

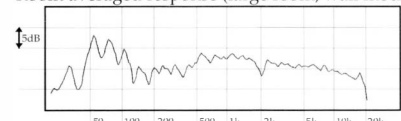
TEST RESULTS

Size (hwxwd)	40x24.5x22.5cm
Weight	7kg
Recommended amplifier power	20-100W
Recommended placement	stands 1-2ft from wall
In room averaged response limits 50Hz-10kHz	+/-4dB
Large room/space LF rolloff (-6dB ref midband)	28Hz
Large room/wall LF rolloff (-6dB ref midband)	28Hz
Large room output at 20Hz (ref midband)	-11dB
Estimated midrange sensitivity (ref 2.83V, 1m)	86dB
Impedance characteristic (ease of drive)	current hungry
Typical price per pair (inc VAT)	£220

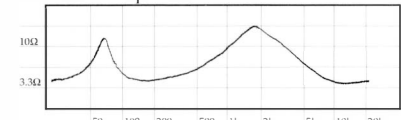
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



Modulus of impedance



Following founder Roy Allison's pioneering work on the interaction of loudspeakers and rooms, this is now a well established US brand, based on the East coast, and known primarily for models designed to be placed close to a room boundary. However, our recent experience of the AL series models suggests that this shouldn't necessarily be taken as gospel, and that some experimentation is needed to achieve optimum results.

The fourth AL to appear for *Choice* assessment, the 110 slots into the lower middle of a seven-strong range which shows a strong family resemblance and a logical progression from one model to the next. £220 is a shade expensive for a simple two-way sealed-econobox of this size, though there are several nice touches that help to justify the premium, and the 7kg weight shows that build quality hasn't been ignored.

It's not particularly special to look at, though the textured baffle with post-formed edges is quite smart in its own discrete way. A stiff but flexible affair made from perforated plastic, the grille should have good acoustic properties, and serves to hide the rather ugly rebated drivers and fixings.

Said baffle is a hefty chunk of 21mm MDF, while the sides appear to be 15mm thick. There's slight edge bracing, and the box is well stuffed with wadding, but the driver fixings leave some room for improvement. The rather small coarse-pitched woodscrews securing the main driver were pretty tight for the most part, but rather haphazardly placed, and indeed one had broken through into the cutout; the tweeter screws were rather loose too.

The main driver has a small magnet, pressed steel frame and 115mm doped

paper cone, while the tweeter uses Allison's proprietary 'nipple profile' diaphragm. A single terminal pair feeds a simple crossover with generously rated components.

Test report

Given Allison's tradition for boundary-reinforced designs, and in view of the rather vague information in the instruction leaflet, plus experience of both AL100 and AL105, it came as something of a surprise to find the AL110 looks distinctly bass heavy when close against the wall and works rather better when pulled well clear.

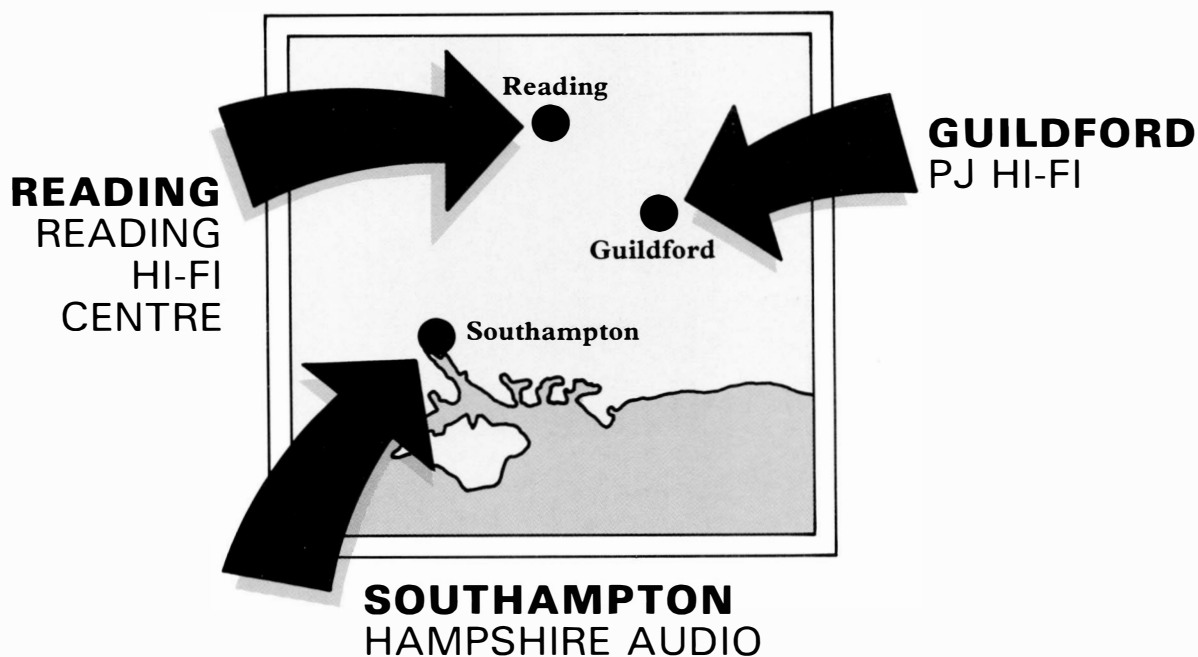
Even in space the mid bass is a shade heavy, though mainly because the upper bass and lower mid is distinctly lean. This in turn leaves the octave centred on 1kHz looking slightly forward and exposed. Treble output is well maintained and looks pretty well integrated too. Compared to the other ALs previously reviewed, the 110 shows a similar overall characteristic, but is clearly smoother and better integrated through midband and treble than either of the cheaper models, in many ways resembling the £420 AL120, and arguably better balanced than this in the bass, though significantly lower in sensitivity.

Despite the current hungry impedance characteristic, the 86dB sensitivity is a little below average, so a fairly powerful amplifier, or at least one with healthy current delivery, is desirable. The positive side of this lies in the unusually good bass extension (-11dB at 20Hz in-room) considering the modest box volume.

Sound quality

Although my own unsighted reaction was rather negative, the panel clearly outvoted

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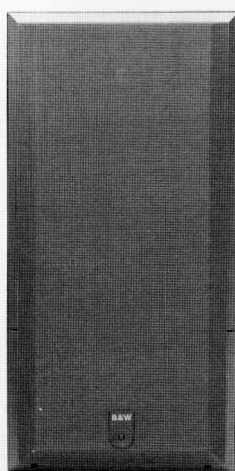
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B&W 610

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The £200 610 is the middle model of a trio of competitively priced B&Ws that first appeared on the market early in 1991. Both rangemates have already come under *Choice* scrutiny (issues 94 and 98), and both delivered sufficient of the goods at their respective prices for formal Recommendation. The common factors include a clever and smart baffle fascia in moulded plastics, and a smooth overall balance alongside a rather bland delivery, which inevitably sets the scene for this large bookshelf size variant.

£200 seems a very modest price for such a decent size enclosure, though the combination will leave little scope for engineering extras beyond those expected in a modern econobox. All is wrapped in the obligatory black vinyl, though a large grey plastic moulding with chamfered edges covers the whole front panel and keeps everything looking smart and tidy. The grille has an open moulded frame to minimise acoustic disturbance — except along the top edge, for some reason.

The box itself is built from pretty basic 15mm chipboard, well stuffed with wadding but otherwise unimproved, save of course for the extra stiffening contribution of the plastic baffle. Precisely what this contribution might be is difficult to ascertain, at least without access to the sort of labs they have down in Sussex, but the main driver is held in place by six rather diddy little coarse-pitch screws, four of which bite only into the plastic, but two of which extend through to the woodwork.

Said main driver has a small magnet, pressed steel basket and 145mm plastic cone with soft surround termination. The tweeter has a 28mm metal dome, with an annulus phase corrector providing some protection, mounted on a plastic chassis.

All screws were satisfactorily tight, and the mounting hardware covered by soft plastic trim. A fairly simple hardwired crossover is fed from two pairs of terminals (for bi-wiring) and is tag connected to the drivers.

Test report

Sensitivity is a substantial 89dB, yet bass extension is also very well maintained, the 20Hz in-room level averaging an impressive -7dB. Indeed, the sealed-box 610 goes significantly lower than the much larger reflex/ABR loaded 620. Another of the secrets of this favourable equation lies in an impedance characteristic that is 4ohms across much of the band, and will therefore be making double the current demands of the stereotypical 8ohm model.

The in-room responses clearly favour a site fairly well clear of room boundaries, though to some extent it's a matter of achieving the right balance between over-heavy mid/bass (at the wall), and some lower mid excess when moved well clear. The overall balance falls within quite tight limits, but is also characterised by significant unevenness through the broad midrange, some loss of energy in the lower treble, and recovery to a mild peak around 8kHz — the latter not visible on either of the other 600 series models.

Sound quality

The blind listening tests were rather inconclusive, inasmuch as the panellists came to quite diverse conclusions — delivering an uneven response to the response unevennesses perhaps.

The overall balance is pretty good and the broad midband lively and open, though there was consistent criticism of the bass, which sounds slowed and a little lacking in control: 'a real non-event' in the

words of one panellist. Transients and other treble information is a little detached and obvious, and the presence is a little dulled, giving a slightly dark, hooded and shut-in impression, alongside a tinkly and sometimes splattery top end.

On balance, and acting as referee as well as sighted listener, there's no question that the speaker goes creditably loud with decent scale and balance, and creates a pretty convincing stereo image. But I also found the 610 distinctly lacking in genuine coherence and communication skills. The sound remained determinedly reproduced, and one had to fight hard through the reproduction artefacts to get through to the messages lurking in the music beneath.

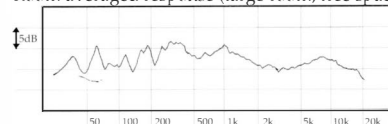
Conclusion

Fine finish and presentation and 'plenty of box for your bucks' make the 610 a fairly tempting looking prospect. Certainly it offers good in-room bass extension and goes impressively loud too, but does so with the rather indifferent integration and coherence that is so often the hallmark of the cost-effective 'large bookshelf' size loudspeaker.

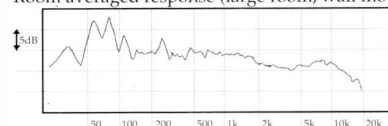
TEST RESULTS

Size (hwxwxd)	49x23.5x30cm
Weight	8kg
Recommended amplifier power	15-100W
Recommended placement	stands clear of walls
In room averaged response limits 50Hz-10kHz	+/-4dB
Large room/space LF rolloff (-6dB ref midband)	25Hz
Large room/wall LF rolloff (-6dB ref midband)	25Hz
Large room output at 20Hz (ref midband)	-8dB
Estimated midrange sensitivity (ref 2.83V, 1m)	89dB/W
Typical price per pair (inc VAT)	£200

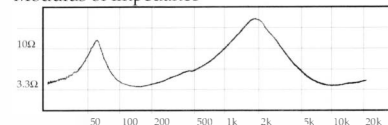
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



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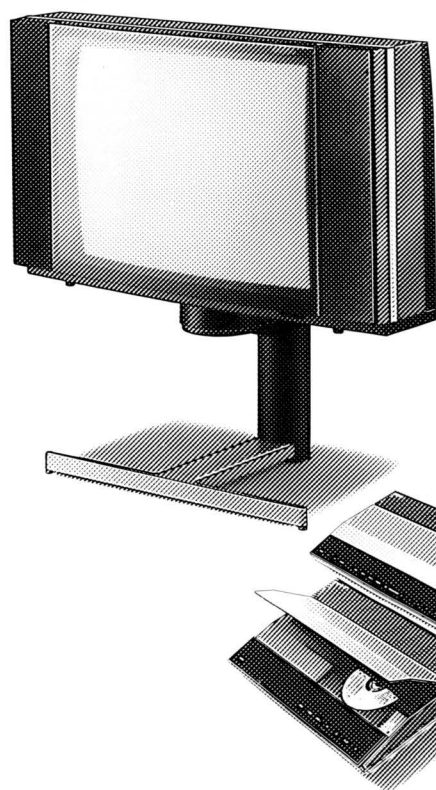
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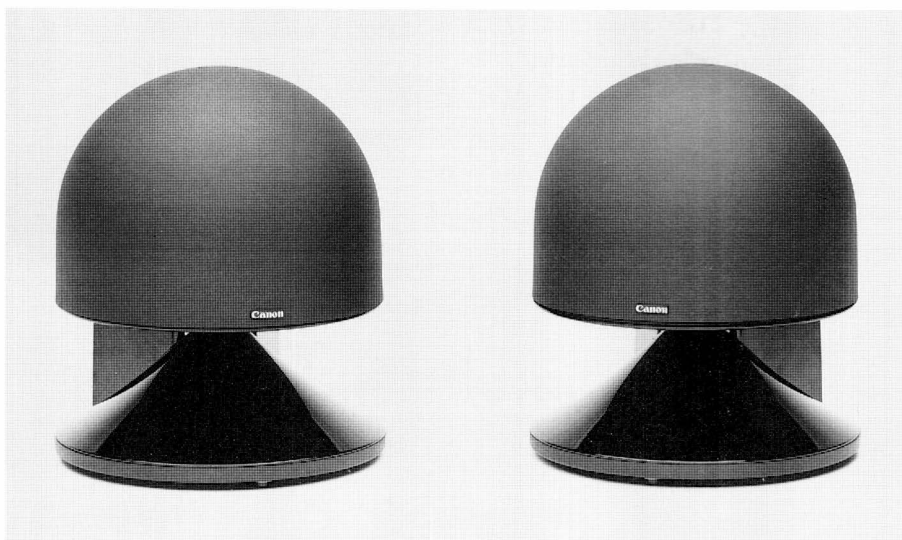
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The background and special qualities of this radical and unique loudspeaker have already been covered in some detail in a *Lifestyle* feature (issue 98), but the *S-50*'s both interesting and important enough to be well worth revisiting in this more formal and comparative assessment, complete with measurement and blind listening backup.

It's an important loudspeaker for several reasons, not least of which is that it marks the arrival of imaging multinational Canon on the specialist hi-fi scene, and with a British designed and built product to boot. The Boothroyd penned styling is most unusual, very attractively so in the eyes of most of my visitors, and the whole package has been elaborately tooled and painstakingly developed.

To call it a specialist hi-fi speaker only tells part of the story. In some respects its hi-fi capabilities are somewhat limited, the tiny, solitary equalised main driver inevitably constraining the total performance envelope. But the USP (unique selling point) which goes some way towards justifying the £350 price tag is the 'wide imaging stereo' (WIS) feature, that seeks to make good stereo imaging available over a wider seating area than is usually the case.

It's all done by mirrors, or maybe that should be lenses, since the 'mirror' under each driver has been carefully shaped and positioned to provide rather greater control over the directivity of the loudspeaker. The Canons are loudest in the direction in which they are pointed, yet also maintain a relatively uniform balance across a wide lateral angle. When placed as intended, so that each is aimed towards the opposite corner of the room, their directionality ensures that even seats well away from the ideal centre line can

still hear each speaker with roughly the same loudness, and so form a reasonably convincing stereo image.

A curiously shaped all black object that looks more like an Art Deco table lamp than a loudspeaker, the foundation is an elaborate and substantial metal casting that forms both mirror and baffle. A single dual-cone driver is used to cover the full range, the main doped paper cone being about 90mm across, and supplemented by a little 'whizzer' in the centre to help out the high frequencies.

The plastic dome that dominates the appearance acts as the (ported) enclosure for the driver. It's roughly the volume of a conventional miniature, is braced, inherently self damping and carefully filled with longhaired wool. Although there's no crossover in the true sense of the word, some equalisation of the driver output is carried out by a network fitted inside the base. The matching stand completes the visual statement and was used throughout these tests.

Test report

For reasons that arise from the WIS feature, the *S-50* needs to be used clear of walls, and the room curves confirm that the balance has been appropriately optimised. The small size of both driver and enclosure decree a necessarily limited performance envelope, in-room bass extension falling rapidly below 50Hz and sensitivity registering a low 84dB, happily alongside an easy amplifier load.

The overall frequency balance is very good indeed through the bass and midrange, all the way up to 3kHz. Above that point, however, output falls steadily, and struggles to maintain anything credible above 10kHz.

Sound quality

The results of the panel listening test were a little disappointing — though much the same was true of all the miniatures on this occasion, suggesting a general dissatisfaction with the babies within what turned out to be a middleweight dominated group.

Half the panel reacted against the Canon, mainly on grounds of the dulled and rather coloured treble, and a bass which is neither tight, quick nor extended. The other half were more charitable, praising the stereo imaging in particular and mentioning the good bass/mid balance in despatches.

Extended sighted listening leaves me in no doubt that WIS does extend the effective stereo listening area quite significantly, though the quality of focus when seated on the main axis does seem slightly diluted. And despite the rather too relaxing treble, the sound shows good basic clarity, detail and coherence, with a measure of genuine transparency.

Conclusion

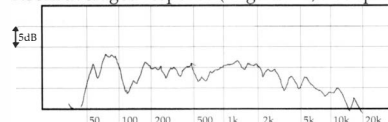
Although £350 can buy more and better hi-fi sound from elsewhere, the *S-50* is aesthetically attractive and very unusual, and the WIS feature really works, which makes it a very attractive proposition for family NICAM TV enjoyment. Any evaluation must try to take these unique factors into account, so considered Recommendation seems appropriate.



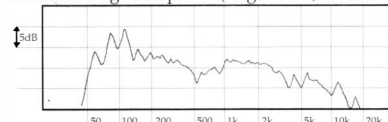
TEST RESULTS

Size (hwxwd)	30x24(diam)cm
Weight	5kg
Recommended amplifier power	20-80W
Recommended placement	stands in free space
In room averaged response limits 50Hz-10kHz	+/-5dB
Large room/space LF rolloff (-6dB ref midband)	48Hz
Large room/wall LF rolloff (-6dB ref midband)	48Hz
Large room output at 20Hz (-6dB ref midband)	below -20dB
Estimated midrange sensitivity (ref 2.83V, 1m)	84dB
Impedance characteristic (ease of drive)	very good
Typical price per pair (inc VAT)	£349

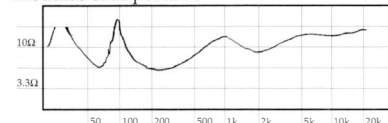
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)

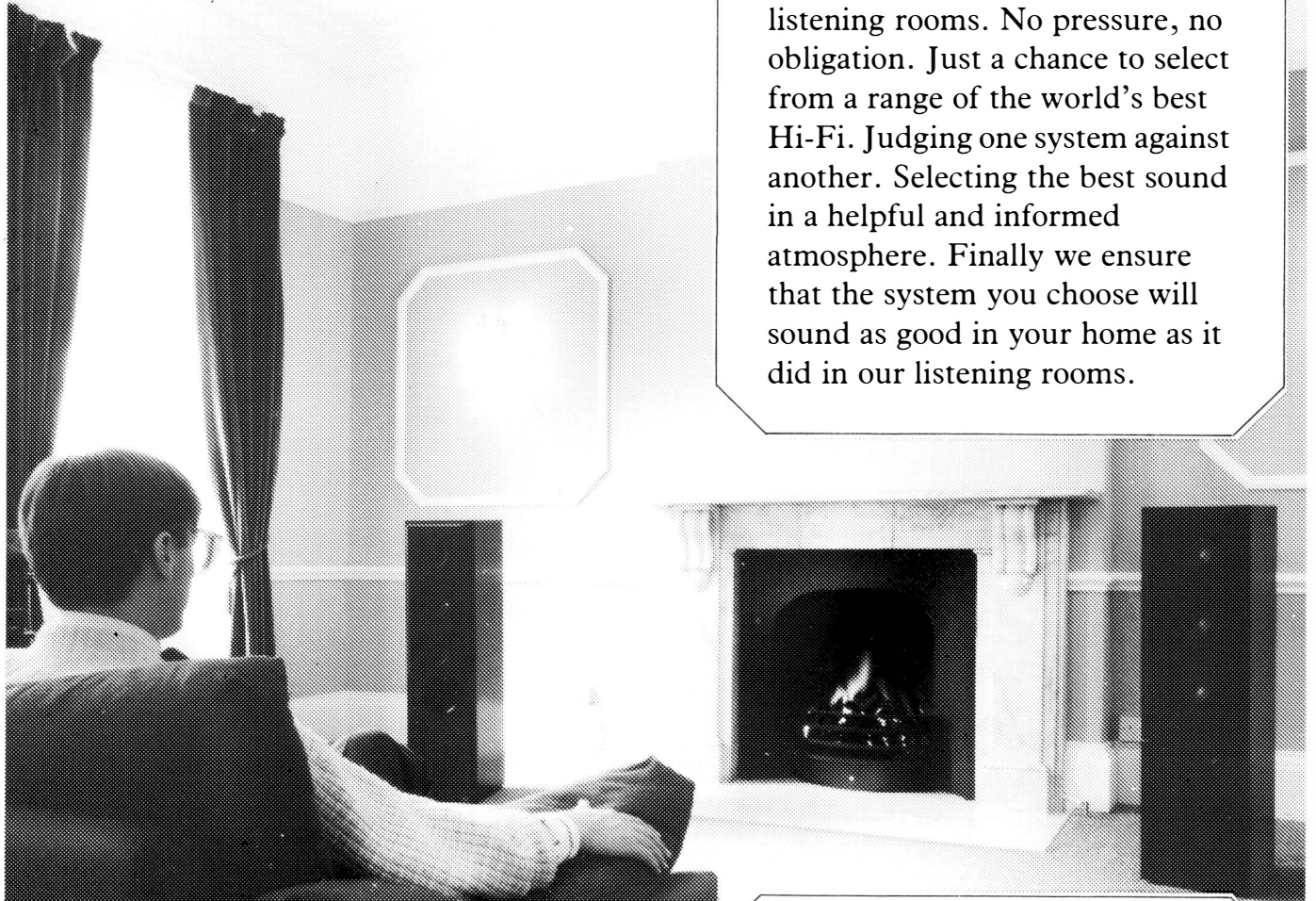


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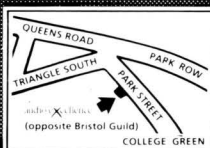
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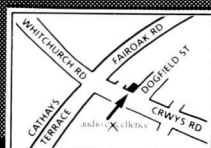
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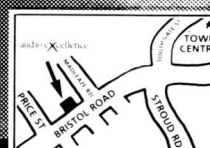
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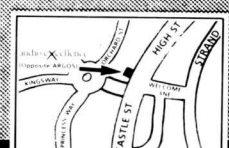
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I was full of anticipation when I heard Castle was shipping me a pair of *Storm Grey Trents*. Surely they meant a brace, of some lightly smoked North Yorkshire delicacy. My epicurean fantasies were predictably shattered by the arrival of a pair of pretty little matt mid-grey loudspeakers.

The *Trent* is a longstanding budget Castle model, but the *SGT* is a new and decidedly trendy looking variation. It's a cute little two-way, reflex loaded by a little front panel port, and selling at a pretty competitive £129. It's also something of a departure for a company better known for conservative presentation and tasty real wood veneers.

Size is somewhere between a miniature and a small bookshelf model, which is pretty damn small, and the reinforcement supplied by close-to-wall siting is a pretty well essential ingredient in giving the bass end a helping hand.

Simplicity is the keynote, and there's not a great deal to say about such a straightforward design, save that it's all very neatly presented and nicely finished, and makes a very pleasant change indeed from the en masse indecency of umpteen black imitation textured woodgrain prints. A decent enough affair with chamfered MDF frame, the black grille threatens to restore some anonymity, but if you leave it off you'll notice the main driver is rebated, which is a nice touch at the price.

The front baffle is 15mm MDF, with 13mm MDF used for the wrap, the insides lined with a light foam. Both units are secured by tight if coarse-threaded woodscrews, the main driver using a pressed steel basket and fair size magnet to drive the little 100mm paper cone. The tweeter is a rather unusual annulus type device that Castle makes. A simple

PCB crossover is fed from a single terminal pair.

Test report

One must expect limited bass extension and/or sensitivity when dealing with the very small. With a decent magnet and light cone, Castle has opted for above average sensitivity with limited extension in this instance. The impedance load is benign, so you should get plenty of volume out of even a modest midi system amplifier.

Free space siting will provide the smoothest midband, but leaves the bass starting to fall off steadily below 120Hz (which is, after all, only an octave below middle C). Proximity to a wall does a lovely job of adding an extra octave of extension prior to roll-off, though the region around 2kHz suffers a little, and the 65Hz port resonance becomes a shade too obvious.

The response isn't particularly smooth, nor dramatically flat, but it is extremely well balanced. Apart from the aforementioned presence dip, which is not too serious, it stays within impressively tight overall limits while falling some 7dB between 70Hz and 10kHz.

Sound quality

In a group test which generally didn't seem to favour miniature size models, the *SGT* turned in a pretty respectable performance, within admittedly rather limited capabilities. Inevitably there's no serious scale and weight, and the sound is a bit small, but the bass line remains clear and intelligible and the good balance and bass-to-mid coherence was well appreciated. Stereo soundstaging is good by wall-mount standards.

The treble is quite lively, if a bit jangly

and coarse with it, while a couple of listeners complained of some mid bass box 'honk'. However, the most serious limitation is that the *SGT* tends to clog up and lose its poise when the going gets tough and complex, somehow compressing the dynamics, muddling the timing and becoming rather aggressive.

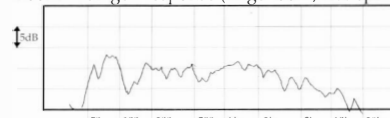
Conclusion

Besides being very cute to look at, the *Storm Grey Trent* is a rather nice sounding loudspeaker, provided the demands made on it are not too great. Well balanced, lively, coherent and more sensitive than most of its ilk, in this case the latter doesn't translate into greater loudness capability. It's not too comfortable when driven hard with complex material, but instead should make good use of lower powered amplifiers. Although it doesn't set any new standards for the type, it is nevertheless good value for money and deserves Recommendation.

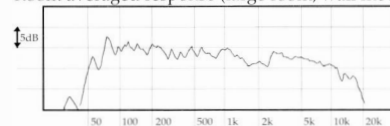
TEST RESULTS

Size (h x w x d)	33.5 x 18 x 20cm
Recommended amplifier power	15-60W
Recommended placement	stands close to wall
In room averaged response limits 50Hz-10kHz	+/-4dB
Large room/space LF rolloff (-6dB ref midband)	50Hz
Large room/wall LF rolloff (-6dB ref midband)	50Hz
Large room output at 20Hz (ref midband)	below -20dB
Estimated midrange sensitivity (ref 2.83V, 1m)	88dB
Impedance characteristic (ease of drive)	good
Typical price per pair (inc VAT)	£129

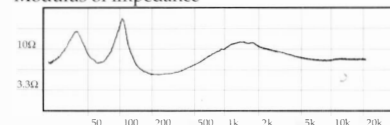
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)

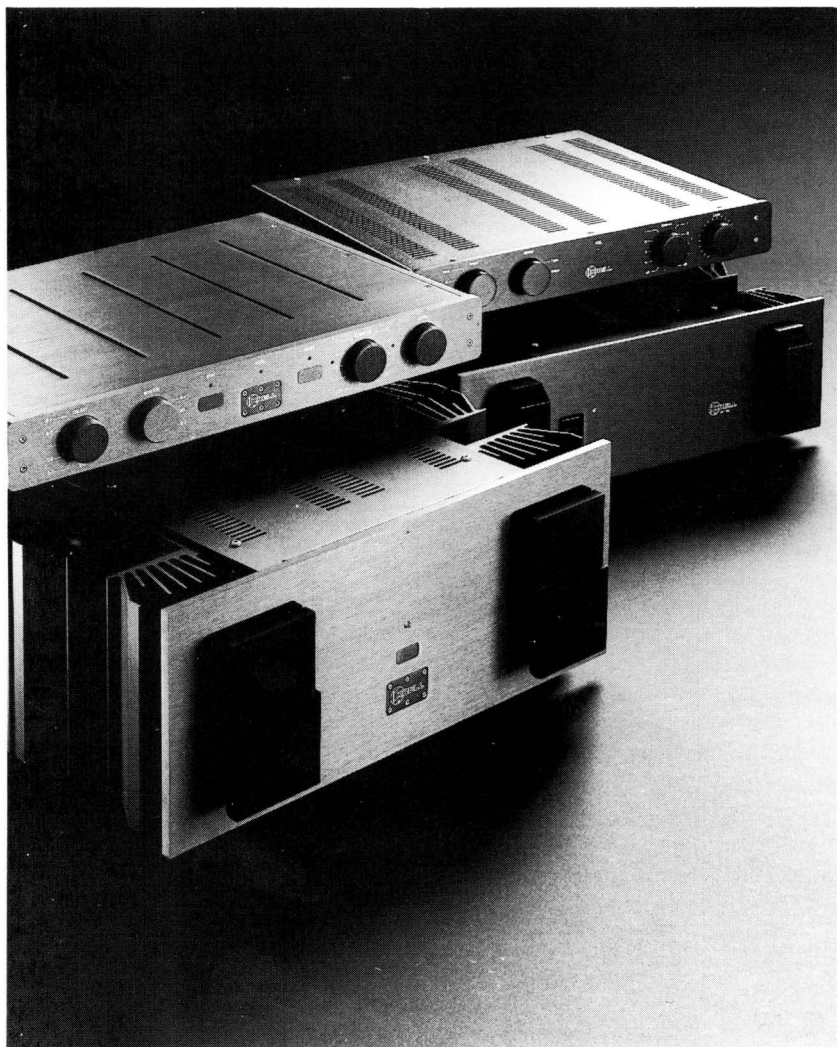


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Celestion 9

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Celestion's new 9 (and sister model the slightly larger 11) represent a logical extension of the company's 'budget bookshelf' range of loudspeakers, building on the success enjoyed by the established 3, 5 and 7. Logically enough, the price is £249, some £50 above that asked for the 7, but thereafter logic and tradition breaks down, and Celestion adopts a much more radical posture.

Instead of simply making the cabinets and drivers just that little bit larger and/or better, the 9 flies in the face of orthodoxy by adopting a three-way driver configuration, mounted in a cabinet significantly smaller than that used for the 7, albeit slimmer, taller and rather more elegantly — and stiffly — shaped.

The arguments for and against three rather than two-way speakers are many, but boiled down to their essentials usually give the three-way the advantage in areas like power handling and sensitivity, whereas the simplicity of the two-way is its own reward in the integration of the whole.

It's all very professionally presented, albeit within a vinyl woodgrain context, with a particularly neat open frame grille for those who like to keep their drivers under wraps. But if you've got three, the temptation to flaunt them will be very great, I daresay, so the baffle is well finished and the rude mechanicals integrated within moulded driver frames and trimwork. The generous rear mounted port is also an elaborate moulding, and integrated within the (non bi-wirable) terminal block.

The baffle is 15mm chipboard and the wrap 12mm chip, lightly filled but relying on the shape alone for stiffness. All drivers were tightly secured, albeit using coarse-pitch woodscrews, but the drivers

themselves are perhaps a little surprising, over and beyond the plastic frames. The bass unit has a quite small 125mm paper cone (20mm smaller than the 9), whereas the midrange driver — used rather as a filler, over the two octaves 1-4kHz — has a surprisingly large 98mm paper cone. The tweeter is a 25mm metal dome. The crossover is quite simple for a three-way.

Test report

The extra driver helps lift sensitivity to 89dB, a shade above average and 2dB better than the 7. Bass extension is nothing particularly special, though the impedance is mild and easy to drive.

The balance is pretty good overall, provided the speaker is kept well clear of nearby walls (and of course the floor). The relative bass level appears to be nicely judged and the broad midband decade, 200Hz-2kHz, is very flat, albeit not particularly smooth. There's a significant step loss of energy of 4dB at around 3kHz, followed by partial recovery around 6-8kHz.

Comparison with the responses taken for the 7 show the 9 provides significantly more relative output through most of the bass region, though the mid-to-treble transition is a little less well handled.

Sound quality

The results of the listening tests were rather disappointing. The 9 had one supporter, who enjoyed the good clarity, dynamics and separation, but the other panellists were distinctly less impressed, complaining with some consensus that the sound was boring, bland, slow and distinctly box-bound.

My hands-on listening left me on the side of the majority rather than the 9, finding the latter all a bit time-smear-

and middy, and lacking in convincing full bandwidth coherence. Dynamics are quite punchy and bass control is pretty good, but information on complex textures is a bit sparse and the sound tends to get a bit shouty if worked too hard. Though the broad mid integration is a positive virtue, the presence is a bit shut in and sibilants are controlled but clearly detached.

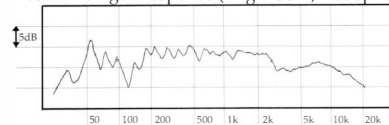
Conclusion

The decision to go with a very compact three-way configuration has brought good sensitivity and an impressively flat bass-to-mid balance. However, the bugbear of multi-driver systems is coherence and integration, and in this respect the 9 seems somehow rather less convincing than the 7. Although this is an attractively compact and very nicely presented model, and pretty fair material value for money, the total experience doesn't really make a convincing case for a return to three-way driver systems in compact bookshelf models.

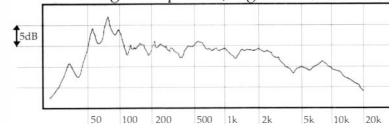
TEST RESULTS

Size (h x w x d)	49.5 x 20.5 x 24cm
Weight	8kg
Recommended amplifier power	15-100W
Recommended placement	stands clear of walls
In room averaged response limits 50Hz-10kHz	+/-7dB
Large room/space LF rolloff (-6dB ref midband)	30Hz
Large room/wall LF rolloff (-6dB ref midband)	30Hz
Large room output at 20Hz (ref midband)	-14dB
Estimated midrange sensitivity (ref 2.83V, 1m)	89dB
Impedance characteristic (ease of drive)	good
Typical price per pair (inc VAT)	£249

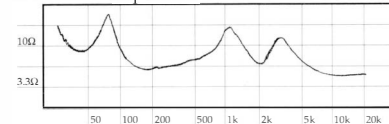
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



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Not more than three days later, true to form, he rang again - same problem and no, he hadn't thrashed them. I was getting annoyed - this was beyond a joke (not that it had ever been). Either the cross-over was the problem, or he was secretly trading in tweeters.

I went over to his house, deciding that this was the last time. He greeted me at the door, looking decidedly sheepish.

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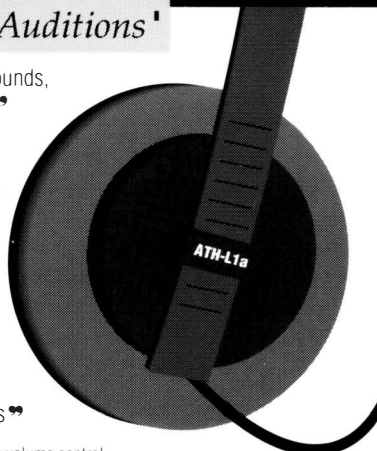
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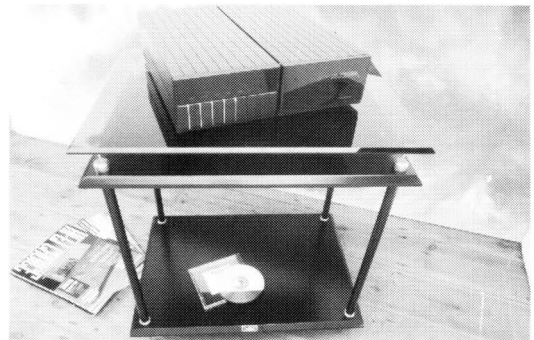
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Faraday FS5

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Faraday is a classic example of the small 'cottage industry' loudspeaker brands that provide so much of the lifeblood of creativity in British hi-fi, and do so much to widen the choice available to the enthusiast. It's very much a one man band operation, in this case single minded attacking the problems of loudspeaker cabinet coloration by opting for a concrete based enclosure in place of the usual reconstituted wood cabinetwork.

Choice evaluated Faraday's £330 *Siren* a few months back (issue 94), finding some promise in the ultra-heavy box, but distinct limitations in a driver combination that was clearly showing its age. The *FS5* that was submitted for this review project has many similarities to the *Siren*, but also some important differences.

On the plus side the drivers are now much more up to date devices, complete with bright yellow hi-tech composite diaphragms. Finish is better too, the baffle now a substantial slab of MDF, while a new moulding relieves the edges with a little extra postforming, but we're still basically in Flintstone country here, with uneven surfaces and matt black paint which is all too easily damaged.

The downside is that the price is now quoted as a whopping £589, which is largely explained by the decision to market through normal dealers rather than sell direct, but which also puts the *FS5* up against a whole different level of competition.

It's a 'large bookshelf' size model, a little bluff and foursquare in appearance and with no form of grille supplied to cover the yellow drivers, or the port set into the front panel. The drivers are properly bolted home and rebated into the

baffle, so tightly in fact that internal inspection was not possible, the all-up weight of just under 20kg indicating something similar to the *Siren's* 20mm wall thickness (taking the MDF baffle into account). Light damping has apparently been applied selectively.

Both drivers use plastic-bonded fibrous diaphragms, the cast frame main unit using a 125mm cone, the tweeter an inverted (concave) 26mm dome. A single pair of gold-plated terminals fit through the rear panels.

Test report

Sensitivity is a generous 90dB, though some 3dB of that is a function of the low and current hungry impedance characteristic through bass and midrange. There's still a touch of upper bass heaviness, but provided the enclosure is kept well clear of walls, the overall balance is unusually flat all the way up to 1.5kHz, showing none of the problems that afflicted the *Siren*, and delivering much better in-room bass extension too.

Above 1.5kHz the influence of the crossover is seen in some dulling and loss of output, especially around 3.5kHz, leaving the broad treble plateau a shade isolated, though appropriate in level.

Sound quality

The listening panel did not respond too kindly to the sound of the *FS5*, correctly and consistently identifying several weaknesses, but perhaps overlooking some of the strengths, partly through unfamiliarity.

I had a similarly rather negative reaction when beginning extended sighted listening. The dulled presence and well filled upper bass creates some boxiness that requires a little familiarisation, and the exposed treble is also both audible and a little distracting. But the sound also has a pleasing solidity, good dynamic range and fair coherence.

And the more I listened, the more I found to enjoy. The bass character is certainly different from wooden boxes. The lower bass does sound a bit loose, ponderous and thumpy, but manages a measure of power and authority nonetheless, while the separation, detail and lack of congestion through the upper bass and lower mid is much better than wood can usually manage.

The overall balance is a bit laid back and lazy for my personal preference, but there's plenty of detail and you can hear what's going on pretty well.

It's not the fastest sound around, but is fundamentally both relaxing and

informative, which is more than half the battle.

Conclusion

There's absolutely no question that the *FS5* represents a considerable improvement over the *Siren*. It's much better balanced sonically, giving the concrete enclosure a real chance to strut its stuff, and the presentation is a little better too (if still a bit gruesome). But the move towards conventional distribution has pushed the price up dramatically too, which in turn substantially raises the standard that is required for formal recommendation.

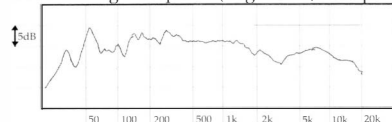
Which leaves the *FS5* very much a borderline case. The panel found the bass quality somewhat distracting, but I suspect that this was partly a reaction against its differentness, and overlooked strengths which become more apparent over an extended period.

My feeling is that it's well worth a listen, if you like a relaxing sound and can handle the aesthetics.

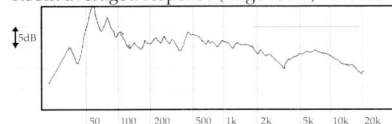
TEST RESULTS

Size (h x w x d)	46x27x26cm
Weight	19.5kg
Recommended amplifier power	10-120W
Recommended placement	stands in free space
In room averaged response limits 50Hz-10kHz	+/-5dB
Large room/space LF rolloff (-6dB ref midband)	28Hz
Large room/wall LF rolloff (-6dB ref midband)	28Hz
Large room output at 20Hz (ref midband)	-11dB
Estimated midrange sensitivity (ref 2.83V, 1m)	90dB
Impedance characteristic (ease of drive)	current hungry
Typical price per pair (inc VAT)	£589

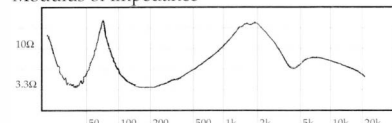
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



Modulus of impedance



Heco Reflex 10

HECO UK, FOURBURY HOUSE, 36 VICTORIA ROAD, MORTIMER, NR READING RG7 3SE. TEL: (0734) 333 636



The West German brand Heco was originally founded way back in 1948, though the current generation of hi-fi speakers more properly belong to the era since 1986 when the company reverted to German management control. Four distinct ranges of loudspeakers (at the last count) should keep me in Hecos to test for a few more years yet, while the experience of several of the models so far has shown an impressive control over in-room balance, albeit with a touch of blandness about the sound quality.

This little *Reflex 10* is one of four models that comprise a new *Interior Reflex* line. It's the bottom rung of the ladder, priced at £160 and comprising two drivers in a 'small bookshelf' size box, ported at the front in order to distinguish it from the quite similarly priced sealed-box *Interior 80* and *90* models. The latter was reviewed back in issue 74, and should provide an interesting point of reference, though unfortunately the test data is not strictly comparable because of subsequent changes in the measurement methodology.

Constructionally the 15mm wrap comprises baffle, back, top and bottom, all finished in a black textured laminate, while the 15mm sides provide the obligatory black woodgrain vinyl and are extended out either side of the baffle. The grille fits neatly into this gap, but both the thick grille frame and sides are acoustically quite obstructive, especially since the drivers are rebated flush with the baffle. Everything is very well finished, but the sticky-out sides look a little silly with the grille removed, and my engineering notes describe the badge as ghastly.

The main driver has a 110mm cone, pressed steel basket and small magnet, while the tweeter uses Heco's aluminium/

manganese, phase compensated 19mm dome. Both were held in by rather less than tight woodscrews. A fairly complex PCB crossover is tag-connected to the drivers and fed from a single terminal pair. The interior walls of the box are lined and the space lightly filled.

Test report

Sensitivity is a high 90dB, 3dB of which is due to the Continental style current hungry impedance, but certainly a worthwhile improvement on the *90*. The port is tuned to a quite low 45Hz, and this helps give quite impressive low frequency extension considering the small overall dimensions.

Woefully mid forward when well away from room boundaries, close-wall siting helps to balance things up rather well, to the point where there's even some risk of mid bass boom. Elsewhere the response holds within quite close limits, though it's certainly lean in the lower midrange and rather prominent and uneven between 400Hz and 500kHz, which makes a considerable contrast to the rather thick and rather dulled balance of the *90*.

Sound quality

The *R10* did pretty well in the listening tests, albeit with one dissenter. The small size told against it as far as weight, scale and authority is concerned, but the panel liked the open balance, the relatively out-of-box soundstage and the lively, if somewhat projected midband.

That said, the treble is a little obtrusive and a touch coarse, tending to emphasise vinyl disc surface noise, and the bass isn't particularly quick or clear, tending to muddle rhythmic detail somewhat. Despite the good balance, the whole isn't particularly coherent across the band, so

that transients are a bit time-smeared and information somewhat obscured.

Though I was one of its supporters in the blind presentation, the hands-on experience was altogether less appealing. I found the sound rather small, slow and boring, rather topky and spitty with it, and with some boxy midrange coloration.

Conclusion

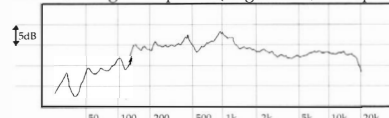
Notwithstanding the respectable measured performance and blind listening test results, it's difficult to see that this model offers particularly good value for money.

The presentation and finish is very good, and the ingredients are comfortably par for the course, but the build is unexceptional and the baffle edge treatment unhelpful, and there are plenty of others that can more than match the package for the price.

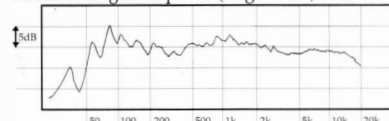
TEST RESULTS

Size (h x w x d)	32x21x23cm
Weight	5kg
Recommended amplifier power	15-70W
Recommended placement	stands up to 1ft from wall
In room averaged response limits 50Hz-10kHz	+/-5dB
Large room/space LF rolloff (-6dB ref midband)	50Hz
Large room/wall LF rolloff (-6dB ref midband)	30Hz
Large room output at 20Hz (ref midband)	-14dB
Estimated midrange sensitivity (ref 2.83V, 1m)	90dB
Impedance characteristic (ease of drive)	current hungry
Typical price per pair (inc VAT)	£160

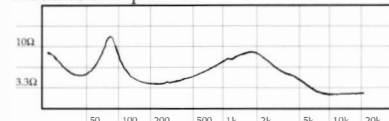
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



Modulus of impedance





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Best known for a number of fine quality budget to mid-price bookshelf speakers, the £950 *Sextet* represents Heybrook's first model to tempt the more upmarket customer since the *HB3* faded from the scene a few years back. It's a three-way wall-mount like the '3, but the latter's dumpy styling is here replaced by an elegantly tall, slim and very shallow enclosure.

Though floorstanding, this is not a large loudspeaker, and will actually take up no more room space than one of Heybrook's normal bookshelf size models. The speaker alone costs £899, and has provision for adding floor spikes for use in that form, though in practice the limited fore-and-aft footprint represents a significant mechanical compromise. For an extra £49 a little metal frame lifts the whole thing an extra inch off the deck and extends the footprint to a worthwhile degree (though it remains a bit marginal for the height and weight distribution in my opinion).

The bass section of the *Sextet* is reflex-loaded by two small ports located in the base of the speaker. The precise tuning of this system will vary slightly according to the exact height of the enclosure, and in fact it's also very easy to block them entirely with a wedge of foam — which I found an interesting option, even though Heybrook probably doesn't approve.

Analysis of the ingredients and engineering quickly shows that the *Sextet* is much more than just a pretty wood veneered exterior. The all up weight of nearly 20kg shows that there's been no skimping, the front baffle comprises a massively thick (c40mm) laminate of chipboard and MDF, to which the drivers were all tightly mounted, with bolts and T-nuts for the bass driver and good quality woodscrews elsewhere. Further enclosure stiffening is provided by a figure-8 brace below the bass driver and a full partition above giving the midrange-only driver its own generous enclosure to absorb rear radiation in place of the plastic beaker affairs usually encountered in three-way systems. A complex mix of damping materials has been carefully and strategically placed, while the 18mm cabinet walls are further damped by heavy bituminous pads.

The bass and mid drivers have generous magnets and cast frames, the former fitted with a 120mm doped paper cone and the latter a 90mm plastic cone. The treble is handled by a ribbon-shaped planar device, 5cm long and 1cm wide. Hardwired solid-core cabling connects to the bi-wire crossover, and production samples will be fitted with a simple two-way switch that includes or bypasses a resistor which adjusts treble output.

Test report

The review samples were initially supplied with the resistor in circuit, but the modification undertaken in response to my observation that there wasn't enough treble added a worthwhile couple of dB (though I daresay some rooms and systems might favour the lower setting). The end result is a balance that is generally impressively smooth, especially through the crossover and into the treble, albeit dominated by a prominence of up to 4dB across the broad upper midband, 600Hz-2.5kHz, and also showing a rather resonant mid/bass, around 50Hz.

Blocking the ports in fact reduced this lower peak by a couple of dB, and also improved in-room LF output at 20Hz by several dB. Overall sensitivity is a little below average, though the forward bal-

ance tends to compensate subjectively. The impedance characteristic should be nice and kind to amplifiers.

Sound quality

Serious censure on one day (tweeters set low) was replaced by fulsome praise and enthusiasm with tweeters high on the morrow, leaving your adjudicator to sort out the contradictions.

There's no question that that this is a very impressive and revealing transducer, showing fine coherence, speed and dynamic life. But there's no avoiding the fact that the mid forwardness is quite audible departure from neutrality.

This can add to the presence and excitement of the music, but it does add a measure of shouty, cuppy and quacky coloration, and can be uncomfortable when fed from sources of inadequate quality. In the right system it can sound glorious, aided by the sweet treble and analytical midband, but it's also so revealing as to make system matching critical.

Conclusion

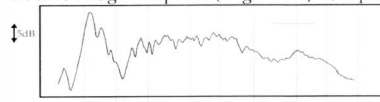
Far from perfect, the *Sextet* is nevertheless a lot of fun, and very rewarding when used at the end of a carefully matched system. One might have expected slightly greater sensitivity and/or LF extension for the size and price, and the forward balance will not be to every taste, but the fine finish and build and impressively analytical sound are ample grounds for Recommendation.



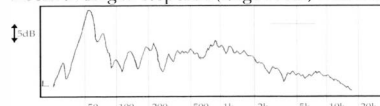
TEST RESULTS

Size (hwxwd)	96x27x20cm
Weight	19kg
Recommended amplifier power	20-120W
Recommended placement	close to wall
In room averaged response limits 50Hz-10kHz	+/-7dB
Large room/space LF rolloff (-6dB ref midband)	25dB
Large room output at 20Hz (ref midband)	-13dB
Estimated midrange sensitivity (ref 2.83V, 1m)	85dB
Impedance characteristic (ease of drive)	very good
Typical price per pair (inc VAT)	£899 (frame £49 extra)

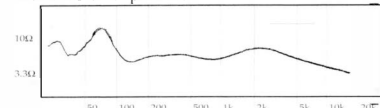
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)

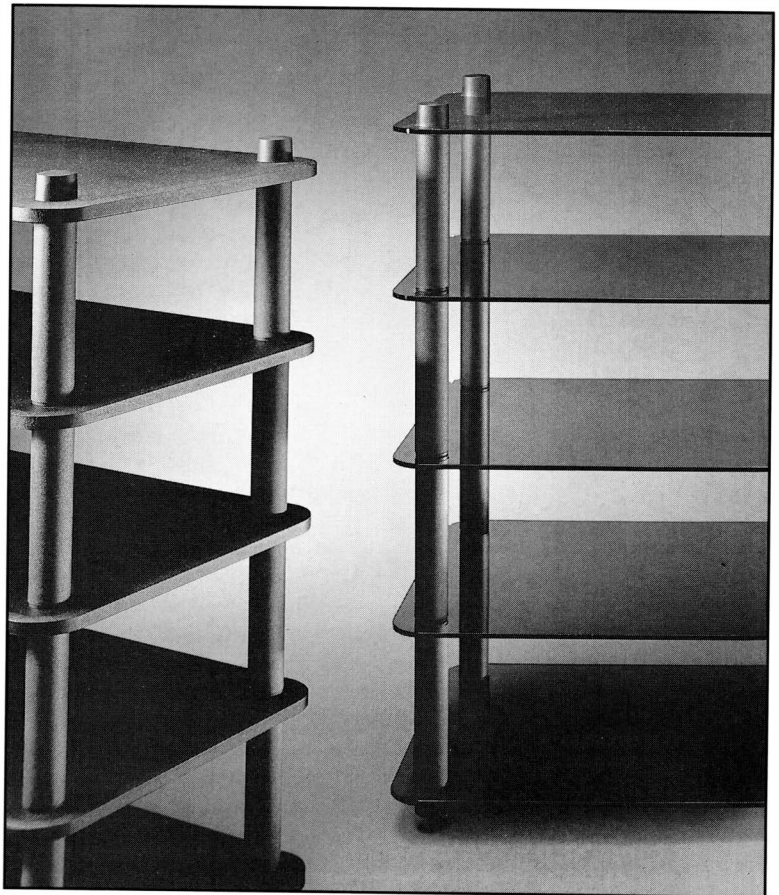


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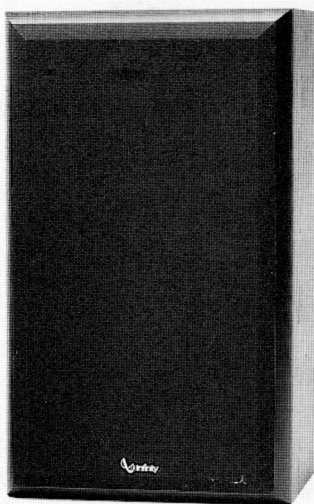
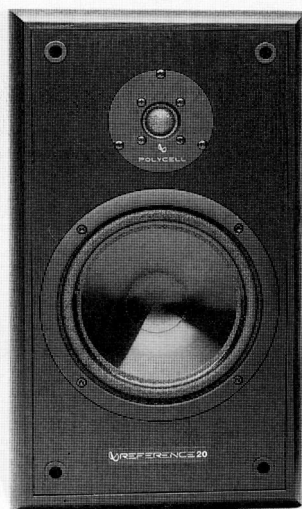
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US manufacturer Infinity conceived its newish *Reference* series of models with more than half an eye on the European market. The reviews in issue 98 covered the small bookshelf size *10* and the three-way floorstanding *50*, the former comfortably meriting Recommendation while the latter proved a singular disappointment. Since the £220 'large bookshelf' *20* has much more in common with the smaller model, it would seem to be in with a good chance.

There's plenty of evidence of substantial investment in both tooling and technology. The main driver is one of the first to use injection moulding for the plastic cone, a technique (also recently introduced by Mordaunt-Short and Tannoy) that allows the thickness to be adjusted and varied to optimise mass and stiffness. The tweeter, meanwhile, uses Infinity's proprietary cellular foam dome, though calling it Polycell isn't going to do much for its hi-tech image here in Britain.

Rather bluff and undersquare in appearance, the box size and weight seems generous enough for the price, and both presentation and finish are very good, within the inevitable constraints of a vinyl woodgrain skin, thanks in part to the neat post-forming around the baffle edge, and some rebating of the drivers. Despite the use of a plastic moulding, the grille frame isn't too well shaped from an acoustic perspective, and is probably best ignored.

If the ingredients look pretty promising, the build is rather less so. The drivers are secured with small coarse hex-driven wood screws, which don't grip well into the rather modest 16mm baffle, stripping their threads all too easily. The chipboard wrap is a little thicker, and a couple of bits of battening stiffen the edges, but me-

chanical integrity is certainly nothing very special.

The main driver cone is 155mm in diameter, fitted into a pressed steel surround and driven from a rather small magnet, while the 27mm tweeter dome is slightly wider than most, which helps explain the early roll-off (see later). These are tag connected to a simple PCB crossover fed from a single terminal pair. The box is sealed, and well stuffed with wadding.

Test report

Clearly too bass heavy and uneven elsewhere when sited close to a wall, the *Ref 20* looks altogether more — indeed distinctly — promising when well clear of reflective surfaces, though a small amount of boundary reinforcement will probably and usefully swell the mid bass a little, providing care is taken not to overexcite the 70Hz system resonance.

The averaged sensitivity is about average at 88dB, and the sealed-box loading ensures pretty good extension (-12dB at 20Hz in-room), though a pretty heavy price is paid in a relatively current-sapping 4ohm impedance characteristic. The response is impressively flat overall, and holds within surprisingly tight limits, 50Hz-13kHz, for such a large box and main driver. Note, however, that the trace peaks up a little at around 1kHz, and then goes through a rather lumpy crossover region, while the eventual final treble roll-off starts rather early.

Sound quality

Helped by the unusually good balance, the *Ref 20* certainly passed muster in the listening tests, though it has to be said that the panel didn't show any wild enthusiasm, and one was positively bitchy!

There's some sense of weight and scale here, though this isn't helped much by the slight mid forwardness and a rather thick-textured bottom end which lacks both pace and clarity.

Stereo images show some space and depth, but there's a touch of latent aggression, aided and abetted by a mildly detached treble and the somewhat coloured and uneven presence band, which shows signs of clogging and hardening when things get loud and/or busy.

Conclusion

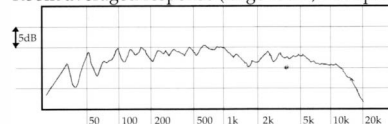
The *Reference 20* is a bit of a mixed bag. It looks attractive and is pretty good material value for money, while the measurements show a very well engineered frequency balance without the lack of bass control that is all too prevalent amongst models of this size.

However, the build quality is a little disappointing, and the sound doesn't entirely hang together in a genuinely convincing way, despite the even balance. It offers rather more weight and scale than the *Ref 10*, and greater overall smoothness too, but somehow doesn't quite sound as nimble or agile.

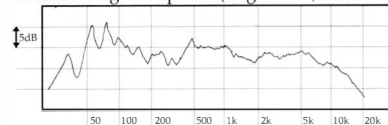
TEST RESULTS

Size (hxwx d)	46x27x24cm
Weight	8.5kg
Recommended amplifier power	15-100W
Recommended placement	stands 1-2ft from wall
In room averaged response limits 50Hz-10kHz	+/-3dB
Large room/space LF rolloff (-6dB ref midband)	29Hz
Large room/wall LF rolloff (-6dB ref midband)	27Hz
Large room output at 20Hz (ref midband)	-11dB
Estimated midrange sensitivity (ref 2.83V, 1m)	88dB
Impedance characteristic (ease of drive)	current hungry
Typical price per pair (inc VAT)	£220

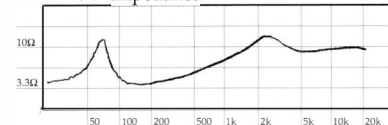
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



Modulus of impedance



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Jamo Concert V

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Danish manufacturer Jamo has a large number of different loudspeaker ranges, each targeted at its own particular market niche. The *Concert* series is aimed at the upmarket hi-fi sector, the various models featuring luxurious real wood finishes and high engineering and build quality, alongside some unusual techniques in driver disposition on the larger examples.

Such is true of the £500 *Concert V*, a substantial though quite compact and slim floor-standing model which features an extra main driver on the rear of the enclosure, presumably in order to supplement the necessarily limited bass output of a small main driver.

It all seems to make good sense in theory. Small main drivers have the advantage of working better at the top end of their range, especially in terms of maintaining good dispersion. Tucking the extra bass driver around the back helps 'lose' any unwanted midrange

information and balance mechanical forces, albeit at some cost in terms of phase discontinuities. However, turning theory into practice is not always that straightforward, as we shall see.

It's certainly very nicely finished, in the reddish mahogany veneer that is currently so popular in continental Europe, and the grille is neatly designed for minimal obstruction, using a thin metal frame with driver cutouts that is held by magnets concealed within the baffle.

Both main drivers have 115mm plastic cones and wide soft surrounds, mounted in pressed steel frames, while the tweeter uses a 25mm metal dome, protected by a mesh cover. The drivers are held by bolts, but these are driven via a tiny hex socket that provides little purchase for tightening — or indeed assessing the tightness. Heavy gauge wire connects the drivers to the classy bi-wire terminals.

The whole thing weighs a substantial 18kg and sits on four rubber feet, with the option of inserting spike cones for use on wooden floors. The fore-and-aft footprint is just about adequate for the height and weight of the enclosure, though I remain nervous about the possible subjective implications of the rubber decoupling.

One reason for the hefty weight lies in Jamo's proprietary baffle, which is a massive 30mm thick and apparently made from a composite of sand and lossy binder. The sides are also more than 20mm thick, and a couple of rods provide some extra bracing between front and back panels. Foam lines the internal walls, with a particularly thick and dense wedge carefully placed between the two main drivers.

Test report

Although rather higher through the bass, the main midrange sensitivity is only 85dB, which is low for a speaker of this type, though the exceptionally good bass extension is some recompense.

Even kept well clear of walls, however, the response looks a little odd, and is certainly quite different from the norm. The overall limits are respectable enough, and the broad midband decade, 150Hz-1.5kHz, is impressively smooth and flat, but there's more than a touch of the 'loudness' contour about the way the bass and treble rise up by several dB at each end of the spectrum. The crossover shows a mild though distinct discontinuity.

Sound quality

Perhaps confused by the rather 'different' balance, the panel was polarised into likes

and like notes. One of the latter described it as 'a German corporate engineered loudspeaker', which won't please the Danes a lot, but which may not be that far from the mark.

Certainly the sound is dominated by the balance, which some found pleasantly relaxed, with nice air and space and ambience recovery, while others criticised it as altogether too heavy and laid back, with more than a touch of boom'n'tizz.

My subsequent sighted listening tends towards the latter view. The bass and treble lift does create a good impression of scale especially when listening at low levels, and adds a welcome punchy quality without unwanted chestiness. But it's fundamentally slow and somehow detached, as is the treble, so that there's little overall coherence to hold things together when turning up the wick, despite the relatively well ordered midband.

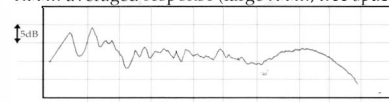
Conclusion

Delivering unusually extended bass at the expense of lowish sensitivity, the *Concert V* sounds rather different from the norm by virtue of a balance which lifts up somewhat at the frequency extremes, a factor that those habitually listening at modest levels might well find appealing. The midband is even and relatively uncoloured, though overall coherence is rather suspect.

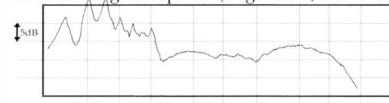
TEST RESULTS

Size (h x w x d)	86 x 24 x 28 cm
Weight	18 kg
Recommended amplifier power	20-150 W
Recommended placement	well clear of walls
In room averaged response limits 50Hz-10kHz	+/-6dB
Large room/space LF rolloff (-6dB ref midband)	below 20Hz
Large room/wall LF rolloff (-6dB ref midband)	below 20Hz
Large room output at 20Hz (ref midband)	-4dB
Estimated midrange sensitivity (ref 2.83V, 1m)	85dB
Impedance characteristic (ease of drive)	fair
Typical price per pair (inc VAT)	£500

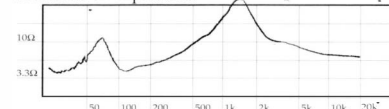
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



Modulus of impedance



JBL LX55

HARMAN (AUDIO) UK LTD, MILL STREET, SLOUGH,
BERKSHIRE SL2 5DD. TEL: (0753) 76911



I don't know when the LX55 first appeared on the scene, but the shape and size suggests it might have been around the same era that Noah was experimenting with boat building and gopher wood. Certainly this bluff, squat and decidedly large model has all the appearances of a throwback, or maybe even an exercise in nostalgia.

Not that there's anything wrong in nostalgia, as increasing numbers of valve amplifier users have found, and there's no denying you get a lot of loudspeaker for your £350.

It's a classic example of what the Americans still regard as a bookshelf speaker, inasmuch as the shape is quite squat and bluff, and clearly isn't intended to be plonked straight onto the floor, though I wouldn't fancy putting my rawl plugging skills to the test with its 15kg weight and 30cm depth. And in any case the 55 is intended for free space siting, three feet from walls and on an 18inch stand, as the instruction manual - and our room measurements — make abundantly clear.

This big heavy box houses an equally classic three-way driver configuration, with a generous port fitted to the rear. Chuck in JBL's powerful reputation and you're looking at plenty of perceived value here, though closer scrutiny does reveal that this is an econobox at heart. Such a large expanse of black vinyl woodprint will never look pretty, but the styling department has given it the silk purse treatment with vertical edge postforming and a thin black foam blanket over the

baffle, and a neat and tidy surface-mount driver installation.

However, there are some grounds for complaint. The grille frame is horridly thick for starters. And although the mid and treble drivers are offset from the front panel centering in order to reduce and spread edge diffraction effects, no attempt has been made to mirror image the offset between the pair, a factor which will compromise stereo imaging (as indeed will the wide baffle).

The bass unit has a decent size magnet and 200mm ribbed paper cone, but this is fitted with tiny and rather slack woodscrews into a rather modest 19mm chipboard baffle.

Similarly unimpressive fixing applies to the other two drivers, a 90mm paper cone midrange and 30mm titanium crenellated dome tweeter. The rest of the box is 19mm chipboard too, damped by a light fibrous lining and stiffened by a single crossbrace. A single terminal pair feeds the complex PCB crossover, tag connected to the drivers.

Test report

Kept well clear of walls and floor, this speaker delivers a remarkably well balanced room response, especially considering its bulk and high sensitivity. 91dB combined with -4dB at 20Hz in-room is itself very impressive, and all the more so since this is an easy-to-drive 8ohm load.

Give or take the inevitable room effects and other minor irregularities, the response is especially well balanced through the bass and midrange, all the way up to 600Hz. Above that point there's a gentle downward trend, interrupted by a minor notch at the HF crossover point.

Sound quality

Notwithstanding the impressive measured performance, the listening panel was rather unimpressed by the LX55. The bass extension would have been appreciated had it shown anything like sufficient control, but the thick, heavy and slow low frequency performance was criticised with great consistency, terms like 'plodding' and 'boxy' appearing in the notes.

The good scale and impressively even balance remain strong points, but good amplitude consistency is only one aspect of loudspeaker performance. The LX55 sounds distinctly smeared in the time domain, and is consequently short of genuine solidity, transparency and coherence, and a general lack of subtlety in both resolution and imaging was noted on more complex material like a massed choir.

If the quality is rather suspect, this JBL certainly delivers ample quantity, as I discovered during the hands-on listening. It may be a bit of a boom box, but it's nice to hear this sort of scale, headroom and authority all the same.

Although it probably contributes to the chesty and boxy effects, the mid/bass energy is very impressive, well suited to realistic level rock reproduction. The large area baffle favours a listening distance of at least two and preferably three or more metres.

Conclusion

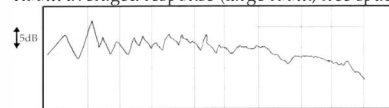
Nostalgia notwithstanding, a dinosaur is a dinosaur, and the LX55 isn't sufficiently fleet of foot to keep up with today's competition. In hi-fi terms it's an object lesson in the perils of putting lots of drivers in a big box and economising on the build quality, but few can match its capability and cost effectiveness in creating disco type levels even in large rooms and without spending a fortune on the amplification.

This is one for the headbangers.

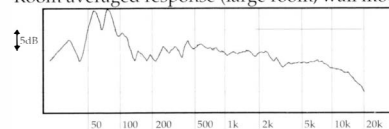
TEST RESULTS

Size (h x w x d)	66x34.5x29cm
Weight	15kg
Recommended amplifier power	10-200W
Recommended placement	stands well clear of walls
In room averaged response limits 50Hz-10kHz	+/-6dB
Large room/space LF rolloff (-6dB ref midband)	below 20Hz
Large room/wall LF rolloff (-6dB ref midband)	below 20Hz
Large room output at 20Hz (ref midband)	-4dB
Estimated midrange sensitivity (ref 2.83V, 1m)	91dB
Impedance characteristic (ease of drive)	very good
Typical price per pair (inc VAT)	£350

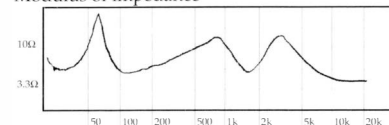
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



Modulus of impedance



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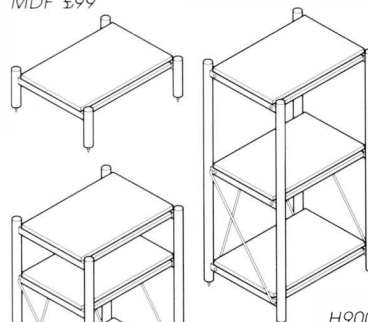
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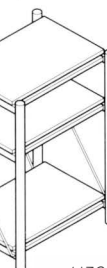
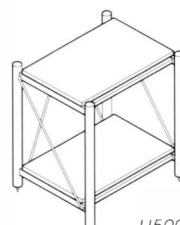
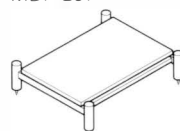
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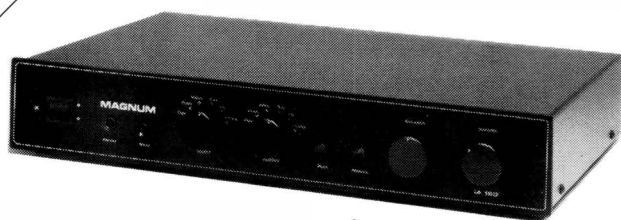
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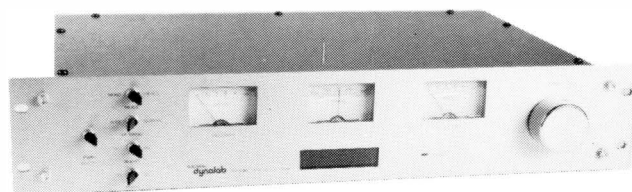
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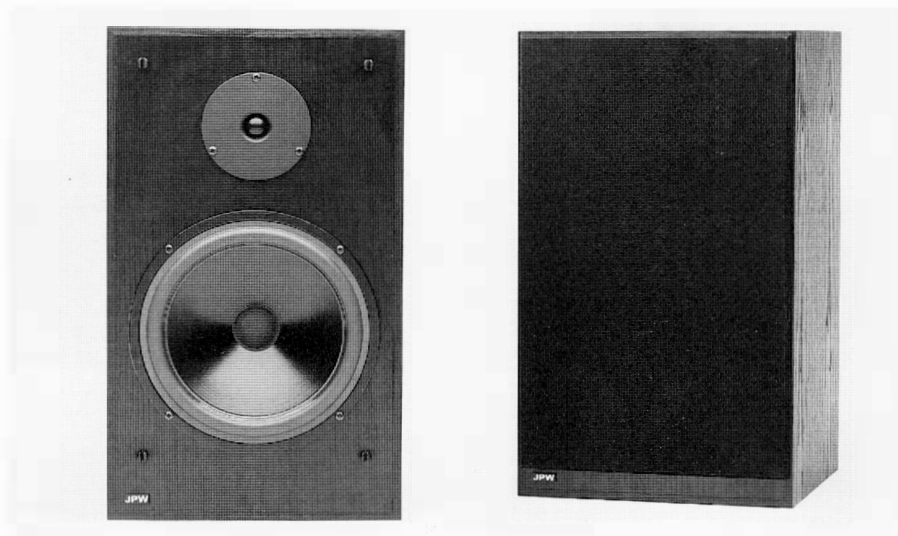
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JPW P1 Vinyl

JPW LOUDSPEAKERS LTD, UNIT 1, RICHMOND WALK, PLYMOUTH, DEVON PL1 4LL. TEL: (0752) 607 000



West Country manufacturer JPW doesn't introduce new models very often, and the one under scrutiny here is little more than a minor variation on the familiar *P1* theme, specifically with vinyl woodgrain in place of real wood veneer, at a modest £10 saving on the price.

The reason behind the *P1V* is simply that JPW has been too successful, picking up a Queen's Award for Export during 1991 and getting close to exhausting the production capacity of its real-wood box builder.

The result of all this is that the vinyl wrapped variant is significantly less attractive visually — indeed, I can't readily recall a less interesting looking loudspeaker — but the *P1* has always been very competitively priced, even in veneer finish, so there's every prospect the *P1V* will prove even more so.

Certainly you get a proper bookshelf size speaker for little more than price of many of the better miniatures. Even for a boring looking econobox, 7kg of total weight for £135 represents very good material value for money.

The shape is rather bluff and square, the stygian blackness of box and grille relieved only by a little silver badge. You don't need to keep this on of course (the grille not the badge, that is), but the drivers are surface- rather than flush-mounted and look better covered up, while the grille frame is fairly thin and chamfered MDF.

A simple sealed box, JPW has not skimped on the engineering. The carcass is built from substantial 15mm MDF, and the drivers are properly and tightly bolted in place.

The main unit has a small magnet and pressed steel frame, with generous 155mm paper cone and foam surround. The

tweeter is a small 19mm soft plastic dome. The enclosure is lightly filled with absorbent wadding, and a small simple hardwired crossover links the simple terminal pair to the drivers, with standard wiring and tag connectors.

Test report

Sensitivity is a comfortably average 87dB or thereabouts, while the amplifier load is mild and easy, and the in-room bass extension (-12dB at 20Hz) looks most impressive for such a compact model, given that system resonance is at a highish 80Hz, thanks in part to the gentle (6dB/octave) rolloff characteristic of the sealed-box loading.

The two room-averaged response traces, taken close against the wall and well out into the room, suggest that this is an either/or (or neither/nor) model that will probably work best halfway in between; try one or two feet out for starters.

The overall balance is very good, though the fine detail is not particularly smooth, and the upper midband in particular is rather uneven and a little exposed. The driver integration through the crossover region is very impressive indeed.

Sound quality

The panel didn't get particularly enthusiastic about the *P1V*, though it certainly passed muster and achieved broad acceptance, albeit with some misgivings. The balance is good, if a shade cold, and voices in particular sound quite clear and quite natural, if not entirely free of lispy coloration

Although there's a reasonable impression of weight and scale, genuine slam and authority are not on the agenda. The bass is pretty well controlled, but a little

thickened and slow, leading to some muddling of rhythmic subtleties and a measure of transient smearing. Stereo images are well formed, with a touch of genuine depth and transparency.

Conclusion

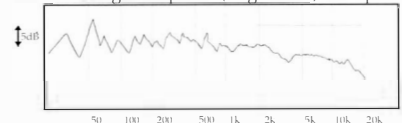
Not the prettiest econobox around, the *P1 Vinyl* nevertheless represents seriously good engineering value for money. Both measurement and listening tests confirm that the fine overall balance established by the original *P1* (see issue 59) is fully maintained here.

Hampered a little by the modest drive units, this is, inescapably, a very good allrounder. It's a little limp and sluggish in the bass, but delivers a more convincing midrange and stereo image than most at the price. It will also go satisfactorily loud without embarrassing even modest midi system amplification. A Best Buy rating is clearly appropriate.

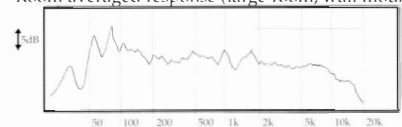
TEST RESULTS

Size (hwxwd)	43.5x25.5x26cm
Weight	7kg
Recommended amplifier power	10-80W
Recommended placement	stands 1-2ft from wall
In room averaged response limits 50Hz-10kHz	+/-5dB
Large room/space LF rolloff (-6dB ref midband)	32Hz
Large room/wall LF rolloff (-6dB ref midband)	28Hz
Large room output at 20Hz (ref midband)	-12dB
Estimated midrange sensitivity (ref 2.83V, 1m)	87dB
Impedance characteristic (ease of drive)	very good
Typical price per pair (inc VAT)	£135

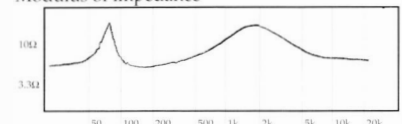
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



Modulus of impedance



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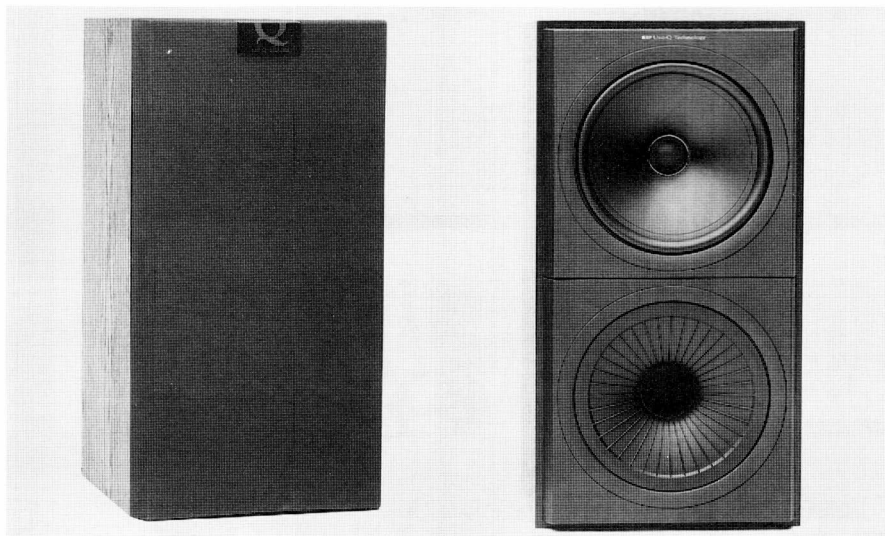
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For 1991, KEF has replaced its *C-series* of popularly priced models with two distinct ranges, the *K-* and *Q-series*. The former comprise three conventional two-way systems, while the three *Qs* feature KEF's proprietary Uni-Q coaxial driver.

The pricing structure has changed somewhat, in that the *Q-series* now carries a significantly greater premium than before. Whereas the 20 litre Uni-Q C55 was £269, the equivalent 20 litre Uni-Q Q60 carries a £349 pricetag.

However, there's justification for the upgrade in the engineering improvements that have been incorporated in the Q60, notably the new decoupled magnet system used on the driver and in the flared port arrangement that dominates the appearance if the grilles are removed.

More radical still, at any rate as far as KEF is concerned, is that this model has been deliberately balanced to operate correctly when mounted close to a wall. In the past KEF's championship of low coloration has led the company to favour exclusively free-space optimised designs. But many potential customers today prefer the convenience of wall-mounting, so now at last the company is offering this alternative.

The bare bones is that this is a 'large bookshelf' size two-way reflex loaded speaker, vinyl clad but with a very slick looking moulded baffle cover and well designed, magnetically held grille, not to mention a new badge in the best designer tradition.

The Uni-Q main driver is clever indeed. It makes use of the latest rare earth magnet technology to locate the tweeter on the pole piece of the main mid/bass driver magnet, arranging it so that the acoustic centres of the two drivers are coincident. This dramatically simplifies

the task of integrating the output from the two drivers through the crossover region, and incidentally means that the stereo imaging will work just as well if you lay the speakers on their sides.

The main cone is plastic, a generous 155mm in diameter, mounted on a pressed steel frame which is fitted with a generous magnet. The latter is decoupled from the frame via a lossy gasket, a technique which reduces the transmission of vibration from the motor (no longer strictly speaking a stator) into the cabinet structure. The tweeter has a 25mm metal dome. Six reasonably tight coarse-pitch screws secure the driver to the plastic sub-baffle, while the well-lined box is 18mm chipboard throughout, wrapped in vinyl woodprint. Bi-wire terminals feed a complex PCB crossover that's hardwired to the driver.

Test report

KEF's claim of a high 90dB sensitivity is entirely vindicated, and although the impedance cheats a little around 200Hz, it's still a pretty easy amplifier load. Nor has bass extension been significantly compromised in the mix: this size/performance relationship will be hard to beat.

The balance is a little more controversial. While it's clearly better suited to wall reinforcement, the midband (200Hz-1kHz) is also rather projected and somewhat uneven, and there's a steady downward trend that amounts to a drop of 5dB across the decade from 500Hz to 5kHz. Perhaps surprisingly, a slight crossover notch is still visible.

Sound quality

The Q60 delivered a solidly above average result in the blind listening tests. It has to be said that little particular enthu-

siasm was shown, but the majority regarded the overall mix positively.

Good midrange detail, fine stereo focus and lack of obvious cabinet colorations are all in its favour, as is the nice sense of space and air that comes across. The balance is presumably responsible for the slightly hooded 'shut in' and warm overall sound, though some treble harshness also attracted comment.

However, the more serious criticism was directed at the bass. The quantity is just about right, but there seems little real sense of purpose, authority or weight, giving a rather muddled and thickened effect that doesn't do much to sort out complexities. That said, if quantity is what you're after, the Q60 really does deliver the goods. Even a modest amplifier can drive it indecently loud, and the whole thing holds together impressively well whilst doing so.

Conclusion

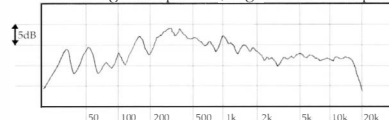
Wall-mount or not, KEF has still somehow managed to create a speaker that delivers fine midband performance at the expense of an indifferent and indecisive bass, which only goes to confirm that compromise is the essence of good loudspeaker design. And as a compromise, bearing in mind the impressive performance envelope, the Q60 stacks up pretty well, sufficient to justify Recommendation even at £349.



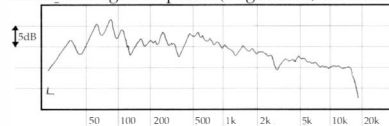
TEST RESULTS

Size (hwxwd)	48x25x27cm
Weight	8.5kg
Recommended amplifier power	10-150W
Recommended placement	45cm stands close to wall
In room averaged response limits 50Hz-10kHz	+/-6dB
Large room/space LF rolloff (-6dB ref midband)	28Hz
Large room/wall LF rolloff (-6dB ref midband)	25Hz
Large room output at 20Hz (ref midband)	-12dB
Estimated midrange sensitivity (ref 2.83V, 1m)	90dB
Impedance characteristic (ease of drive)	very good
Typical price per pair (inc VAT)	£349

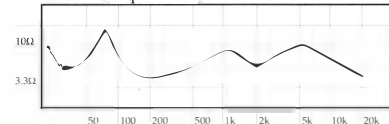
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



Modulus of impedance



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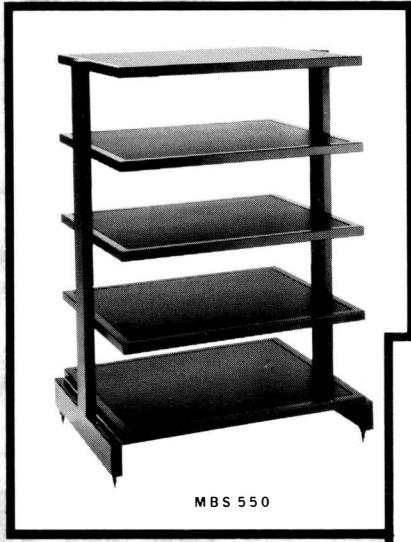


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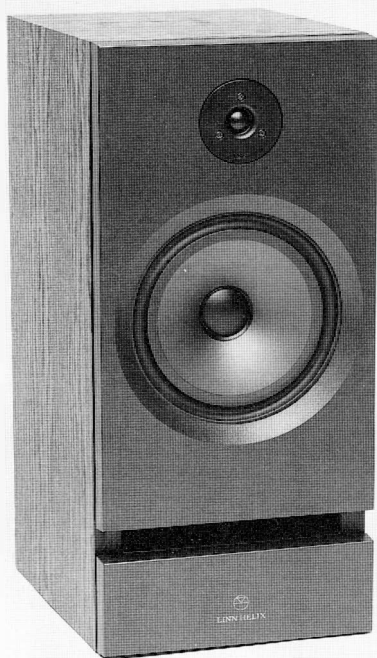
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Linn Helix II

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Though not the first model to bear the name, this *Helix* is an all new design from Linn Products, bearing some striking similarities to the smaller *Index II*. Both share the same matching stand, for example, the elegant and unusual *Ku-Stone* (so called because of the expanded metal composite material that forms its massy central pillar).

Since stand and speaker go together so naturally, it's sensible to regard this as a £466 package, the speaker itself costing £357 (some 50 per cent more than the *Index*), the stand accounting for the £109 balance.

However, *Helix* differs from *Index* — and all other Linn speakers to the author's knowledge — in two important respects. First, it's a reflex (port) loaded design rather than a sealed box, and second, it's designed for siting well clear of walls, both factors that will have significant bearing upon the overall flavour of the sound.

In most respects this is a fairly conventional loudspeaker, a little on the expensive side for the basic two-way configuration and 'large bookshelf' enclosure size, but justifying the premium with slick finish and an impressive attention to both presentation and engineering detail.

The box has the usual black vinyl woodgrain over chipboard wrap, while the baffle is more substantial 18mm MDF. The drivers are surface mounted using tight bolts and T-nuts, the main driver tensioned by a dense elastic gasket, while gunmetal grey plastic mouldings cover

up all this unsightly engineering, add the slot port and provide the support for the neat frameless stockingmask grille.

The result looks smart and modern with or without the covers in place, while the stand adds a distinctive backwards tilt of a few degrees, allowing the whole thing to be slightly shorter than would otherwise be the case, but adding a few watering problems for houseplant fanciers.

A figure-8 brace stiffens up the enclosure, while a light absorbent fill provides some internal damping. The main driver has a good size magnet, a pressed steel frame and a largish plastic cone, while the tweeter has a small 19mm plastic dome, with short horn flare. A standard PCB crossover has bi-wire terminals and heavy internal wiring feeds the drivers.

Test report

The room averaged traces confirm that the *Helix* should be placed at least a foot and maybe two or three from the nearest wall. When so positioned the response trace is unusually smooth and balanced by any standards right across the band. By crossing from bass/mid to tweeter at a lower frequency than usual (1.5kHz electrically), the usual presence dip is largely avoided, though the main treble output (3-8kHz) is a little stronger than most and the ultimate HF rolloff, starting at 8kHz, a shade early.

Compared to the *Index*, one advantage of the reflex port and larger main driver and box is seen in significantly improved sensitivity. The *Helix*' 88dB is a shade above average and achieved alongside a very easy load for the partnering amplifier. In this context, the -13dB output at 20Hz represents very respectable bass extension.

Sound quality

With one dissenter who found the relative brightness a little disconcerting, the *Helix* was very well received by the listening panel, with widespread praise for its open — indeed 'open-mouthed' — quality as a stand-out characteristic.

The bass is dry and well controlled, keeping chestiness at bay quite effectively though it is a little lacking in genuine weight, extension and welly. There's not quite the familiar bass slam and authority one has come to associate with Linn's wall-mount, sealed-box models.

However, removed from early wall reflections, colorations across the broad midband are limited to mild pinched and nasal qualities, and the sound is impressively well-timed and coherent, deliver-

ing a good measure of immediacy.

When driven hard things hang together pretty well. There's a slightly aggressive edge to this loudspeaker which is always threatening to make its presence felt, making for an exciting if slightly intimidating overall experience. The *Helix* just about gets away with it when driven from top quality sources and amplification, but can ruthlessly expose any inadequacies further up the chain.

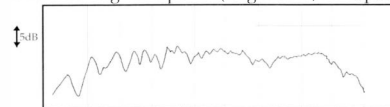
Conclusion

This is a clever design that provides the traditional Linn strengths of speed and coherence in a package that is freed from the inevitable coloration and stereo constraints associated with wall mounting. With the caveat that the experience might be a little too edge-of-the-seat uncomfortable for some listeners and systems, there's no question that the *Helix/Ku-Stone* combo well justifies its premium price and deserves confident Recommendation.

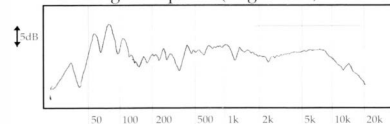
TEST RESULTS

Size (hwxwd)	57x24x30cm (box only)
Weight	9kg (stand 10kg)
Recommended amplifier power	15-100W
Recommended placement	KuStone stands 1-2ft from wall
In room averaged response limits 50Hz-10kHz	+/-3dB
Large room/space LF rolloff (-6dB ref midband)	33Hz
Large room/wall LF rolloff (-6dB ref midband)	30Hz
Large room output at 20Hz (ref midband)	-13dB
Estimated midrange sensitivity (ref 2.83V, 1m)	88dB
Impedance characteristic (ease of drive)	very good
Typical price per pair (inc VAT)	£357 (stands £109)

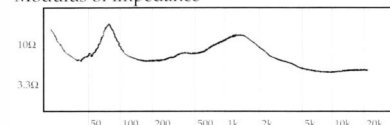
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



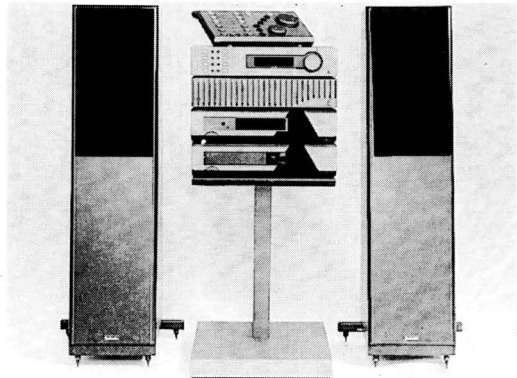
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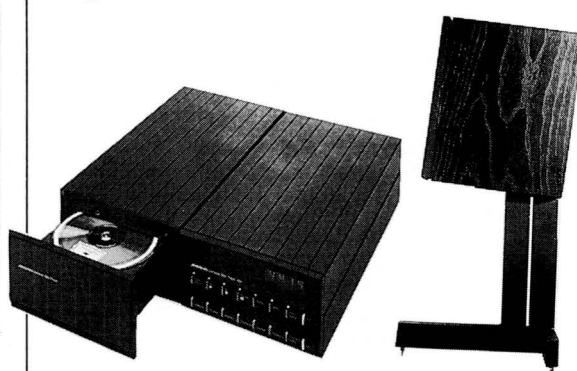


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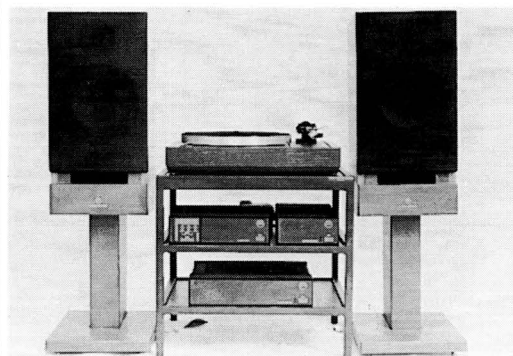


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Mission 761i

MISSION ELECTRONICS, STONEHILL, HUNTINGDON,
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Mission's 761 started out as a pretty conventional medium size bookshelf speaker, that worked sufficiently well to rate a Best Buy when reviewed back in issue 66. Three years down the road an *i-for-improved* version is being brought in as a replacement, though the only real resemblance between the two lies in the price point and enclosed volume.

The 761i may have nothing whatever to do with the 761 physically, but it does draw heavily on the highly successful little £99 miniature 760, another Best Buy first introduced a little over a year ago. In fact it's a 'stretched' 760, featuring two little main drivers placed either side of the tweeter.

Doubling up the drivers like this means doubling up the total cone area, and so (theoretically at least) moving more air and going louder for the same amplifier input, whilst conveniently avoiding the need to increase the driver diameter and compromise the favourable lateral dispersion of a very narrow cabinet. The low moving mass advantage of the smaller cone is also retained, while placing the main drivers either side of the tweeter ought to make the net output from the two bass/mids and the tweeter geometrically more coincident.

However, the waveform which emanates from a pair of spaced drivers is qualitatively different from that created by a single point source tweeter. In fact the pattern tends towards the cylindrical rather than the spherical, and the mismatch between the two can create its own set of problems.

The vinyl woodprint box is actually a third taller and a fifth deeper than the 760, giving a box volume broadly comparable with its predecessor. Larger panels require extra stiffness, so a 15mm wrap

replaces the 760's 10mm, and all is lined with foam. However, the most important carryover from the 760 is the precision moulded structural plastic baffle, ensuring close engineering tolerances and incorporating small twin ports, and the grille with which it cleverly and securely mates. The latter is definitely aesthetically preferable to baffle nudity, and deftly avoids introducing any acoustic compromise.

The main drivers have small 95mm doped paper cones, set in pressed steel frames and driven by big magnets. The tweeter is a 19mm fabric dome, and all retaining screws were nice and tight, if rather coarse in pitch. A single terminal pair feeds a quite complex hardwired crossover network, tag connected to the drivers.

Test report

Reason might lead one to expect that the extra main driver would increase sensitivity by about 3dB, or add a few extra Hz of bass extension. Though in practice it is almost impossible to distinguish between the various room-averaged response traces obtained with 761i, 760, or for that matter the Cyrus 780.

The explanation for this apparent paradox is seen in the impedance graphs, which show that although the 761i delivers the same specific output for a given voltage input, it only draws half as much current from the amplifier when doing so. After all, reducing the stress on the driving amplifier is one quite effective way of improving sound quality.

Rather more typical of 7litre rather than 12litre models, the response shapes look well suited to the intended close-to-wall siting, and are pretty well balanced overall, albeit a little strong around 1kHz and then falling some 6dB over the next

two octaves. The bass does look a little smoother and better controlled than the other two Mission models, but the broad midband is a little uneven, and the treble is perceptibly exposed.

Sound quality

In contrast to the giant-killing performance of its siblings, the 761i left the panel largely unmoved and not at all impressed. Though small and lacking in scale and authority, the sound is quite agile and lively, with respectable dynamics and timing and a fair measure of 'punch'. However, there was consistent complaint against a rather brash treble quality which emphasises sibilants.

With hindsight it would have been nice to have had a pair of 760s on hand for sighted comparisons, but hands-on listening still left me a little disappointed with the 761i, which somehow seemed less coherent than the better two-driver miniatures, and this in turn makes one less forgiving of its limitations.

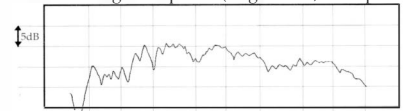
Conclusion

It's difficult to avoid the conclusion that the 761i is actually less convincing overall than the smaller, simpler 760. Certainly it seems to offer very little more, save that which might be gained from working the driving amplifier rather less hard. Maybe there is some benefit in terms of mid bass control and drive, but I rate coherence rather higher up my list of priorities, and here some question marks remain.

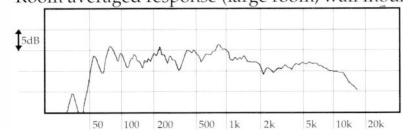
TEST RESULTS

Size (h x w x d)	38x19x24cm
Recommended amplifier power	15-100W
Recommended placement	stands close to wall
In room averaged response limits 50Hz-10kHz	+/-4dB
Large room/space LF rolloff (-6dB ref midband)	48Hz
Large room/wall LF rolloff (-6dB ref midband)	48Hz
Large room output at 20Hz (ref midband)	below -20dB
Estimated midrange sensitivity (ref 2.83V, 1m)	88dB
Impedance characteristic (ease of drive)	very good
Typical price per pair (inc VAT)	£150

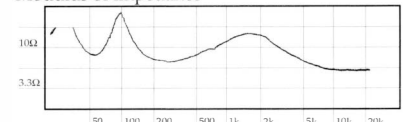
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



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The M7Tube is a full facility pre-amplifier with phono stage and full line stage, which makes it an excellent partner with a number of power amplifiers, valve or transistor.

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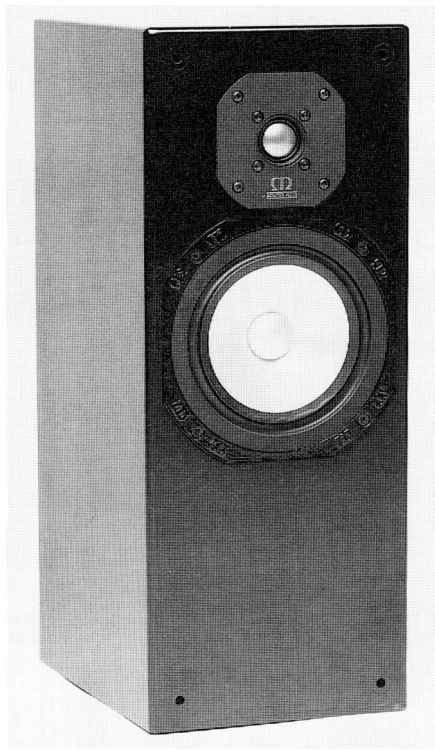
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Monitor Audio Studio 15

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Well known for its attractive cabinetwork and enthusiasm for metal dome tweeters, Monitor Audio has been taking further steps down the metal diaphragm road by developing its own metal cone bass/mid driver as a natural companion, introducing the twain to an appreciative and well-heeled audience in the decidedly upmarket *Studio* range.

The £1,600 *15* is the third of four *Studios* to undergo formal *Choice* assessment, the tiny sealed-box *5* and middle size ported *10* both demonstrating very impressive mid/presence focus but suffering from less convincing bass performance coupled to rather high pricetags. The *15*'s somewhat larger (ported) enclosure volume at least holds out promise of bass improvement, even if the £1,600 pricetag made me blink.

Though really quite small in total volume, it's certainly a very nice looking loudspeaker: fashionably slim, deep and tall, and beautifully finished in piano lacquer black, with neat radiused edges and corners. Although MA usually offers all sorts of interesting veneers, the *Studio 15* is a bit of a departure in that it is only available in black; either a standard finish or that glorious piano lacquer, although the latter adds another £400 to the price.

A feeling of *deja vu* came over me as I started to examine the *15*, and comparison to the data gleaned when covering the *10* back in issue 90 shows why. Finish, height and weight seem the only obvious differences, so the £510 seems a hefty

price premium for an extra 1,000 square centimetres of damped 18mm MDF and the fancy finish. However, closer inspection shows detail differences in the main driver too, most apparent in the dust cap area; in fact the *15* borrows the driver from the floorstanding *20*, so maybe it should be regarded as a down-sized *20* rather than a stretched *10*.

That said, it's beautifully built, using the finest ingredients throughout, though you might be better advised to leave the MDF-frame grille inside the packing carton assuming the sight of the gold and silver driver diaphragms doesn't leave you feeling queasy. The drivers are rebated into the baffle, the cast frames making a tight friction fit, though the securing bolts on the tweeter were a little slack. The 18mm MDF box is lined first with bituminous damping pads and then absorbent foam.

Audiophile grade cables link the simple hardwired crossover to the twin gold-plated bi-wire terminal pairs and the drivers. The main metal cone is 'silver' in colour, 118mm in diameter and sits in a strong cast frame with a beefy magnet, while the tweeter has a 'gold' 25mm metal dome. A large port is fitted to the rear.

Test report

Whatever the effect of the main driver and box changes, the *Studio 15* still shows a remarkable resemblance to the *10* in measured performance, confirming both the similarity of the designs and welcome consistency in the test programme. The port/enclosure is tuned a fraction lower at 55Hz, but otherwise the impedance trace is unchanged, as is the roughly average sensitivity.

There are some subtle changes in the response, however, and these are all in favour of the newer *15*. The bass still looks rather mis-tuned, but much less seriously than before. It's still very much a free space design, and the port output still looks rather too strong, but the 70Hz bump is less obvious and there's a couple more dB of in-room output at 30Hz. Also noticeable and worthwhile is a significant increase in smoothness through the vital midband, especially 400Hz-1.5kHz.

Sound quality

Liked on one day but disliked the next, the *S15* nevertheless turned in a pretty good account of itself overall, a view which corroborates with my sighted listening.

Though rather undemanding and ultimately a little frustrating to a speed freak like myself, listening to the *S15* is a fundamentally pleasant, relaxing and very en-

joyable experience.

The seductive midrange focus and lively mid/treble coherence grab the attention and emphasise the superior midband performance of this advanced main driver. Sibilants are a shade detached and obvious, but stay somehow sweet with it. The bass too is rather slow, detached and band-limited, though its subjectively averaged energy content is about right so it's easy just to accept the situation and keep on enjoying that midrange detail.

Conclusion

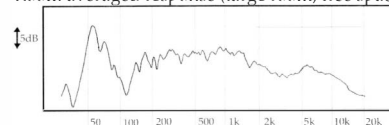
Certainly a significantly better speaker than either the *5* or the *10*, the *Studio 15* has some beguiling and enchanting qualities that some will find irresistible, even though the limited and lazy bass spoils some of the enjoyment. Still I can't figure out why it's quite so expensive so my Recommendation must remain cautious.



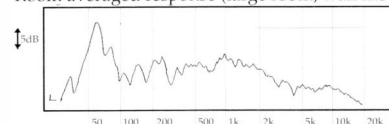
TEST RESULTS

Size (h x w x d)	51 x 20 x 26 cm
Weight	11 kg
Recommended amplifier power	20-80 W
Recommended placement	stands in free space
In room averaged response limits 50Hz-10kHz +/-7dB	
Large room/space LF rolloff (-6dB ref midband)	45Hz
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)	87dB
Impedance characteristic (ease of drive)	fairly good
Typical price per pair (inc VAT)	£1,600

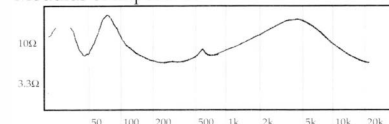
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)

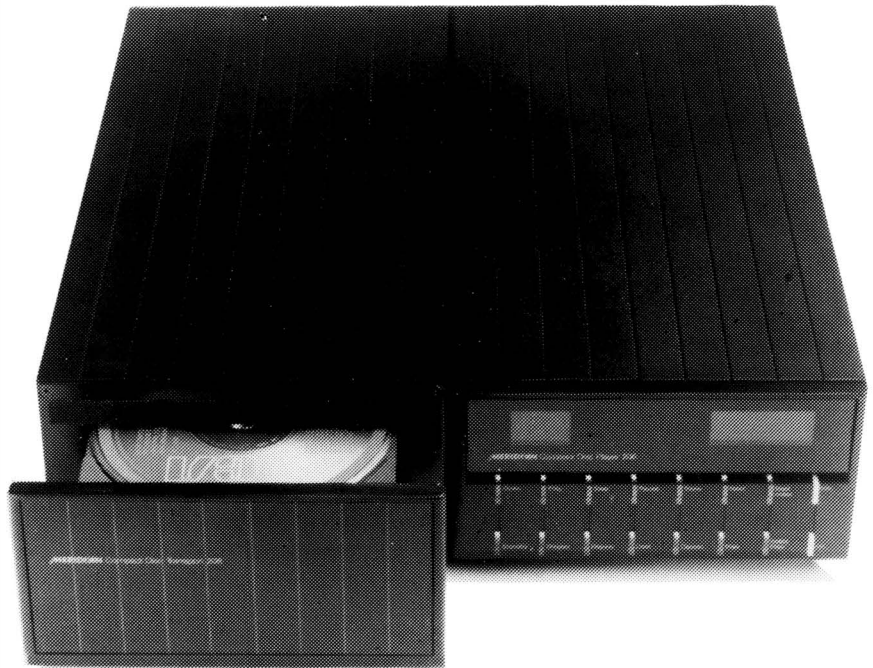


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Mordaunt-Short Classic 20

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I chased to get hold of this particular model, after hearing a glowing reference from a fellow reviewer whose judgement often parallels my own. That things didn't quite work out the way I'd expected merely serves to prove the old adage that nothing's fair in love, war or loudspeaker design.

Over the course of many years Mordaunt-Short built a powerful reputation and image around the world. Unfortunately it was a reputation for being a reliable, quality budget box-stuffer, which is not an ideal basis for entering the value-added, niche-marketing Nineties.

The re-positioning strategy got under way with the acquisition of Epos some three years back, a significantly more upmarket brand that's something of a cult amongst enthusiasts. Epos is being developed in parallel with Mordaunt-Short, but kept quite distinct, as a greyhound amongst corgis perhaps.

The two new Mordaunt-Short *Classic* models that were launched last Autumn look like the logical next step. There are clear engineering parallels between this £395 *Classic 20* and the delightful (£330) Epos *ES11* that was an enthusiastic Best Buy in issue 94, which was a further stimulus for getting a listen to the *20* though there are sufficient differences in both construction and in the deliberate voicing of the final package.

This is a luxury compact, roughly book-shelf size in volume but fashionably slim and deep to provide good lateral distribution and fore-and-aft stability when properly stand mounted. A heavy central-pillar type is available, was supplied and consequently used.

All round classy red mahogany veneer and a gold lozenge-shaped badge confirm the careful market positioning. The

(brown) grille is well-chamfered MDF, curved along the lower edge to add a distinctive touch, but those who prefer nude loudspeakers will find the drivers deeply rebated and mounting hardware well concealed by soft plastic trim, leaving just those ugly grille mounting lugs to spoil the view.

A conventional though quite substantial 19mm enclosure is used here, with MDF baffle, in place of the *ES11*'s smaller but heavier plastic/MDF combination. There's no bracing or other treatment beyond a light fill. A large rear port is used, and a very simple crossover, with tweeter overload protection, is fed from two pairs of gold-plated terminals.

The *20*'s main driver in fact goes a step beyond the *11* in creating a fully integrated cone and surround assembly from a single precision injection moulding process, improving tolerances and allowing much greater control over mass and stiffness. This is mounted in a plastic frame with a decent size magnet, held by almost tight bolts. The 25mm mesh-protected metal dome tweeter was secured by fairly tight woodscrews.

Test report

Showing quite close correspondence with the traces obtained for the *ES11*, the *Classic 20* is a nice easy amplifier load, but has slightly below average sensitivity and little genuine bass extension below the 48Hz port resonance.

Even away from walls, the mid bass looks rather over-exposed and the upper bass rather lean, while the broad midband is quite flat and even, albeit rather forward. The balance drops away somewhat through the presence region, but the crossover is otherwise well integrated and the treble nicely judged.

Sound quality

Against expectations, the *Classic 20* proved a disappointment to the listening panel, for which I can offer no glib explanation, save to note that was it presented immediately after lunch, sited uniquely on its own stands. Maybe something wasn't quite right in the set-up, since most found the sound slow, heavy and lacking dynamics, though a couple commented upon the natural midrange detail.

Certainly managed to find rather more good in them during the hands-on listening — changing the stands for *HBS1s* helped to tighten and sharpen up the bass a bit, for starters. And given a little time to settle down, I found myself becoming more and more enchanted by the soft but subtle, coherent and multi-layered midrange detail, which has a transparency that few achieve. However, I never really did manage to get the bass to keep up and make coherent sense alongside that lovely midband.

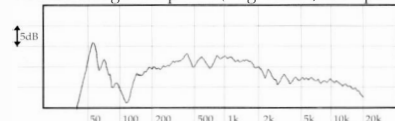
Conclusion

Such a promising design in so many ways, I have to admit that at the end of the day I find the *Classic 20* slightly disappointing. It can deliver a midband transparency to give any box speaker a run for its money, and one quickly adjusts to the slightly dulled presence, but for whatever reason, in my (largish) room and (enthusiast oriented) system, the bass simply failed to deliver the goods in any convincing fashion.

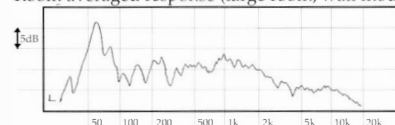
TEST RESULTS

Size (hwxwd)	37x22x27cm
Weight	6.5kg
Recommended amplifier power	20-80W
Recommended placement	stands in free space
In room averaged response limits 50Hz-10kHz	+/-7dB
Large room/space LF rolloff (-6dB ref midband)	45Hz
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)	86dB
Impedance characteristic (ease of drive)	very good
Typical price per pair (inc VAT)	£395

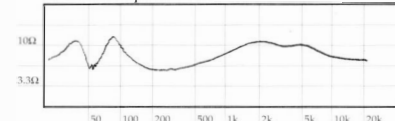
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



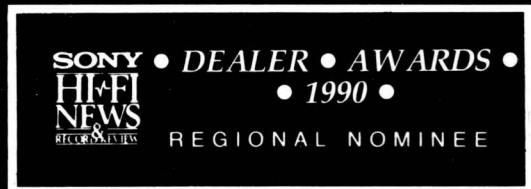
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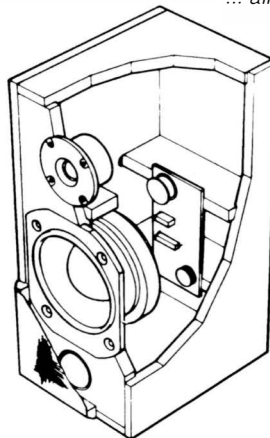
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Last to come under formal *Choice* scrutiny, the £1,527 *SBL* was actually the first of Naim's current loudspeaker range to be introduced, several years back, and is already firmly established as one of the leading sellers in the £1,000+ sector of the market.

The acronym stands for separate box loudspeaker, and is a pretty fair description of one of the more complicated models to try and explain. Nicely finished in proper wood veneer, the compact dimensions and angled baffles make for a very discrete package even in smallish rooms. To a first approximation it's a two-way sealed-box, compact floorstanding wall-mount, but the driver line-up is the simple bit; the enclosures, stands and installation represent the real hard work and engineering costs.

There are in fact three separate enclosures, each decoupled mechanically from the others but attached to the main stand

frame. The smallest top section carries and mass-loads the little 19mm soft fabric dome tweeter, while the main driver — a generous 150mm doped paper cone unit with protuberant phase plug in pressed steel basket — operates into its own miniature enclosure. This is mechanically decoupled from but acoustically connected to the much larger main enclosure, via a controlled-leakage acoustic resistance panel.

The purpose of this arrangement is to combine the control afforded by a small enclosure over driver excursion with the lower fundamental resonance and better extension provided by a much larger box, characteristics particularly useful for vinyl disc replay.

What with gaskets to seal and spikes to adjust, assembly is far from straightforward, and some care must be taken not to cause damage if moving the assembled unit; happily Naim takes dealer training quite seriously. For fear of causing damage or misalignment to the assembly, mechanical investigations were restricted to confirming that the main driver bolts and tweeter woodscrews were well tight, and establishing that the *SBL* weighs in at a substantial 17kg. Besides wadding fill, Naim uses rather neat mass damping pads to control cabinet vibration modes. The grilles consist of foam pads, which are ideal acoustically if not aesthetically, and are considered an integral part of the design.

Test report

Sensitivity is a little below average at around 86dB, an observation which is almost inevitable in the light of the ridiculously smooth and easy amplifier load characteristic, and bass extension (-9dB at 20Hz) that is very good for the box size.

The overall frequency balance is almost beyond reproach, and certainly more neutral than the other two Naim speakers, though the flat overall trend is enlivened by significant local unevenness. The bass is notably flat and well balanced, but there are mild peaks at 200Hz and 1.2kHz, a trough at the crossover around 2.5kHz and the subsequent rather isolated but broad treble recovery will all add their contribution to the overall character.

Sound quality

No doubt aided somewhat by the use of Naim electronics, two separate blind presentations nevertheless left the *SBL* close to the top of the listening test findings. It's a design that polarised value judgements,

drawing a strongly positive reaction from the majority but leaving one or two dissidents entirely disaffected.

My casting vote goes with the majority. The *SBL* is not without its cosmetic deficiencies, and adds a little more than its fair share of character to the sound, but it is also highly informative and communicative in the way it drags out many of the musical subtleties lurking within the grooves, thanks mainly to fine speed and precise timing.

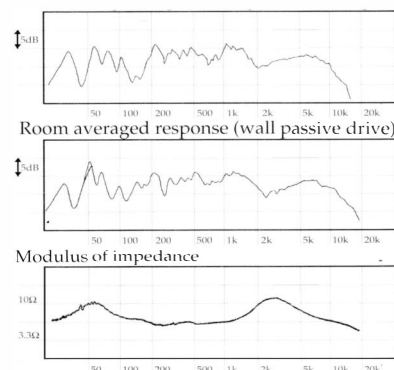
One can criticise the midband for some cuppy and dulled character, and the treble for sounding a little detached, exposed and relentless, but these characteristics are all the more noticeable because the bass is so well controlled and free of its own colorations. But the sheer coherence of the system is its own reward: broadcast voices do have some added colour, for example, but they also sound uncannily lifelike and real.

Conclusion

A bit too characterful for some tastes perhaps, and maybe sometimes a little too revealing of the quality of the equipment driving them, the *SBL* is nevertheless a most impressive and eminently practical loudspeaker that clearly deserves Recommendation. Given the complexity of the multiple enclosures and integral stand, the price seems quite reasonable.

TEST RESULTS

Size (hwxwd)	88x26.5x17-27cm
Weight	17kg
Recommended amplifier power	15-150W
Recommended placement	close to wall
In room averaged response limits 50Hz-10kHz	+/-6dB
Large room/wall LF rolloff (-6dB ref midband)	25Hz
Large room output at 20Hz (ref midband)	-9dB
Estimated midrange sensitivity (ref 2.83V, 1m)	86dB
Impedance characteristic (ease of drive)	excellent
Typical price per pair (inc VAT)	£1,527

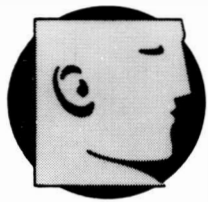


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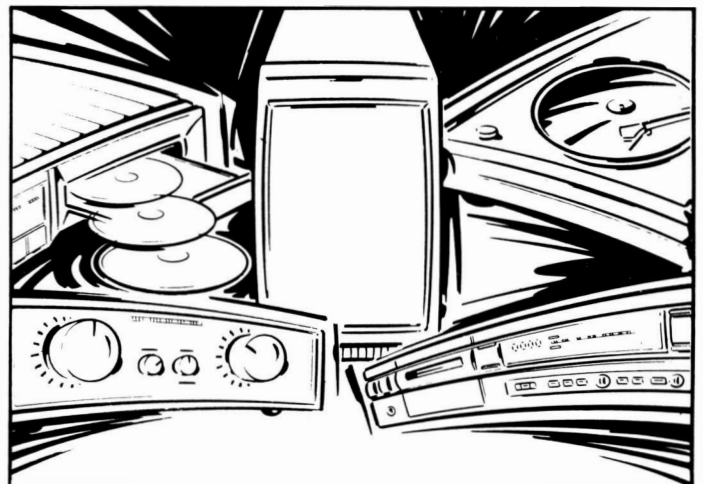
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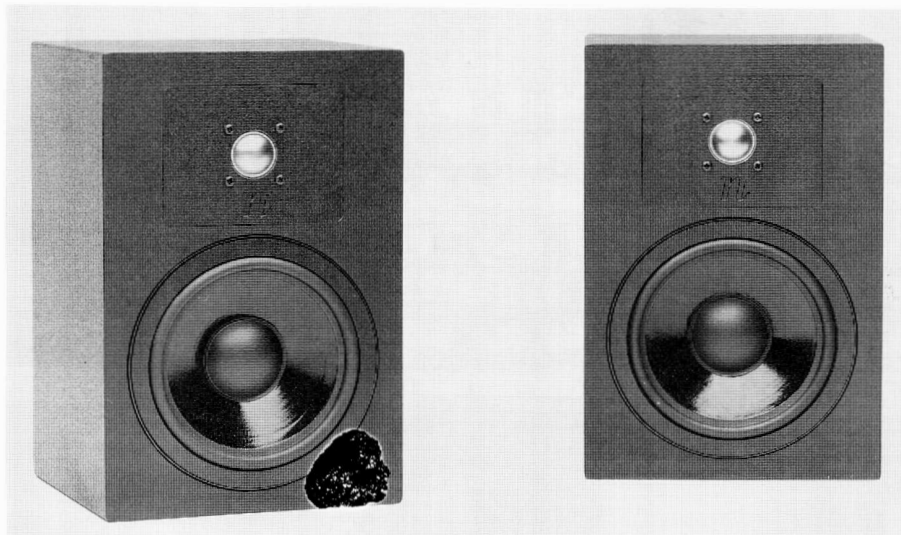
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Although North Eastern Audio Traders (NEAT) is a relatively new name on the hi-fi scene, the youthful vigor and enthusiasm of its principals, plus the cult reputation the little *Petite* loudspeaker has been rapidly building up these past twelve months, all point towards a company that may be going places.

Save from having read the good opinions expressed by other reviewers elsewhere recently, I knew nothing of the *Petite* whilst unpacking its carton. What emerged was a tidy small bookshelf size speaker, finished in retro-industrial crackle finish paintwork with nary a grille or cover in sight and a distinctly exposed looking shiny dome tweeter. (It's actually a plastic, not metal, dome, and therefore inherently rugged and unlikely to suffer accidental damage.)

What did come as a bit of a shock was the news that this apparently innocuous and quite lightweight package carried a £525 pricetag, which is about twice what I'd have guessed from holding and inspecting the *Petite*. Such a pricetag is going to take some justification, somewhere down the line, and the accompanying literature doesn't yield many clues.

Nor does the speaker itself. I had already attempted — and failed, fortunately without causing damage — to get it apart before reading the admonition against such behaviour in the instruction leaflet. Over and above the observations that it's a two-way rear-ported enclosure using a main driver with a 120mm doped paper cone, plus a 26mm plastic dome tweeter sourced from Audax, and that the whole caboodle weighs a little under 5kg, there's little I can report.

NEAT explained to me that the drivers are fixed in place using silicone sealant, for the entirely defensible reason that it

sounds better than screws, though it's clearly going to be a bit of a pain if you blow one up. Quizzed about the high price, it was pointed out that the proof of the speaker is in the listening, and the *Petite* had come about by doing things properly, with reference to arcane and complex cabinet making skills.

Test report

From my measurements the *Petite* is closer to 85/86dB average sensitivity than the 87dB quoted by NEAT. However, bass extension is very impressive for the box size, and I can confirm the very mild and easy impedance characteristic.

Although the leaflet makes no formal recommendation about siting, suggesting quite correctly that one should carry out experiments in situ for best results, the room curves clearly favour placing the speaker fairly close to the wall, since this helps bring the mid/bass up to a level comparable with the upper mid prominence around 1-1.5kHz, and so make the latter's effects less obvious and exposed.

Wherever placed, there is sufficient unevenness to generate some coloration. Midrange peak apart, the balance is pretty good overall, and the crossover region is well handled, though treble output is certainly a little restrained.

Sound quality

Assessed 'blind', the *Petite* was one of my personal (three) favourites, though the panel as a whole was rather less positive, several commenting that the sound was a bit flat and the balance a bit too 'safe', with dulled treble.

Certainly the sound has rather too much character of its own, largely I suspect as the inevitable consequence of the various balance anomalies. Females are

emphasised at the expense of males on large scale choral music, for example, and the pronounced upper midband gives rise to both nasal and quacky effects, and can be a bit relentless.

But the real strength of the *Petite* lies in its most impressive cohesion. Everything seems to hang together properly and make good musical sense. Complex rhythms are handled with fine pace and timing, while bass power and drive is exceptional from one so small.

There's an impressive realism about voices which somehow cuts through the overlaying colorations, rendering them, if not exactly irrelevant, at least comparatively inconsequential. During the sighted listening sessions, I kept finding myself returning to the nimble and agile little NEAT to remind myself just what could be achieved, and learned to respect it more and more as my experience grew.

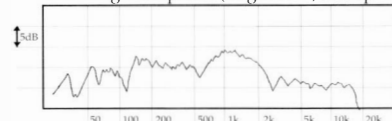
Conclusion

The proof of the speaker is in the listening, and on that basis I have no alternative but to Recommend the *Petite*, irrespective of any reservations over perceived value for money. I should point out that this is more of a personal than a panel choice, and some of the characteristics will not be to everyone's liking, but the way it breaks down the recording barriers between music and listener is its own substantial reward. This is a genuine giant-killer.

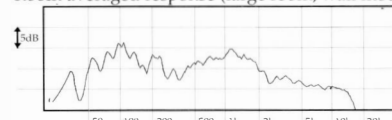
TEST RESULTS

Size (hxwxhd)	30.5x20x18cm
Weight	5kg
Recommended amplifier power	20-120W
Recommended placement	stands close to wall
In room averaged response limits 50Hz-10kHz	+/-5dB
Large room/space LF rolloff (-6dB ref midband)	33Hz
Large room/wall LF rolloff (-6dB ref midband)	33Hz
Large room output at 20Hz (ref midband)	-14dB
Estimated midrange sensitivity (ref 2.83V, 1m)	86dB
Impedance characteristic (ease of drive)	very good
Typical price per pair (inc VAT)	£525

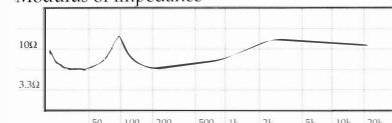
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



Modulus of impedance





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

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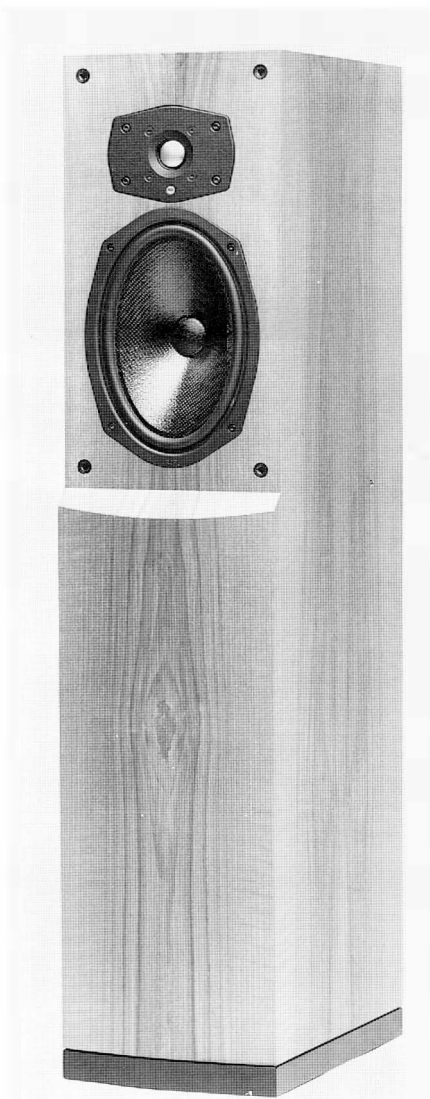
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Not a name instantly familiar to even the most dedicated UK hi-fi buff, RCF is an Italian brand, better known over here for loudspeakers built for PA and sound reinforcement applications. That the company is just as established as a hi-fi manufacturer is made clear with HW's recent decision to import the *Mytho* range.

Italian hi-fi reaches these islands only rarely, though the items that do appear are invariably pretty and distinctive. That's certainly true of the *Mytho 3* loudspeaker, a generously proportioned floorstander with the sort of beautiful presentation and finish that goes some way towards justifying an upmarket pricetag of £1,395.

The lovely Italian walnut veneer makes a good starting point, and the clever way the front and back surfaces are curved adds a welcome distinctive touch. The front panel is stepped back to accommodate a flat baffle area for mounting the

two drivers, but the curve is maintained in a grille that is consequently aesthetically important. Which is a pity, as its thick frame looks determined to undo much of the promise of good lateral distribution afforded by the slim cabinet and elliptical main driver.

If this one important detail seems to have slipped through, in other respects there is evidence of careful and original thought. The enclosure is deep enough to provide a secure footprint, and is built on a substantial 30mm base equipped with floor-coupling cones (whose lack of adjustability might prove a problem with concrete floors).

This is basically a two-way system, but with twin-ported cabinet network that also incorporates an internal 'drone cone' ABR diaphragm which matches the main driver cone and is fitted in a horizontal partition/brace baffle just below the main driver. Even thinking about the possible complexities of such an arrangement has brought me out in a cold sweat, and the propaganda is not terribly enlightening either, so let us pass on . . .

The drivers are interesting too. The brochure refers to a 31mm titanium dome tweeter, but the unit fitted measured no bigger than 25mm. The main driver has a 120x190mm elliptical cone, apparently of resin impregnated carbon fibre, which is a good way to provide the lateral dispersion of a 120mm driver (and narrow baffle) with the air-moving ability of a 150mm cone. It also uses a rubber-damped cast frame and a very generous magnet. Both units were secured by fairly tight woodscrews.

The enclosure is as substantially constructed as the 21kg all up weight indicates. The baffle is 20mm MDF, while this is virtually doubled by the additional curved section. The sides are 20mm chipboard, and the upper chamfer has a light foam lining. The well-damped PCB crossover is fed from two gold-plated terminal pairs and in turn feeds the drivers along classy audiophile cables.

Test report

Sensitivity is a useful 88dB, but some 3dB are due to the 40ohm impedance through the bass and midrange. Indeed the impedance graph shows all manner of rapid swings right up through the band, the various associated electrical resonances all presumably making the amplifier's job just that little bit more difficult.

The room curves show a number of weaknesses at the low frequency end. Even well away from walls there is clearly

not enough genuine LF extension, and rather too much mid/bass output, 30-60Hz. The broad midband is very well ordered, though there's some unevenness around the 1-5kHz crossover region; the treble looks very nicely balanced.

Sound quality

The *Mytho 3* passed muster on the blind listening tests, though it couldn't really be said to have justified its rather exalted price. Most found the overall balance pleasant enough, but there were unanimous complaints against a slightly obvious and detached treble which tends to exaggerate sibilants, and a rather heavy, ponderous bass.

Removing the grille gets rid of a rather pronounced nasality, revealing a very pleasant midband, with nice detail and clarity on voices. Stereo images are well formed, but the tizzy quality remains, along with a lack of genuine snap, drive and extension. At lowish levels the balance works rather well, the slight bass boost being rather welcome here, but things become rather more uncomfortable at higher levels.

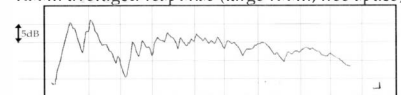
Conclusion

Undoubtedly very attractive and well built, incorporating a number of unusual and interesting ideas, and creating a generally pleasant and well balanced sound, the *Mytho 3* doesn't really justify its highish price — or largish size — in terms of sheer performance and sound quality.

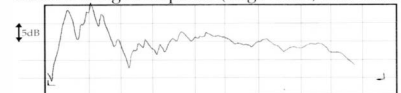
TEST RESULTS

Size (h x w x d)	100 x 21.5 x 30 cm
Weight	21 kg
Recommended amplifier power	15-150 W
Recommended placement	away from walls
In room averaged response limits 50Hz-10kHz	+/-8 dB
Large room/space LF rolloff (-6dB ref midband)	25 Hz
Large room/wall LF rolloff (-6dB ref midband)	25 Hz
Large room output at 20Hz (ref midband)	-14 dB
Estimated midrange sensitivity (ref 2.83V, 1m)	88 dB
Impedance characteristic (ease of drive)	tricky
Typical price per pair (inc VAT)	£1,395

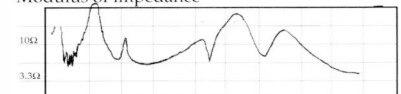
Room averaged response (large room, free space)



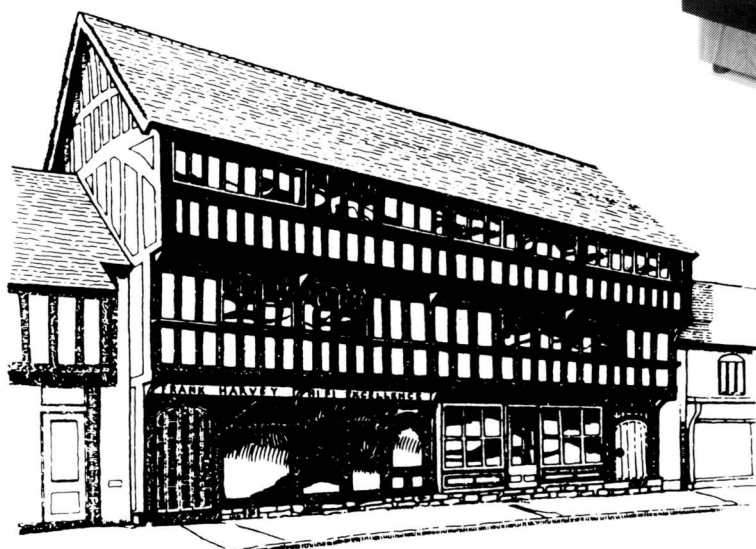
Room averaged response (large room, wall mount)



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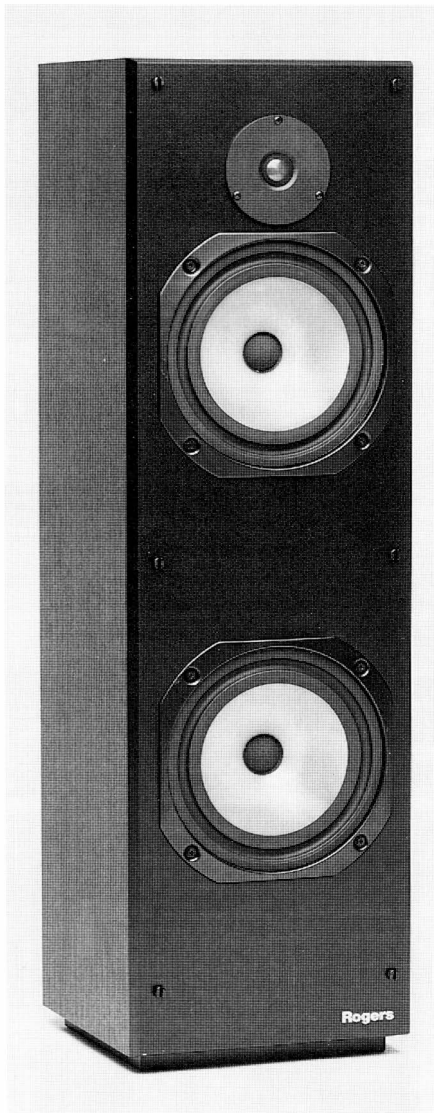
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Rogers LS8a

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Alongside the 2a/2 and 4a/2, the LS8a is one of a trio of new models that update and augment the bottom end of the Rogers range, but unlike its smaller brethren it breaks with company tradition in two important respects. First it's a floorstander, and secondly it has two bass drivers, both features that are currently fashionable, but both of which represent a significant departure for Rogers. Furthermore, the £425 pricetag looks very competitive indeed for such a large 16kg freestanding box, especially bearing in mind that there's no need to find another £100 or so for a pair of stands.

Floor-coupling here is achieved by inserting sockets for spikes in a small plinth that forms the base of the enclosure, which is certainly the most economical solution, and one that's used by a number of manufacturers. But practical experience suggests that it's not necessarily the right solution. In the first place, of the dozen or

more spike-insert equipped speakers I've come across, every one has failed to seat the insert sufficiently securely to cope with my spike tightening enthusiasm — and if a spike isn't properly secure, it doesn't work properly. The Rogers was more trouble than most in this respect, and it's also only 25cm deep, so a rather small footprint has to support a tall and top heavy structure: there's no overt instability of course, but I suspect that a metal frame with longer footprint (and welded spike inserts) might well have improved performance had such an alternative been available.

Tall, slim and wrapped in vinyl woodgrain with a full length grille and black laminate front and back, the loudspeaker itself looks attractive enough in a rather innocuous and deliberately conservative way.

The unclothed baffle with transparent driver cones isn't a particularly pretty sight, but the grille arrangement, using a cloth covered thin board with cutouts that sit snugly around the driver frames, is a very neat way of minimising any acoustic impediment.

The bass and bass/mid drivers appear to be identical, though in fact the lower one is rolled off above 400Hz, and only the upper one functions as a midrange driver. Both have 145mm clear plastic cones with wide soft surrounds in pressed steel frames. The magnets are a decent size but the fixing is done using silly little woodscrews that could have been tighter — as indeed they were on the 19mm metal dome tweeter.

The front baffle is built from sturdy 19mm MDF, while the wrap is 16mm chipboard, with a central horizontal partition to provide stiffening and separate upper and lower chambers acoustically. The inside is lined with foam, and bi-wire terminals feed the PCB crossover which is hardwired to the drivers.

Test report

Given the Rogers tradition, the measured performance came as a bit of a surprise. Sensitivity is very high, and the load impedance is kind to amplifiers too, so serious loudness is on the agenda even with modest amplification. Unlike the KEF and JBL models included in this review group, however, the LS8a achieves this by sacrificing something in bass extension, which rolls off quite rapidly below 50Hz.

The response is well balanced enough overall, at any rate from 50Hz up to around 13kHz, though the shape is dominated by distinct upper mid prominence between

800Hz and 3kHz, which is bound to add significant character to the sound.

Sound quality

The listening panel gave the 8a a rather mixed reception. The speakers were certainly able to generate an impressive sense of scale and a fair amount of welly, but the bass is also a bit lacking in pace, delivering slam of a kind that is also a little thick, warm and plodding, leaving the sound distinctly short of snap, drive and excitement.

Stereo images are well formed and free of boxiness, and vocals do sound quite appealing, if a bit pinched and coloured too — the midband is slightly nasal, harsh and quacky, presumably because of the upper-mid forwardness. Perhaps in consequence the sound lacks genuine transparency, but on the other hand it does go very loud and stays well controlled while doing so.

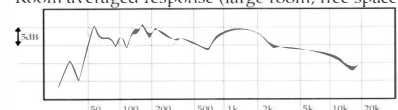
Conclusion

The LS8a is something of a mixed bag, largely I suspect because of the engineering compromises imposed by producing such a large loudspeaker at such a modest price. The end result is obviously good material value for money, has plenty of scale and welly, and will go impressively loud too, but it is also rather lacking in the subtlety, clarity and agility delivered by smaller but more substantially engineered rivals.

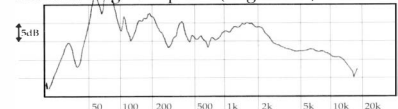
TEST RESULTS

Size (hwxwd)	89x25.5x25cm
Weight	16kg
Recommended amplifier power	10-100W
Recommended placement	clear of walls
In room averaged response limits 50Hz-10kHz	+/-5dB
Large room/space LF rolloff (-6dB ref midband)	48Hz
Large room/wall LF rolloff (-6dB ref midband)	48Hz
Large room output at 20Hz (ref midband)	-19dB
Estimated midrange sensitivity (ref 2.83V, 1m)	91dB
Impedance characteristic (ease of drive)	very good
Typical price per pair (inc VAT)	£425

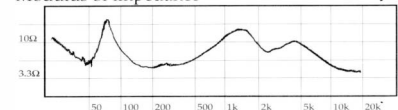
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)

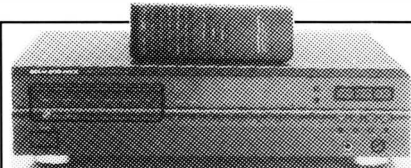


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A little more than twenty years ago, a small firm called Spendor started up around a nucleus of ex-BBC personnel, and brought to market one of the most influential loudspeaker designs ever, the redoubtable *BC1*. This stereotype 'BBC monitor' was one of the first to use a plastic main driver cone, and delivered a midband smoothness and evenness that still sets a standard today.

Although this is a much smaller design, and the engineering itself has evolved steadily over the intervening two decades, *BC1* ancestry can still clearly be seen in this new Spendor *S20*. Notice the fine real wood veneer finish on all six faces, the conservative and tasteful presentation, and the substantial high quality build, each enclosure weighing in at a hefty 10kg. Such honest to goodness traditional virtues don't come cheap in this mass production age. The *S20* costs £500, which may be a lot less than some even smaller rivals, but must still be regarded as expensive, even by 'luxury compact' standards.

It's a two-way sealed box, both baffle and back panel slightly recessed under the wrap, with drivers that are rebated to sit flush with the front. A carefully shaped MDF frame grille incorporates damping felt in the tweeter area. The main driver uses a quite small 110mm clear plastic cone with wide surround termination, mounted on a cast frame and driven from a very powerful magnet. No fewer than eight fixing bolts were all tightly secured, though the four holding the 19mm fabric dome tweeter were more variable.

The front panel is built from 15mm MDF, while the wrap follows Spendor's longstanding tradition of using thin (9-10mm) walls, damped and mass-loaded by heavy bituminous pads. Further stiff-

ening is provided by an internal shelf brace, and dense foam fills up the space. Two pairs of bi-wire/-amp terminals are tag connected to the drivers by a complex PCB crossover.

Test report

Sensitivity is a resolutely low 83dB or thereabouts, but the impedance is very benign, and bass extension very good for such a small loudspeaker.

In the best Spendor tradition, the room averaged responses are exceptionally smooth and even through the midband and treble, especially when the speaker is kept well clear of walls. However, the relative bass levels suggest that a little wall assistance will prove beneficial, so a little experimentation to find the best compromise is necessary.

Away from walls output is strongest in the lower midrange, the response falling away slowly but surely above that by about 3dB/decade. The crossover transition from main driver to tweeter is exceptionally coherent and smooth.

Sound quality

Recognised as a classic Spendor sound by at least one panellist, the *S20* still failed to raise any great enthusiasm amongst the panel as a whole. The main complaint was that it made the music sound rather dull and boring. It delivers an impressive enough sense of scale considering the small size of the box, but the bass quality attracted considerable criticism for its lack of integration, coherence and 'tactile power', in the words of one panellist.

I spent a fair amount of time with the Spendor after the blind tests, and developed a healthy respect for its strengths, even though I still regard the bass quality as a weakness.

Slate Audio stands proved good partners, and I relished the extraordinarily natural timbres when reproducing the spoken word, which is clear evidence of the BBC heritage. The seamlessness of the midrange and treble is its own reward here, despite some thickening and chasteness, and the fact that the treble doesn't sound 'obvious' is a further bonus.

So too is the fine stereo imaging — provided you take care to find the precise hot-spot and stick with it. (It's one of the unwritten laws of stereophony that the finer the detail the more axis-sensitive the speaker.) Yet at the end of the day I was always conscious that the sounds I was listening to were reproduced sounds. The Spendor renders the recording, transmission or whatever with great accuracy, but somehow never makes — or even attempts — that leap towards breaching the reality barrier that is the goal of the serious hi-fi enthusiast.

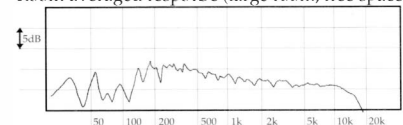
Conclusion

One man's relaxed self-effacement and neutrality is another man's blandness and boredom. Spendor's *S20* may be reluctant to send pulses racing, and is not a first choice for promoting communication between performer and listener, but it successfully avoids many of the colorations that plague most rivals, and provides an unusually natural perspective onto the recording medium. Weighing up these conflicting priorities must be a matter for the reader, not the author.

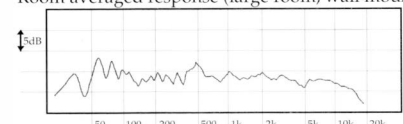
TEST RESULTS

Size (hwxwd)	38x22x26cm
Weight	10kg
Recommended amplifier power	20-100W
Recommended placement	stands 1-2ft from wall
In room averaged response limits 50Hz-10kHz	+/-5dB
Large room/space LF rolloff (-6dB ref midband)	25Hz
Large room/wall LF rolloff (-6dB ref midband)	22Hz
Large room output at 20Hz (ref midband)	-7dB
Estimated midrange sensitivity (ref 2.83V, 1m)	83dB
Impedance characteristic (ease of drive)	very good
Typical price per pair (inc VAT)	£510

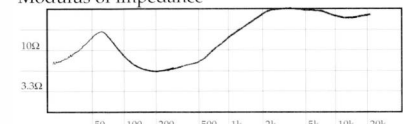
Room averaged response (large room, free space)

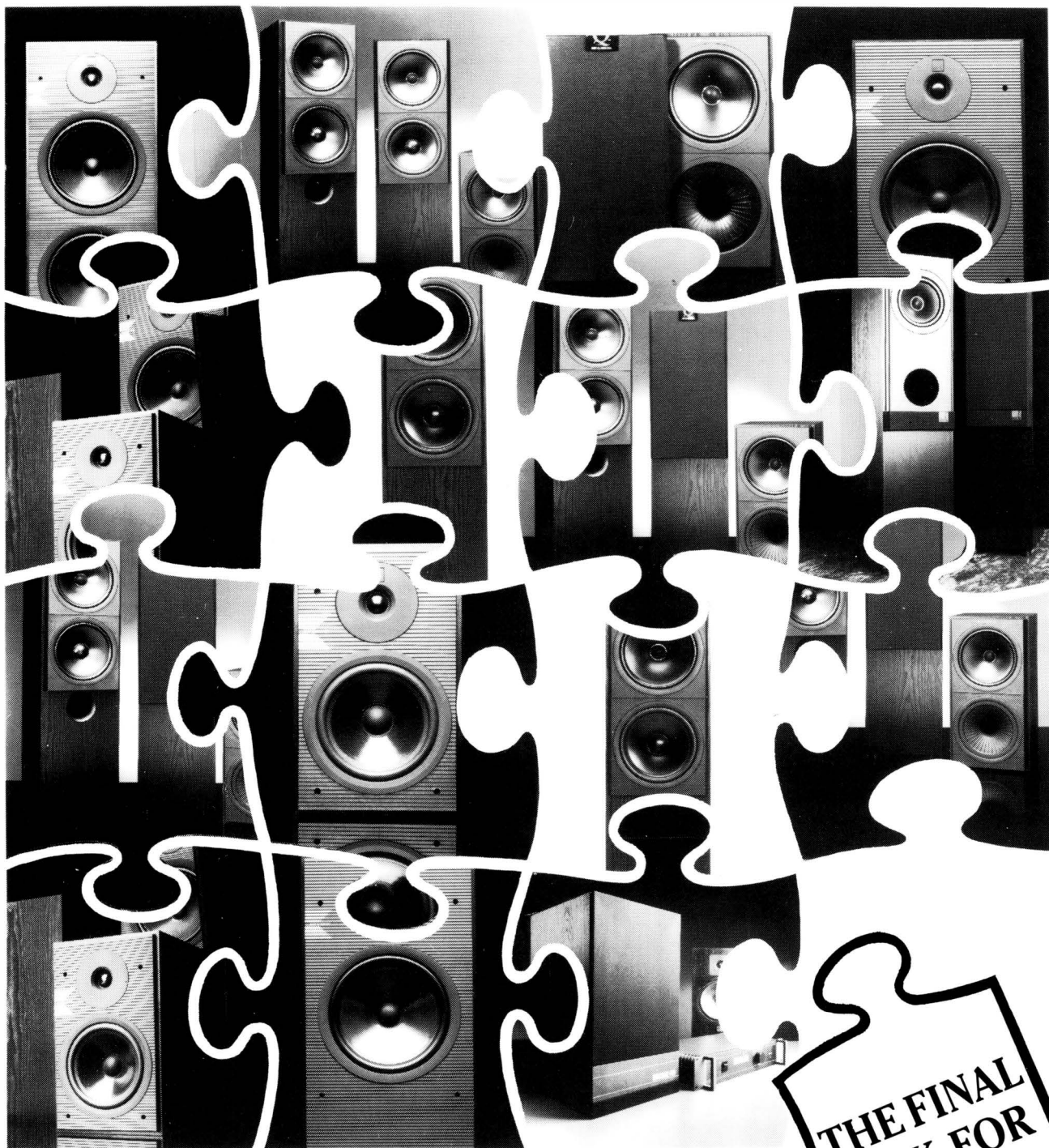


Room averaged response (large room, wall mount)



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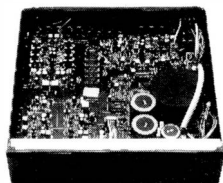
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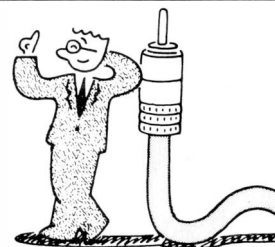
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Tannoy 603

TANNOY LTD, ROSEHALL INDUSTRIAL ESTATE, COATBRIDGE, STRATHCLYDE, SCOTLAND ML5 4TF. TEL: (0236) 20199



Tannoy took its courage firmly in both hands when conceiving the new *Sixes* range of loudspeakers, though early reports suggest that this radical departure in styling and appearance has been well received, by dealers and public alike. Perversely, there are in fact seven models in the range; *Sixes* refers to the fact that the ubiquitous square box shape has been discarded in favour of a hexagonal shape with six sides, capped top and bottom by plastic endpieces.

Certainly there's no question that the end result looks strikingly and appealingly different, though the engineering rationale behind the decision is equally cogent, from acoustic, mechanical and production perspectives. The conventional cuboid shape has a number of inherent problems, to do with standing waves created by the three main internal dimensions, and by adopting an irregular hexagon plan, Tannoy has reduced and spread those arising from two of the dimensions. The creation of a largenumber of unequal size panels should also promote stiffness and spread panel vibration modes, while the comparatively narrow baffle for the size of the box will assist in achieving good lateral dispersion.

The 603 is the baby of the range, a tiny little two-way reflex ported miniature that's priced at £120 and designed to be used well clear of reflecting surfaces like walls and the floor. To which end Tannoy will supply a rather elegant matching stand, made from substantial MDF endplates with twin pedestals that can be mass-loaded with lead shot. It's a tripod, with hexagonal overtones and decorative laminate to match the speakers.

The speaker itself feels a rather lightweight affair, a letter balance probably providing a more accurate assessment of

the 3kg or so weight than my bathroom scales. Construction is based around the aforementioned hexagonal wrap, the plastic base providing sockets for security bolting to the stands. The top insert features a curious though attractive laminate, with a sort of tortoiseshell pattern that can't decide whether its blue or brown, and could prove an irresistible temptation to pot plant fans. The optional grille is a neat affair with slim plastic frame, set out from the baffle on short stalks.

The wrap is only 12mm chipboard, though the shape assists structural rigidity. A vertical brace clamps top and base together, and is also mechanically coupled to the main driver magnet via heavy damping gunk. The inside is lightly filled with damping material, the small port being located at the rear.

The main driver has a tiny 85mm plastic cone with quite a wide, soft surround, built on a pressed steel frame and equipped with a decent size magnet. The tweeter is a 25mm metal dome, with detachable protective mesh cover.

Test report

Small boxes and drivers inevitably constrain specific and low frequency output. The sensitivity rating of 85dB is somewhat below average, but pretty typical of the type. Impedance is nice'n'easy, and bass output predictably rolls off quite rapidly below 50Hz.

The response trace confirms the optimisation to free space siting, and is impressively smooth and even right across the band. But it is a dulled response, starting to fall slowly at first above 500Hz, but by around 6dB over the next decade (to 5kHz), and continuing thereafter. Note the contrast with the 609, which maintains its flat response right up to 2.5kHz.

Sound quality

Unlike its big brother, the 603 did not distinguish itself in the listening tests.

Half the panel roundly dismissed it as dull (which the measurements confirm) and boring, which presumably follows in consequence. The lack of any genuine bass weight doesn't help of course, and what bass there is seems a little slow and ponderous, lacking in drive and energy.

However, one listener did go some way towards justifying Tannoy's unusual cabinetry, stressing the notable lack of boxiness and nice stereo imaging, observations which were amply confirmed during subsequent sighted auditioning. Balance notwithstanding, the sound is quite open and well integrated, and coloration is pretty well controlled, though the lack of drive remains a limiting factor.

Conclusion

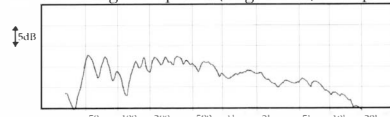
This pretty little speaker is competitively priced and has a lack of boxiness that does much to vindicate its unorthodox construction. Budget miniatures balanced to work well away from walls, with all that means in terms of midband clarity and stereo precision, are pretty thin on the ground, and the slightly dull balance here could also prove a boon when connected to the end of a comparably priced budget system. Ultimately the sound is a bit small and feckless, but cautious Recommendation seems appropriate.



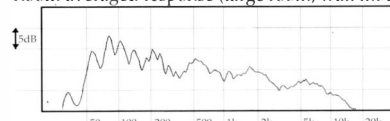
TEST RESULTS

Size (hwxwd)	33.5x22(max)x16cm
Weight	3kg
Recommended amplifier power	20-80W
Recommended placement	high stands in free space
In room averaged response limits 50Hz-10kHz +/-5dB	
Large room/space LF rolloff (-6dB ref midband)	45Hz
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)	85dB
Impedance characteristic (ease of drive)	very good
Typical price per pair (inc VAT)	£120

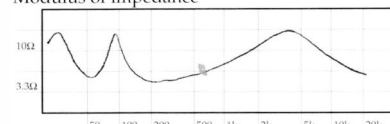
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



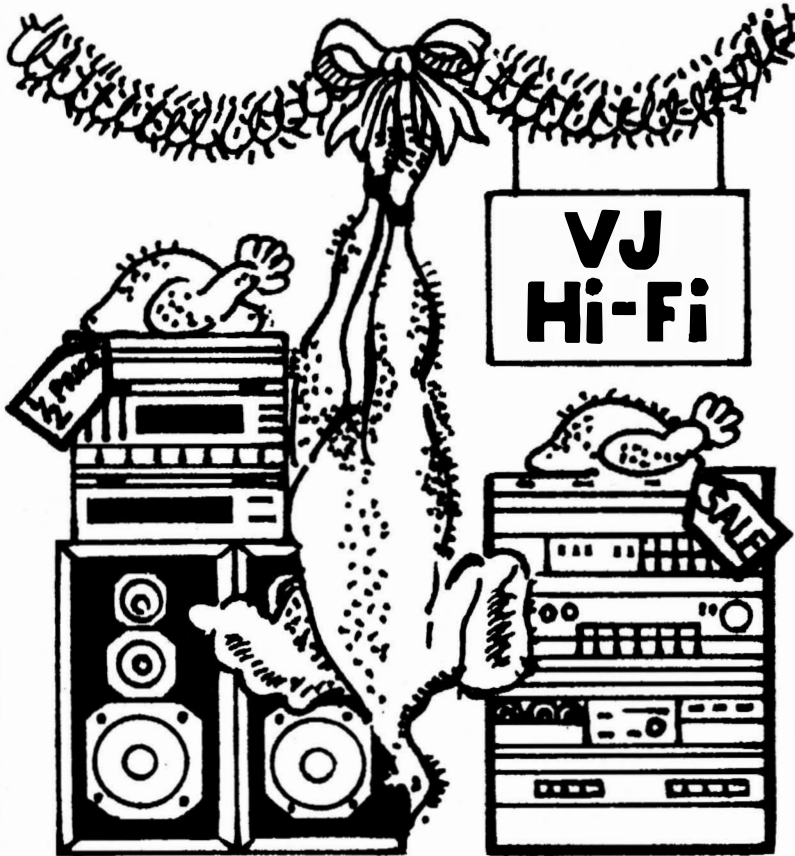
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Tannoy 609

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Tannoy's new *Sixes* represent a radical departure in loudspeaker cabinet design. One which not only introduces a touch of aesthetic freshness to a world of cuboid boxes, but also provides sound engineering justifications for the change, some of which are briefly summarised in the review of the tiny *603* on the previous page.

The £250 *609* sits at the midpoint of the seven-strong range, sharing the 'large bookshelf' size enclosure with the cheaper *607* but fitted here with the latest domestic version of Tannoy's famous dual concentric driver, as used throughout the top four *Sixes* models.

The DC driver has been central to Tannoy's engineering for longer than I can remember. The term dual-concentric refers to the fact that the tweeter is mounted in the middle of the main driver, specifically at the back of the magnet, and is coupled via a horn that uses the main driver cone as part of the flare. Such concentricity inevitably improves the integration of the drivers and eases the passage through the crossover region.

Horn-loaded tweeters have advantages in sensitivity, which explains their popularity in high level and PA work, but historically have tended to lack the sort of smoothness preferred for lower level domestic applications. This new variation has been subject to extensive computer aided design optimisation, and significant improvements are claimed.

This new DC driver is a handsome affair, the throat horn being formed from a precision plastic moulding set into the main voice-coil throat. The tweeter compression driver is firmly clamped to the generous magnet assembly of the main driver, which uses a pressed steel frame and 150mm plastic cone. Surface-mounted, the whole assembly was quite

tightly bolted in place.

Though quite large, the pretty hexagonal cabinet is quite a lightweight affair, with its moulded plastic base and chameleon-like laminate top. The six sides are 18mm chipboard covered in vinyl woodprint, and a long brace couples top to bottom and couples to the main driver magnet via a gooey mastic-like chunk. Bi-wire/-amp terminals have a clever captive bridge for those unwilling to lay out on the extra wire. The grille poses little impediment, the thin plastic frame being set out from the baffle on little stalks, while twin small reflex ports are fitted in the rear panel.

Test report

Sensitivity registers a high 90dB, the impedance represents an easy amplifier load, and yet bass extension is very well maintained (-10dB at 20Hz in-room), an equation that shows Tannoy knows how to do sums and stretch the loudspeaker performance envelope.

The in-room traces show that close-to-wall siting is unwise, but that a little wall reinforcement can help fill in the rather lean mid-bass balance seen on the free space trace. Barring some unevenness, especially the dip around 800Hz, the response is impressively well balanced from 30Hz up to around 2.5kHz, which is where the tweeter takes over. There is quite a significant loss of energy above this point, the broad—and notably flat—treble part of the spectrum lying some 6-7dB below the main midrange level. A contributory factor could lie in the rather directional nature of the horn tweeter, and consequent reduction in the reflected sound reaching the measuring microphone, but there's no avoiding the rather abrupt amplitude step, even though the trace

looks impressively smooth for a horn loaded device.

Sound quality

The panel reacted very positively to the *609s*, even though a number of criticisms were also expressed. Though not dramatically 'fast', it's always lively and has very superior coherence. The inherently communicative midband helps the music to flow well and exposes the musical messages behind the sound.

It goes loud with some decorum and punch, though the bass is a little short on pace and authority, and most listeners thought the speaker sounded a little smaller than its measured bandwidth suggests. The relative lack of treble was duly noted, as was a consistent 'quacky' coloration on voice that is probably due to the response 'knee'. Other colorations are audible, but reasonably well controlled.

Conclusion

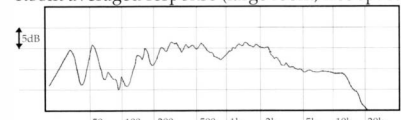
I suspect the *609* might have worked better still with a few more decibels of treble output, but there's no question that the slight treble roughness of earlier DC drivers has been eliminated. Although the foundation provided could perhaps have been more solid, the hex cabinet introduces little apparent coloration, while the lively coherence is itself ample grounds for enthusiastic Recommendation. Indeed, at £250, I guess it deserves to rate a Best Buy.



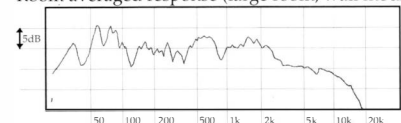
TEST RESULTS

Size (h x w x d)	50 x 32 (max) x 22 cm
Weight	7.5 kg
Recommended amplifier power	10-150 W
Recommended placement	stands clear of walls
In room averaged response limits 50Hz-10kHz	+/-6dB
Large room/space LF rolloff (-6dB ref midband)	25Hz
Large room/wall LF rolloff (-6dB ref midband)	25Hz
Large room output at 20Hz (ref midband)	-10dB
Estimated midrange sensitivity (ref 2.83V, 1m)	90dB
Impedance characteristic (ease of drive)	very good
Typical price per pair (inc VAT)	£250

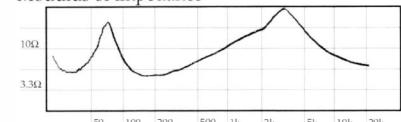
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



Modulus of impedance



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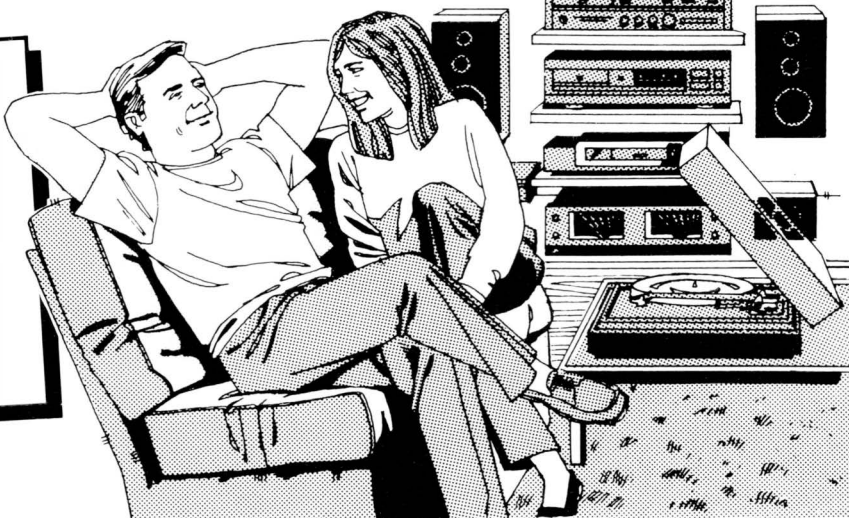
This month, we would just like to clarify what we are trying to achieve (some aspects are already referred to in the Spotlight), and what you can expect from us. Firstly, what you will not find is huge arrays of speakers, amplifiers, CD players and cassette decks. If you want to hear every brand on the market, don't bother! We haven't the space or the inclination to stock them all. We have to be selective, and so the equipment we stock has been chosen by us as representing the best we can find, to cover a specific need, be it price, size or looks.

For example, anyone requiring a small, reasonably priced speaker, need look no further than either the RUARK Swordsman/Plus or the Sabre, but if you can afford more, but still require a small speaker, then you can't do much better than the AEI's. If you require a large speaker then you can choose between the RUARK Accolade, the ATC50/100's or the only American speaker we sell, the Dahlquist DQ12/30. We are not claiming that all the other speakers on the market are rubbish; just that we know that combining the units we sell, with appropriate amplification from AVI, Exposure, Forte, Boulder and Threshold etc., we can produce systems that sound as good as any we have heard. And it's the total system sound that is important, and where so many reviews fall down. They cannot go to the lengths we go to, to find the combinations that work. One magazine recently gave the ATC SCM20 a lukewarm review, but then they were using NAIM amplification. Nothing against NAIM, but it is not what we would recommend for ATC20's. The following month the same magazine published an article by another reviewer, raving about the speakers, and pointing out that he was using completely different amplification to that used previously! So much for that review! That is what we are about!

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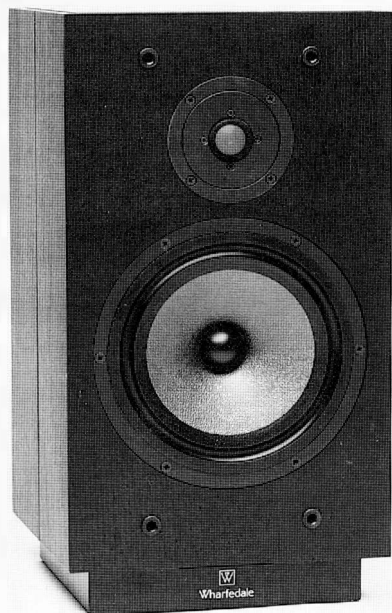
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Wharfedale Coleridge C

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Wharfedale's *Coleridge* made its *Choice* debut a couple of years ago (issue 82), so the time for a little re-gilding of the original lily is just about due. Gilding isn't perhaps quite the right word for a process which presumably involves ceramic vapour deposition, but Wharfedale's latest development of a 'ceramic' tweeter was an ideal opportunity to update the *Coleridge* by adding a C suffix.

Tweeter aside, this is already a pretty unusual and interesting design, both from a styling and a construction point of view. It's a compact stand-mount intended for free space siting, and weighs half as much again as a typical loudspeaker of similar dimensions.

A lovely real wood veneer covers front back and sides, apart from a decorative groove, and the square top surface has a neutral decorative laminate that looks the perfect site for a little jardiniere, and some species of parlour palm.

All is built onto a solid little MDF plinth, which incorporates and conceals a quite generous reflex port and the two pairs of bi-wire input terminals. The grille frame moulding is acoustically effective enough, if rather self-consciously elaborate in design; at least its a bit different and quite smart, though the tree-wood naked baffle with neatly rebated drivers is arguably prettier.

The box is hefty 21mm MDF, with even thicker top and base, the wrap further stiffened by an O-brace, and the baffle by a ring. All is lined with felt and fairly well filled with wadding. Bi-wire terminals are hardwired to the high power PCB crossover and the drivers.

The main driver has a 150mm textured plastic cone, a cast frame and a very big magnet, all secured by six tight bolts to a baffle reinforcing ring. The 'ceramic' tweeter has a dimpled dome about 24mm across, and was fixed with four fairly tight woodscrews.

Test report

Tweeter apart, one might have expected to find close correspondance between *Coleridge C* and the original *Coleridge*. The box may be much the same, but just about everything else has changed, a amply illustrated by the quite different impedance characteristic.

It remains a fairly easy load for the partnering amplifier, but the sensitivity, as judged by the main midrange, is a dramatic 5dB lower, and is now a little below average.

This is in fact a good thing, because the net result is a much more balanced overall response, especially in terms of the relative levels of bass and midrange, now that the 150Hz-1.5kHz decade has been pulled back into line.

This new version now shows an impressively even balance all the way from 50Hz up to 15kHz, interrupted only by a mild crossover suckout. But it is also a steadily falling smooth and even response, the overall trend tilted down by about 8dB across the band.

Furthermore, both bass and treble look a shade exposed, and the former falls off rather rapidly below the port resonance at 50Hz — one might have expected greater bandwidth for the price, size and sensitivity.

Sound quality

The panel was evenly but implacably divided over this one; two in favour, two against and one sitting on the fence. One possible source of confusion may have been its habit of sounding happier with CD than with vinyl disc, an observation that held true in sighted as well as blind listening.

There was also some suggestion that the sound got better as it warmed up and/or ran in, two factors which make subjective assessment in a multiple review context somewhat unpredictable. Initial notes complained of some treble harshness, but this seemed to ameliorate during the course of the review programme, later reports praising the fine treble detail, which provides some validation for the new tweeter technology.

The sound is quite solid, punchy and dynamic, though this is offset by the

slightly recessed presence and somewhat dull overall balance, which tends to thicken and darken the sound somewhat. Lively rather than genuinely 'fast', there's a little chestiness and nasality and the treble remains a shade obvious and detached, but coloration is generally pretty well controlled and stereo images are very well formed.

Conclusion

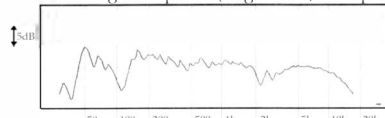
The *Coleridge C* is very prettily dressed and sounds pretty good as well, though whether the end result fully justifies the £600 pricetag must be open to debate.

Well balanced, smooth and a little dull, it could work well in a CD-oriented system, and the new tweeter makes its own very positive contribution, but the sensitivity and bass extension are less impressive.

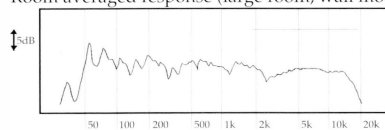
TEST RESULTS

Size (h x w x d)	48x25.5x25.5cm
Weight	12kg
Recommended amplifier power	20-100W
Recommended placement	stands clear of walls
In room averaged response limits 50Hz-10kHz	+/-6dB
Large room/space LF rolloff (-6dB ref midband)	30Hz
Large room/wall LF rolloff (-6dB ref midband)	30Hz
Large room output at 20Hz (ref midband)	below -20dB
Estimated midrange sensitivity (ref 2.83V, 1m)	86dB
Impedance characteristic (ease of drive)	good
Typical price per pair (inc VAT)	£600

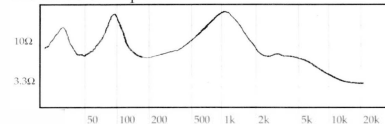
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



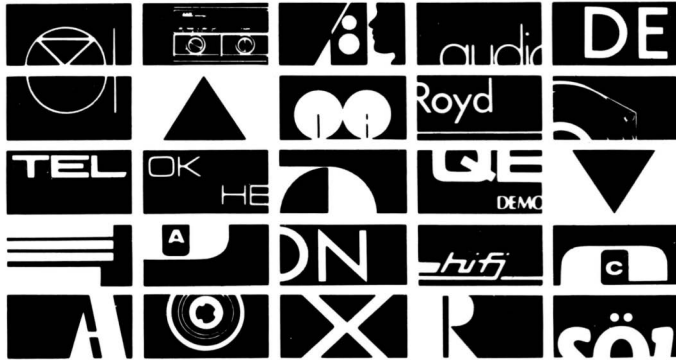
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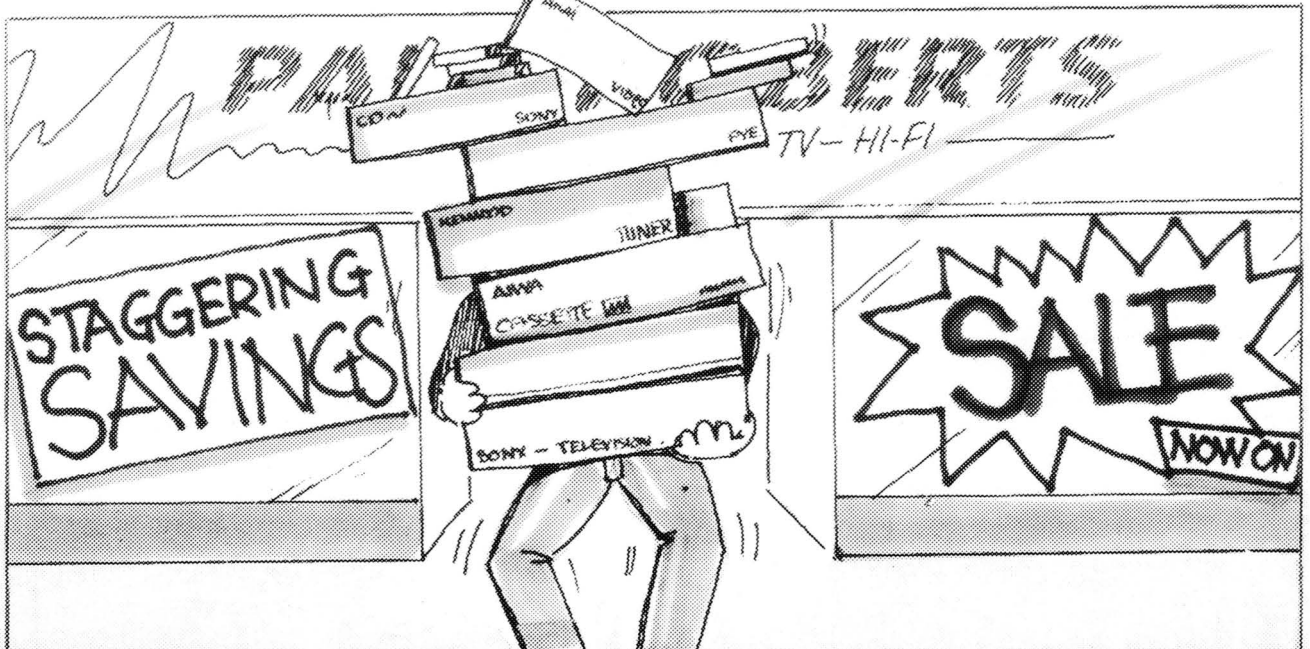
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All interesting early Hi-Fi and Valves considered.

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Conclusions, Best Buys & Recommendations

As the final full stop embellishes the twenty sixth loudspeaker review, the numb-brained contributor attempts to refocus his attention on the Big Picture. This particular group was as engrossing as any, though more for the sheer individuality of the most interesting models than for any coherent and identifiable overall trend. Middle-sized, middle-priced speakers accounted for roughly half the total, the numbers being made up by half a dozen miniatures and five floorstanders.

As usual, about half the models achieved Recommended status, though drawing the dividing line was perhaps a little more difficult than usual, and I could quite easily have restricted the list to six, or extended it to eighteen, depending on the somewhat arbitrary weighting of the various criteria.

A numb-brained Paul Messenger gathers his thoughts on this month's group of loudspeakers and sums up the more appealing models that he heard.

Although it would be nice to have a set of absolute criteria against which to assess speaker sound quality, the real world isn't that simple. The loudspeaker is at the end of a chain of components, and the substitution of any of these will influence the final results in one way or another. So too will the listening room itself, which is another completely unpredictable variable.

And there's no avoiding the fact that my own personal preferences and prejudices are bound to come into play, no matter how I try to moderate them through the blind listening tests. There's no question that the NEAT and the Naim were my personal preferences from the current crop, simply for their superior speed and coherence (and hang the coloration). But my partner often preferred the rather softer and lazier but more delicately transparent sounds made by the M-S *Classic 20* and MA *Studio 15*

Best Buys

Two models stood out sufficiently to deserve Best Buy rating. It's hard to argue with a package that's such good material and build value as the £135 **JPW P1 Vinyl**. This speaker is a safe bet that's unlikely to disappoint when used on the end of an appropriately modest system, and its performance envelope is very good for the price.

The £250 **Tannoy 609** is an altogether more radical proposition in every respect. I have a soft spot for the sheer coherence of dual concentric drivers, and Tannoy's latest reworked variation is considerably sweeter than the generation it replaces.

Recommended

Structured in the time honoured price ascending tradition, the tiny £120 **Tannoy 603** starts the ball rolling. Optimisation for free space siting gives the

hex cabinet a fine chance to show off its lack of boxiness and superior stereo imaging.

The £130 **Castle Storm Grey Trent**, so called because of its rather pretty painted matt grey exterior, is a wall mount, and well balanced for that purpose. It doesn't need a powerful amplifier to go quite loud, but at modest levels it's engagingly lively and coherent, though not all that smooth.

The **Allison AL110** is a little smaller than many of its £220 rivals, but probably turns that fact to its advantage. A little dry and mid forward, the well extended bass is better controlled and more solid than most of its peers, giving good scale and slam.

The £350 **Canon S-50** is small, doesn't go particularly loud, and hasn't any serious bass extension, none of which does much to justify the price. But the styling is sensational and this curious shape is used to create a stereo soundstage which is effective over a much wider than usual area.

Linn's £357 **Helix** is one of the best 'large bookshelf' size models I've encountered in quite a while, most notably for the superior analysis afforded by its dry and controlled bass, and the very open balance. The **KuStone** stand is a natural and elegant partner.

The £379 **KEF Q60** is a quite large stand mount speaker, aligned for wall siting, and distinguished by the company's Uni-Q variation on the co-axial driver theme. The balance is a little odd, and indeed somewhat uneven through the lower mid, but it goes very loud with even modest amplification, and holds together well when doing so.

The **Spendor S20** is a solidly built little compact, priced at a not inconsiderable £500, but beautifully finished and traditionally elegant. It doesn't go loud and the bass is rather unconvincing. But the broad mid-to-treble balance is exceptionally smooth, even and well integrated.

I still can't quite believe that the cute little **NEAT Petite** costs £525, since there doesn't seem all that much to it, at least on the surface. It doesn't even produce a particularly respectable set of measurements. But at the end of the day I consistently found it just about the most entertaining and enjoyable speaker in the whole bunch.

Pretty polished wood embellishments decorate the slim and otherwise discrete **Heybrook Sextet** (£900 plus £50 stand). This elegant floorstanding wall-mount takes up very little room space and uses a three-way driver configuration that includes a sweet ribbon type tweeter to deliver an engagingly coherent and highly analytical sound.

The £1,527 **Naim SBL** must be just about the most elaborate two-way speaker it's possible to conceive. Multiple decoupled boxes and an elaborate integral stand confer an unexpected sense of scale and full bandwidth coherence from an attractively compact and discrete floorstanding wall-mount.

The £1,600 **Monitor Audio Studio 15** offers much less material value for money. It's a little slow and lazy for my personal taste, but several listeners rated it's delightfully coherent and transparent midband very highly indeed.



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Tech Talk

These days the *Choice* loudspeaker test schedule involves almost continuous appraisal of batches of around 25 models, which are published thrice a year, alongside occasional one-offs and smaller groups of niche models (miniatures, giants or whatever).

'One-site' testing is the only sane and sensible way of handling the logistics, even though it does leave my home inundated by black vinyl and cardboard for many months of the year.

The main listening room therein is used for the 'blind' panel and subsequent hands-on listening, and also for the test measurements, which does help provide correlation between the two, but which inevitably means said room will exert a major influence on results. Which may not be ideal, but which is probably unavoidable. The room itself is described in detail later.

The tests

The 'blind' tests on this occasion lasted three days with about five listeners on each occasion, making up around 30 separate presentations of about half an hour each. Split evenly between vinyl and Compact Disc, the programme covers as broad a range of music as possible.

Choice of ancillary components inevitably influences the type of sound, possibly as much as the room itself, and is one potential source of prejudice I know no way of avoiding. The main drive system comprises Naim amplification (*NAC52*, *NAP250* and

Paul Messenger explains how the loudspeaker listening tests and measurements were performed, and outlines what the findings reveal about the products.

NAP135, backed up by Audio Innovations *First Audio* and Alchemist Products *Freyja/Genesis* combination. Sources included Linn *Sondek*/*Naim ARO/Troika* for vinyl disc, Naim CDS, Micromega *Logic* and Meridian *200/203* CD players all mounted on Mana tables.

Bookshelf models were used on Linn *Kan*, Foundation *Designer*, Heybrook *HBSI* and Slate Audio stands, with others brought in for hands-on work. Bi-wiring is adopted where available, using heavy multi-strand Naim *NACA5* in the blind tests, backed up hands-on by Mission *Cyrus* and Heybrook *Heywire* solid core and Naim *NACA4* and Rotel *Supra* multi-strands.

My particular thanks go to Glenn Harris for all his hard work as operator on the blind listening tests, and also to panellists: Ken Weller (Tannoy), Richard Dunn (NVA), Peter Comeau (Heybrook), Guy Sergeant (Audio Innovations), Russell Kauffman (Lecson/AAS), Steve Hopkins (Meridian), Dan Houston (freelance), Phil Ward (Canon), Ian Bolt (Micromega), Robin Marshall and Andy Whittle (Mordaunt-Short).

The test programme is based on two separate sets of room measurements, one taken with the speaker placed close against a rear wall (but more than a metre from side walls), the other a metre out into the

room; intermediate positions produce more or less intermediate results.

A conventional pen recorder/mike set-up (Neutrik) is used to carry out sequential sinewave sweeps (high pen and paper speeds) for a succession of microphone positions. Experiment has shown that seven such plots are ample to define the averaged response in the listening area.

A perfectly flat straight line is not a realistic target. Low frequencies are inevitably heavily modified by the main room modes - most notably the c10dB boost at 30Hz (or 10dB suckout at 42Hz if you prefer). Room reflections also create interference well up into the midband, especially when the speaker is close to the wall.

Nevertheless, careful comparison with listening findings and established references suggests that the ideal balance should be as flat and smooth as possible. Gentle variations are preferable to sharp discontinuities, and prominences tend to be subjectively more irritating than dips, while a gentle high frequency rolloff above c5kHz usually sounds perfectly acceptable.

Sensitivity differences have as much to do with impedance variations as with conversion efficiencies, which is one reason why the impedance has also been plotted and presented. Halve the impedance value and a speaker will suck twice the current and therefore twice the power for the same amplifier volume setting. By adopting 4ohms rather than 8ohms impedance, 'current hungry' designs therefore 'pinch' 3dB of extra sensitivity. Few amplifiers have the capability to deliver this extra 3dB in full, most settling for 1.5-2dB, so an apparent sensitivity advantage may well be largely negated in practice.

The listening room

The speaker and microphone sites parallel the listening tests, giving a measuring distance of 3-4m. The room itself is a sturdily built, sparsely furnished 4.3x5.5x2.6m, with wooden floor. Painted plaster walls and ceiling are broken up by wooden beams, while the open fireplace, alcove doorway and large semicircular bay help distribute standing waves.

One consequence of the room-based testing is that the low frequency extension is defined as much by the room as the loudspeaker. Low frequency roll-off is traditionally expressed as the -6dB (sometimes -3dB) point referred to the sensitivity. Such a technique can be applied with room measurements, but the results tend to be strongly modified (even modulated) by the main room modes.

Probably more useful is to specify the relative level of 20Hz ref the midband sensitivity. However, this has the drawback that a good percentage of speakers don't go down much below 50Hz, never mind 20Hz. Until I can figure out a better approach, I am quoting the -6dB points for both free space and wall mount conditions, plus the 20Hz level.

The *Directory* 'bass from' entries for the reviews carried out using room measurement techniques therefore refer to the best position -6dB point for the speakers concerned, and cannot be compared directly with earlier 'anechoic' entries, though each has its own internal consistency.

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.

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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.

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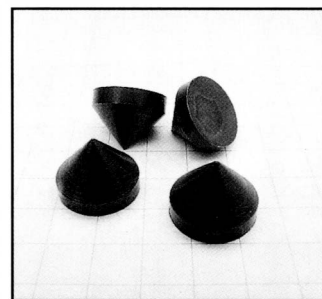
£15.99 ref:A9

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.

Choice Offers Order Form



Furukawa FA11S Series balanced analogue interconnect cables

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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.

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 an appropriately larger occupation area for the skin effect, therefore bass is large 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.

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	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	FS2FO9	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
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RADKA TONEFF:

Fairytales

Ref LP1 £12.95

Ref CD1 £14.95

The well known audiophile (digital) recording of female voice and piano. Worth the asking price just for the opening song, *The Moon's A Harsh Mistress*. Odin CD03/LP03

ODIN SAMPLER

Ref CD2 £14.95

The Odin record label was established by the Norwegian Jazz federation in 1981. This 75-minute compilation on CD provides a taster from the label's catalogue. Not available on vinyl.

Odin NJ-4028-2

GEMINI/TAURUS SAMPLER

Ref CD3 £14.95

A pure jazz label, Gemini records was formed by producer Bjorn Petersen to record Norwegian jazz musicians who deserve wider recognition. Taurus is a subsidiary label presenting less mainstream music. This 15-track sampler is available only on CD.

Gemini GMCD 6239

TOTTI BERGH:

I Hear A Rhapsody

Ref LP4 £12.95

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On the Gemini label, saxophonist Totti Bergh plays a selection of jazz standards, *Jazz Journal* magazine described this as "A delightful 'wee small hours' album". Gemini GMCD48/GMLP48

SMITH/RICCI:

Paganiniana

Ref LP10 £14.95

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Breathtaking purist analogue audiophile recording of classical works performed on piano and violin. On the American Water Lily Acoustics label. Recorded by Kavi Alexander and sponsored by Conrad-Johnson. An essential addition to any audiophile's collection. Water Lily CJCD/CJLP

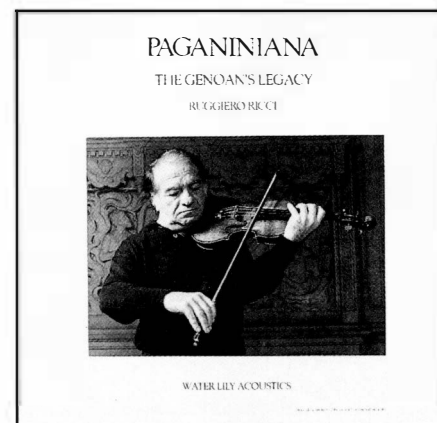
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JIM KELTNER & RON TUTT:

The Sheffield Lab Drum Record

Ref LAB14 £16.99

The Sheffield lab Track Record

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Both the Track Record and the Drum Record are available on a single CD -

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JAMES NEWTON HOWARD: James

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ARNE DOMNERUS' KVARTETT: Blatoner fra Frolidhaugen

Ref CD34 £14.95

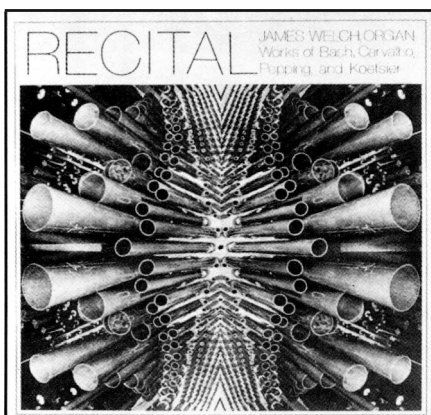
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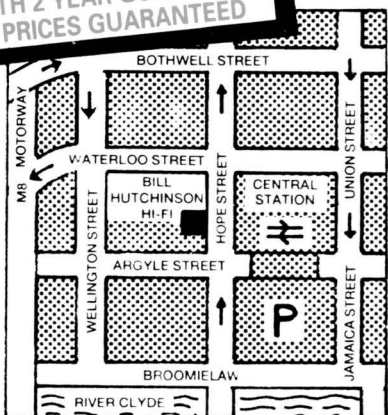


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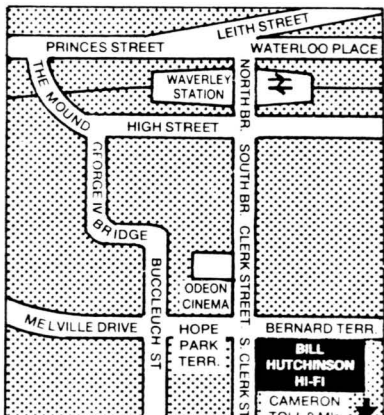
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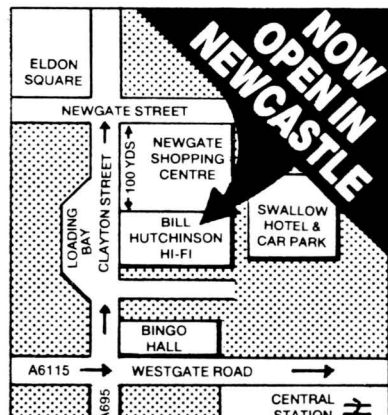
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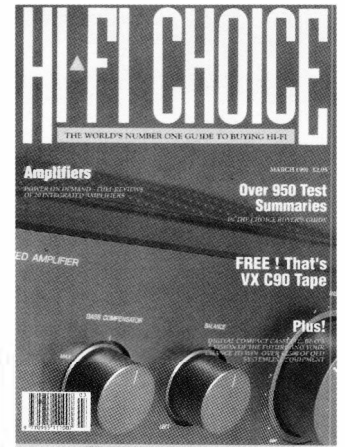
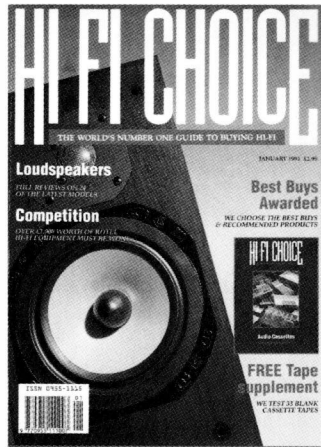
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Glossary

The Hi-Fi Choice dictionary of audio terminology, explaining all the weird and wonderful adjectives used by our reviewers, as well as technical abbreviations.

AM: Amplitude modulated — see 'Medium Wave'.

Acoustic breakthrough: Sound that gets into the turntable and hence the cartridge from the air and thereby creates a risk of acoustic feedback.

Acoustic feedback: If any sound in the room can find its way through the body of the record deck to the cartridge stylus, then that sound will be reproduced from the loudspeakers, along with the desired programme material. If too much of this sound from the loudspeakers is picked up by the cartridge in this way then a vicious circle of acoustic feedback will be created.

Active: Speaker systems which contain electronic crossovers and where the drive units are connected directly to power amplifiers.

Alignment protractor: A device used to minimise the lateral tracking error of a cartridge/arm combination.

Amplitude: Size or magnitude; hence the amplitude/frequency response, known normally simply as the frequency response, which describes the relative loudness of the system at different frequencies with a constant input voltage.

Anechoic: Without echo — a special room or 'chamber' with thick sound absorbing materials on all surfaces to prevent reflections.

Arm mass: More accurately called effective arm mass, because it is not the weight of the arm on a pair of scales. It is the mass of the arm and cartridge combination that appears to be concentrated at, and thus felt by, the stylus tip which is tracking a record groove. There is nothing inherently good or bad about arms with light or heavy effective mass; what matters is the manner and choice of their combination with cartridges of different compliance and the low frequency resonance produced by such combination.

Azimuth: With reference to tape and cassette recorders, the alignment of head gap to tape path.

Balance: 1) The overall relative loudness perceived at different frequencies (eg bass treble); 2) the accuracy of the match between the two channels of a stereo transducer (eg cartridge or pair of loudspeakers).

Bandwidth: A range of frequencies with presumed defined upper and lower limits.

Bass: Lower part of the frequency spectrum.

Belt drive: The turntable motor has its rotational speed geared down to the required platter speed (33 1/3rpm for

LP discs) by a rubber or similar resilient belt which runs round a small pulley on the motor shaft and a large pulley attached to or part of the platter.

Bias: (turntable/arms) Because the cartridge on a pivotal arm is being drawn across the record surface by the stylus tracking at an angle offset from the pivot, groove friction produces an imbalance of lateral force. Bias is the application of a compensatory lateral force acting in the opposite direction.

Bias: (tape) This refers to a high frequency current passing through the record head which allows the audio current also passing through the head to produce reasonably linear magnetisation of the tape at all levels permitted by the combination of each machine with the tape. The lowest level of bias is required for ferric cassettes, a slightly higher one for ferrichrome, an even higher one for chrome or pseudochrome, and the highest for metal.

Bit Stream: the use of single Sign Bits controlling a switched-capacitor DAC to generate a Pulse Density Modulated output. This is achieved via oversampling, truncation of each 16 bit word into 1 bit 'chunks' and the redistribution of errors (noise) via noise-shaping.

Bitstream: a generic term given to those DACs utilising a Pulse Width Modulated output but whose noise-shapers may not operate over the full 16-bit dynamic range.

Cantilever: The thin rod or tube that connects the stylus to the armature and hence the cartridge body.

Capacitance: An element of electrical impedance that is particularly important when matching pickup cartridge, arm leads and amplifier input characteristics to achieve a flat frequency response from discs.

Chipset: a handy euphemism for the decoder, oversampling filter and DAC that comprise the CD player.

Clipping: This is reached when a circuit is overloaded and overdriven, resulting in bad waveform distortion and audibly unpleasant effects.

CLV or Constant Linear Velocity: the rotational velocity of a CD is constantly adjusted so that data passes over the laser at a fixed rate, ie, at a constant 'linear' velocity. The exact velocity differs from disc to disc but usually lies between 1.2-1.4m/sec. The frequency of the recovered data is compared with a crystal reference and the difference is used to speed up or slow

down the rotation of the disc.

Coloration: A general term used to describe the audible effects of distortions, particularly in loudspeakers and record players. These are usually caused by frequency response irregularities and/or resonances.

Compatibility: The selection of interdependent components to achieve optimum system performance; notably arm/cartridge mass/compliance matching, cartridge electrical loading, or loudspeaker compatibility with amplifiers.

Compliance: A measure of the springiness of the cantilever/armature seen from the stylus, expressed in compliance units (Cu), where 1 cu = 10 to the power of -6 cm/dyne.

Crossover: An electrical circuit which uses combinations of inductors, capacitors and resistors to divide the signal from the power amp into the required frequency bands and with any necessary equalisation for feeding to the individual drive-units of the speakers system.

Crosstalk: The leakage from one channel to the other in a two channel stereo system.

Cutter: Mechanism used to cut recorded signal onto lacquer master; consists of turntable, lathe, cutting head, cutting and servo amps.

Damping: A technique for controlling resonances by means of a resistive medium (electrical, mechanical, or acoustic depending on situation)

Decibel (dB): A logarithmic unit that is convenient for expressing ratios that span a wide range on a linear scale. For simplicity it can be regarded as a measure of relative loudness.

De-emphasis: an emphasis or boost is occasionally applied upon recording (max +9dB at 16kHz) to reduce hiss and noise upon de-emphasis within the CD player.

Digital: the use of a binary code (ie, 1's and 0's) to represent, store and transmit an analogue audio waveform.

Digital Output: a datastream adhering to S/PDIF and transmitted in biphasic-mark code, allowing the CD player to be upgraded with an external DAC. The digital output on a player may be coaxial or optical in design but the coding is identical.

DIN: German standards body, responsible amongst other things for a popular range of standard plugs and socket specifications.

Distortion: Literally this can mean any deviation from the original, but usually refers to harmonic rather than intermodulation distortions.

Dither: a low level triangular-distribution noise that is added to convert harsh-sounding granulation distortions into an innocuous background hiss. The S/N ratio may deteriorate slightly but distortion is much reduced.

Dolby: Covers various signal processing/ deprocessing systems, but normally refers to the B and C noise reduction systems used in cassette record/replay, and the B system used for music cassette replay. Also Dolby S Type, the latest form of noise reduction.

Doping: A technique involving the application of damping to a loudspeaker driver cone in order to assist in controlling resonances.

Downforce: The weight, measured at the stylus, which holds it down in the groove.

Drive unit (driver): The term used to distinguish the loudspeaker unit itself, be it bass, midrange, treble or fullrange in application, from the complete loudspeaker system which combines drive units, cabinet and crossover into a total design.

Dropouts: Momentary reductions of programme level due to inadequate head/tape contact caused by oxide particles shedding off the tape onto the head gap, or inadequacies in tape transport or tape.

Dynamic range: The ratio in dBs between the quietest sound that can be successfully recorded and the loudest which can be accepted without serious distortion on an average programme.

Effective mass: The inertia, or mass-controlled resistance to movement, of a device. Particularly important with regard to tonearms.

Efficiency: The amount of acoustic power delivered for a given electrical input power.

Electrostatic: A principle employed in some loudspeaker transducers using static electricity effects to set up a polarising field within which the modulated transducer medium moves.

Equalisation: (general) The deliberate modification of frequency response, usually in response to some engineering limitation or deficiency.

Equalisation: (tape) This refers to the necessary change in frequency response required of an amplifier so that overall flat frequency response is obtained from a tape medium. Equalisation is required both on record and replay. Any tape recorded on a good cassette recorder should have the same inherent response when played back on another correctly set up machine, since all playback

equalisations should have been standardised. These standards are normally specified by the time constants of the circuits involved, eg 70µs or 120µs (microseconds).

Farad: Measure of capacitance.

FM: Frequency modulated, often used to describe radio transmissions of high fidelity potential on the VHF band.

Ferrite rod: A short rod type aerial used for AM reception; may be fitted internally or externally to a tuner or receiver.

Ferro-fluid: A magnetic fluid which is introduced into the voice-coil gap to provide damping and/or improved cooling.

Filter: A circuit (normally) used to restrict the bandwidth of a system, may be fixed or switchable.

Frequency response: The variation in output over a frequency range, particularly of a transducer; can be expressed as a range with decibel limits, or depicted graphically.

Hz (Hertz): One Hz equals one cycle per second and is a measure of frequency which corresponds to musical pitch (the higher the frequency the higher the pitch).

HF: High frequency.

Harmonic: Harmonics are the whole number multiples of a base frequency called the fundamental.

Harmonic distortion: The addition of unwanted harmonics to the required signal.

Hum: A low frequency interfering sound produced by breakthrough or interference from mains wiring or circuitry.

IEC: An international standards body.

Impedance: Measure of resistance (and reactance) in alternating (ie, audio) signals. This is important in the compatibility of both cartridges and headphones with amplifiers. For convenience sake it's measured in ohms.

Integration: Used to describe the success with which the output from two drive units combine to give smooth output through the crossover region.

Intermodulation (IM): A form of distortion arising from two or more signals producing nonharmonic signals that correspond to the sum or difference of the two frequencies.

Jitter: an uncertainty in the position or timing of digital transitions (or edges) caused by interference or poor clock recovery. Digital jitter gives rise to unpleasant distortions after D/A conversion.

Kilo (k): Prefix meaning one thousand.

Lateral friction: The resistance to movement of an arm and cartridge combination in the horizontal plane (ie across a record), caused by friction in its bearings.

LED: Light Emitting Diode; an indicator light.

LF: Low frequency

Load or Loading: The impedance (including resistive and reactive components, ie, ohms, mH pF) seen by one component looking back to its inter-connected component.

'Loudness': An equalisation circuit fre-

quency switchable on amplifiers which is designed to compensate for presumed hearing characteristics at low listening levels by boosting bass and treble.

LSB: or Least Significant Bit, the difference in amplitude between one quantisation level and the next. This is the final bit on the far right of each 16-bit digital word.

MASH: or Multi-stage noise-Shaping. A two-stage process developed by NTT and utilised by Technics (among others) to redistribute the quantisation noise caused by truncation in the bitstream process.

Medium wave: An AM transmission band incapable of high fidelity signals.

Micro- (µ): Prefix for units, meaning 'one millionth of'.

Midrange, Midband: The central part of the audible frequency range where the ear is most sensitive.

Milli- (m): Prefix for units meaning one thousandth of.

Modulation: The audio signal is 'stored' by means of modulations within a medium, eg the 'wiggles' in the groove of a plastic disc, or the magnetic coding on a tape.

MOL: Maximum operating level of tape normally referring to 5 per cent distortion of 315Hz or 3.15kHz.

Moving coil: A transducer (eg cartridge or headphone) where the signal is generated by the movement of a coil within a magnetic field.

Moving magnet: The most common form of cartridge transduction, where the magnet moves while the coils are held relatively stationary.

MSB: or Most Significant Bit. Equivalent to 32768 LSBs in amplitude. This is the sign bit on the far left of each 16-bit digital word.

Multibit: an older style converter that uses 16 or more sequential current sources to build up the audio waveform in response to each 16-bit (or greater) digital word. These DACs suffer from glitches as each current source turns on and off while low-level accuracy is dependent on the precise matching of individual resistive elements. Bitstream DACs overcome these limitations.

Multiplex filter (MPX): A circuit which introduces severe attenuation at supersonic frequencies to decrease interference encountered with the output from some stereo FM tuners.

Nano (n): Prefix meaning a thousandth of a millionth of.

Noise: Random unwanted low level signals.

Noise modulation: An unwelcome breathing effect that can be heard on some programme material, produced by poor noise reduction systems, or circuits.

Noise-shaping: a form of digital feedback used to redistribute unwanted quantisation noise towards higher frequencies.

Octave: Two-to-one ratio of pitch or frequency.

Offset angle: The angle measured between the centre line of the pickup cartridge and the line which joins stylus

and arm pivot point.

Ohm: Unit of electrical impedance (including reactance) or resistance; also kohm, where one kohm = 1,000 ohms.

Overhang: The extent to which the cartridge stylus extends beyond the centre of the platter is critical, and controlled by fore and aft adjustment of the cartridge on the arm.

Oversampling: the mathematical generation of intermediate sample values to effectively double and re-double (etc) the original 44.1kHz sample rate.

PDM: or Pulse Density Modulation represents the audio waveform as the variation in density (or number) of analogue pulses per sample period. More pulses increase the average level of the audio signal at that point in time and vice-versa.

Peak recording level: A level above which distortion becomes apparent. This distortion is introduced when the oxide particles almost reach magnetic saturation, and thus will accept no more level.

PEM: or Pulse Edge Modulation. A bitstream variant developed by JVC that employs two PWM datastreams which are combined to effectively lower the required clock rate.

PFM: or Pulse Flow Modulation. Pioneer's interpretation of true PDM operation.

Phono: The most commonly used plug/socket combination in audio components.

Pico (p): Prefix meaning one millionth of a millionth of.

PLM: or Pulse Length Modulation. Sony's version of bitstream where just seven binary values are used to control a PWM DAC.

Port: An opening in a cabinet which is tuned to characteristics of the bass driver and the enclosure volume to provide reflex type bass-loading.

Power amplifier: The part of an amplifier that provides power to drive the loudspeakers. Usually integrated, it is sometimes a separate component.

Pre-amplifier: The part of an amplifier that accepts the input signals, sorts them, applies any necessary equalisation, and then passes the signal to the (normally integral) power amplifiers.

Presence: A quality of forwardness or immediacy in a sound balance, generally related to an upper-middle frequency response boost.

Print-through: A pre- or post-echo of a loud signal created by magnetisation occurring from one layer to an adjacent layer after the tape has spooled or been recorded.

PWM: or Pulse Width Modulation. The correct term first coined by Technics who truncate from 16- to 3.5-bits, producing 11 binary values which generate any one of 11 Pulse Widths from the bitstream digital to analogue converter.

Q: A measure of the magnitude and shape of a resonance; the higher the Q, the sharper and more severe in amplitude the resonance.

Quantisation: with CDs' 16-bit code there are two to the power of 16 or

65,536 different quantisation levels available to describe the audio waveform once per 44.1kHz sample period. Errors in the allocation of each quantisation level result in quantisation noise and distortion. Truncation in the bitstream process produces huge amounts of quantisation noise.

Reflex: A system of bass loading (using port or ABR) which offers improved efficiency and bass power handling at the expense of subsonic control compared to a sealed box.

Rumble: The low or medium frequency sound produced mechanically by any moving parts in a turntable, mainly the motor and platter bearings.

Sensitivity: The volume of sound output for a specific electrical voltage input.

Separation: As between the two channels of a stereo pickup; see Crosstalk.

Shibata: A special stylus extending the elliptical to a 'line-contact' type of profile.

Signal to noise, Signal/noise, S/N: The difference in total output when an applied signal is removed.

Stylus: The specially shaped piece of diamond in contact with the groove and connected to the cantilever.

Subsonic: Below the audible range; ie, below 20Hz.

Square wave: A signal which consists of a fundamental plus a (theoretically infinite) series of odd (3rd, 5th etc) harmonics in a precise phase and amplitude relationship.

SSN: or Single Stage Noise-shaping as developed by Philips uses either two or three feedback loops together with a unicolor to redistribute quantisation noise in one step.

Stop-band Noise: signals outside the audio or passband related to the 44.1kHz sample frequency and its multiples.

THD: Total harmonic distortion.

Tracking error: The discrepancy between the truly tangential angle at which a record is cut and the slightly off-tangential angle at which it is tracked by a stylus on a pivoted arm during some parts of the arm's travel.

Transient: Signal of very short duration.

Treble: Upper part of frequency spectrum, typically above about 3kHz.

Tweeter: A small drive unit designed to operate over the high frequency range.

Ultrasonic: Frequencies above audibility, ie greater than 20kHz; also supersonic.

Vertical tracking angle (VTA): The angle at which the plane of motivation of the stylus is set with respect to the vertical when viewed from a side elevation of the cartridge. Should match the 20° cutter standard.

Weighting: A factor or function that is applied to a measurement to increase its relevance and usefulness, often seen as A or B Wtd.

Woofer: A drive unit that operates over the bass portion of the audio range.

Wow and flutter: Low and high frequency pitch variations (from poor tape transport or turntable platters with speed drift)

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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.

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, JPWetc. 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 hifi shops. We stock all leading manufacturers & if out of the ordinary, we'll get it for you. We are about to be completely re-furbished to give a splendid demo room with free coffee!! (& whiskey to console the big spenders!!) We have a genuine interest in hifi & 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.

RADFORD HI-FI, 107 Cornwall St, Plymouth. (0752) 226011. 2 dem rooms. Other details as above

RADFORD HI-FI, 28 Cowick St, St Thomas, Exeter. (0392) 218895. All details as Torquay shop above.

RICHLAW ELECTRONICS, 264 Torquay Rd, Preston, Paignton, Devon. (0803) 523734. Pioneer, Technics, Panasonic, Toshiba, Goldstar, Yamaha, Harman Kardon, JBL, Cerwin Vega, Hecc. Demo room, free installation, service dept, home trial facilities. Access, Visa, Amex, instant credit up to £1000 subject to status. Mon-Sat 9-5.30, closed for lunch 1-2.15, closed all day Wed.

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.

DORCHESTER HI-FI, 15 High West St, Dorchester, Dorset DT1 1UW. Aiwa, Celestion, Deltac, Heybrook, Infinity, Philips, Pioneer, Rogers, Rotel, Spendor, etc. Single speaker demo lounge. Home trials available. Free installation, Service department, guarantee on all products. Access, Visa. 9-5.30 6 days

The Choice Dealer Directory

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 spkr dem rooms. Free del. & instal.

BADA

1STAND FOREMOSTHI-FI CENTRE, 49-55 North Station Road, Colchester, Essex CO1 1RQ. Tel: (0206) 549842. Fax: (0206) 762900. Tlx: 987873 SAIDD. 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)

BADA

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, Kef, Yamaha, Mission, Denon, Cyrus, Audiolab, Rotel, NAD. 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

BADA

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.

BADA

AUDIO I, 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.

BADA

HUTCHINSONS, 295-297 High Street, Cheltenham, Gloucestershire, GL50 3HL. (0242) 573012. Pioneer Reference Point, Technics, Dual, NAD, Wharfedale, Celestion, Marantz, Aiwa, Kenwood, Sennheiser. No appts nec, free install, service dept. Instant credit up to £1000. Open Mon-Sat 9.15 to 5.30.

RLEWIS & CO LTD, 45 High Str, Stroud, Gloucestershire GL5 1AW. (0453) 762485/9. Bang & Olufsen, Denon, Quad, Mission, Mordaunt-Short, Pioneer, Sony, Technics, Yamaha, Celestion etc. In store dems, free install, service dept. Access, visa. Open 8.30-5pm 6 days.

ROBBS OF GLOUCESTER, 13/15 Worcester Street, Gloucester GL1 3AJ (0452) 419777. Sony, Technics, Aiwa, Pioneer, Denon, Bose, Celestion, Dual, Kenwood, JVC. Largest selection in Gloucestershire. Dem facilities Home trial. In house service dept. Access, Visa. 9-5.30 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.

BADA

FARNBOROUGH HI-FI, 7 Queensmead, Farnborough, Hants GU14 7RG. (0252) 520146. Linn, Exposure, Denon, Thorens, NAD, Heybrook, Onkyo, Dual, Marantz, Rotel, Wharfedale, JVC, Creek, Sansui, plus others. Dem room by appt. Access, Visa. 9-5.30 Open to 6 Thurs. Closed Wed. Service dept.

HAMPSHIRE AUDIO LTD, 2-12 Hursley Rd, Chandlers Ford. (0703) 252827/265232. Quality CD and analogue agencies. 5 dem studios. Large free car park.

BADA

HOPKINS HI-FI, 38/40 Fratton Rd, Portsmouth PO1 5BX. (0705) 822155 Technics, Quad, Monitor Audio, Tannoy, Denon, NAD, Heybrook, Onkyo, Dual, Marantz, Rotel, Wharfedale, JVC, Creek, Sansui, plus others. Dem room by appt. Access, Visa. 9-5.30 Open to 6 Thurs. Closed Wed. Service dept.

JEFFRIES HI-FI (PORTSMOUTH), 29 London Road, Portsmouth PO2 0BH. (0705) 663604. 2 dem rooms. Closed Mon. Late night Wed. Parking Bus Route. Credit fac

BADA

MARTON MUSIC, 5 Ventnor Way, Fareham, Hants. (0329) 231773. AV International, Marantz, Kelvin Labs, Townshend Audio, TDL, Spendor, Grant Amplifiers, Audio Technica, Dynavector, Origin Live. Demos by appt. Home Trial Facilities. Free Installation. Phone anytime.

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, QED, 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

BADA

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.

DARBYS OF ST. ALBANS, 6 Market Place, near the clock tower, St Albans, Herts. (0727) 50961. Alphason, A&R Cambridge, Bang & Olufsen, Denon, JBL, Harman Kardon, Musical Fidelity, Quad, Ruark, Sony, Home demonstrations, free delivery and installation. Sales rental service. In house credit. Lombard, Tricity, Mon-Sat 9-6

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

BADA

THE AUDIO FILE, 27 Hockerill St, Bishops Cleeve, 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

BADA

NORTH HUMBERSIDE

MURRAY HI-FI, Princes Dock Side, Hull. (0482) 227867. Linn, Naim, Rega, Arcam, Yamaha, Royd, Epos, Creek, Nakamichi, Rotel. Full demo facilities. No appts nec. Free install & delivery. Service dept. Full 2 year guarantee on all products. Access, Visa, Lombard Tricity, Licensed credit broker. 10-6 Tue-Sat.

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 trial 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.

BADA

PROGRESSIVE AUDIO, Rainham, Kent. (0634) 389004. Alphason, Audio Innovation, Conrad Johnson, Proac, Raymond Lumley, Rock Reference, Snell, TDL, Voyd and others. Dem by appt., please phone. Home trial. Free installation. Access, Visa.

STANDENS, 92a High Street, Tonbridge, Kent TN9 1AP. (0732) 353540 Pink Triangle, Kelvin Labs, TDL, Ruark, Marantz, Quad, Musical Fidelity, Micromega, NAD, Arcam, 2 Demo rooms. Home trials. Free installation and Service dept. Access & Visa. HP terms and Bada credit charge. 9.00-5.30 Mon-Sat except Wed 9.00-1.00

BADA

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 demo 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, Spendor, 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.

BADA

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.

BADA

LEICESTERSHIRE

ALPHA AUDIO, 1-3 Guildhall Lane, Leicester LE1 5FQ. (0533) 530 330. Alpha, 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).

MAYS HI-FI, 27/33 Churchgate, Leicester LE1 3AL. (0533) 625625. Sony, Technics, Denon, Kenwood, Pioneer (Reference point), Philips, B&W, Tannoy, Mission-Cyrus, Dual. Listening room, free install, service dept. Full range of credit facilities. Open Mon-Sat 9-5.30, Thur 9-1.30pm

MJS HI-FI, 80 Stapleton Lane, Barwell, Leicester LE9 8HE. (0455) 846977. Rock Reference, Audio Innovations, Kelvin Labs, Albarry, Ortofon, SD Acoustics, Opus, Sinesira, etc. Large range of records stocked, free installation, home trial facilities. Please phone for appts, open by appointment.

THE LEICESTER HI-FI CO, 6 Silver Walk, St. Martins Square, Leicester LE1 5EW. Tel: (0533) 539753. Fax: (0533) 626097. Arcam, Creek, Marantz, Mission/Cyrus, Musical Fidelity, Nakamichi, QED Hi-Fi, Quad, 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. Leicestershire's first Bada member.

BADA

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

BADA

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. Expert 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

BRITISH AUDIO DEALERS ASSOCIATION

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INDICATES MEMBERSHIP OF
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The Choice Dealer Directory

LONDON

ANALOGAUDIO, 849 High Road, London N12. (081) 445 3267. 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 ACOUSTIC, West Ealing, (081) 998 9041. Audio Dimensions, Audio Innovations, Audion, Audio Note, ATC, D.C.M, Glastonbury, Goldring, Helius, Infinity & Modulas, JPW, Lynwood, Mana Acoustics, Marantz/Audiophile, Michell, Nova, Ongaku, Oracle, Originlive, Ortophon MC3000I+MC5000+T3000, Pirates, Rata, Revox, Rotel, Rose Industries, Rock Reference, Sneli, Supra, Systemdek, Target, Triangle Products, Valdi, Vecture, Voyd & Reference Voyd. Home demos. Free install. Single Spker Demo. Free System Design. Free knowledgeable service. Access, Visa. 9.30-6pm. Till late Mon-Sat. Demo by appt. please

AUDIO CHOICES, 66 High Road, Leytonstone, Stratford E15. (081) 534 6987. Marantz, A&R, Musical Fidelity, SD Acoustics, Rotel, Audio Technica, Ruark, Roksan, Moth, Nakamichi, B&W, Van den Hul, Dual, Pink Triangle, Alison Acoustics. Dem room, home dems within M25 area. 10.30-7.30. 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 spker dem room. Free del. and instal.

BATA BILLY VEE SOUND SYSTEMS, 248 Lee High Road, London SE13. (081) 318 5755. Linn, Rega, Naim, Nakamichi, Quad, etc. 2 dem rooms. Int. free credit. Access, Visa. Closed Thurs.

BATA CORNFLAKE SHOP, 37 Windmill St (just off Tottenham Court Rd), London W1. (071) 631 0472. Mon-Sat 10-7. Arcam, Acoustic Energy, Meridian, Monitor Audio, Naim, Nakamichi, Rega, Roksan, Rotel, Royd 3 demonstration rooms, delivery and installation service. In-house service and repairs department. Specialists in multi-room installations. Closed Mondays, Tue-Sat 10-7pm, Fri 10-6pm. Access, Visa.

COVENT GARDEN RECORDS, 84 Charing Cross Road, London WC2 HQJA. (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

BATA 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

BATA HI-FI EXPERIENCE, 227 Tottenham Court Road, London W1P 0HX. 071 580 3535, Fax: 071 436 4733. B+D, Arcam, Meridian, Cyrus, Musical Fidelity, Rogers, Quad, Rotel, Linn, Marantz, 8 x Listening Rooms, no appts nec, home trial facilities, free installation, service dept. Visa, Access, Amex, Diners. Mon-Fri 10-7pm, Sat 9-6pm.

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

.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 til 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.

NICHOLLS HI-FI, 430-434 Lee High Road, Lewisham, London SE12 8RW. 081 852 5780. Sony, Technics, Harman, JBL, Mordaunt Short, Kenwood, Panasonic, Hafler, Sumo, B&W. Demo facilities, no appt. nec., home trial facilities, free installation, service dept. Credit available, Visa, Access. Open 9.30-6 Mon-Sat, Thurs 9.30-1pm.

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. Audio Innovations, Alphason, B&W, Nakamichi, Celestion, Cambridge Audio, Dual, Denon, Kef, Luxman & Technics, Monitor Audio, Mission, Marantz, NVA, Rogers, Sony ES. Appts preferred. Installations available. Access, Visa, Standard credit facilities. Mon-Sat 9.30-6.30

SOUTH LONDON HI-FI & VIDEO, 210 Brixton Hill, Streatham SW2. (081) 674 4433/2033. Denon, Rotel, Yamaha, Kenwood, Tannoy, B&W, INakamichi, Dual, Thorens, Technics, Monitor Audio, Single speaker demo room. Appts. not nec. Installation available. Service Dept. Access, Visa, Amex. Interest Free & Standard credit. 9-6, 6 days

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 & financeterms. 10-7 Mon-Fri, 10-6 Sat.

BATA SUPERFI, 2-4 Camden High Street, Camden, NW1 QJH (071) 388 1300. See main entry under Notts for full details.

TIME AND TUNE, 218/220 Whitechapel Road, London E11BJ. (071) 247 0567/8/9. Akai, Aiwa, Bose, Hitachi, Kenwood, Mitsubishi, Panasonic, Philips, Pioneer, Sony, Technics. Home trial facilities. Free installation Service dept. Instant HP. 9.30am-6pm Mon-Fri, 9.30am-2pm Sun, Sat Closed.

TUNE INN, 124-126 St. Mildreds Road, Lee, London SE12 ORG. 081 698 4446. Huge range of fully guaranteed used equipment. Part exchange welcome. Full service facilities. Great after sales. Demos available on all equipment. Best offers for unwanted equipment., collection arranged Access, Visa, Amex, credit facilities. Mon-Sat 10-6.30.

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

BATA VOLUME ONE, 41 Upper Wickham Lane, Welling. (081) 3044622. 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 Ltd., 30-32 Shudehill, Manchester M4 1 EY. Tel: (061) 834 6700. Technics, Kenwood, Sony, Aiwa, Pioneer, Wharfedale, Mission, Thorens, B&W, Harman-Kardon. Over 45 years experiences, comparator demonstrations, bring your own tapes/CDs etc No appts nec, free installation within 10 miles, service dept. Access, Visa, Style Credit to £1500. Mon-Sat 9-5.30, late night Thur during December. CHRIS BROTOKS 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.

BATA SWIFT HI-FIDELITY, 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

AUDIO T, 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

BATA HOLLOW AUDIO, 27 Springfield Rd, Harrow. (081) 863 0938. Mon-Sat 9.30-5.30. A&R, Audiolab, Cyrus, Denon, Dual, Heybrook, Linn, Monitor Audio, Musical Fidelity, Quad, Rotel, Tannoy etc.

BATA 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.

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.

BATA 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, Hafler. 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, Blowich, 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

BRIDGE HI-FI, 3 Tudor House, Bridge St, Walsall. (0922) 640456. NAD, Dual, Yamaha, Kenwood, Technics, Pioneer, Mission, Celestion, Denon, Mordaunt Short. Appts required. Home trial & free install. Access, Visa, Diners, Amex. Credit to £1,000. 9.15-5.30 Mon-Sat. Service dept.

FRANK HARVEY HI-FI EXCELLENCE, 163 Medieval Spon Street, Coventry. (0203) 525200. All major agencies. Free inst. Service dept. Part ex. 3 dem rooms. Mon-Sat 9.30-5.30. Wed til 8pm

BATA 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

BATA 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.

MUSICAL 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 St, Birmingham B5 4BJ. (021) 622 2323/3619. QAIWA, 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.

SUPERFI, 67 Smallbrook, Queensway, Birmingham B5 4HZ. (021) 631 2675. Specialist Hi-Fi stockists of: Audio Lab, Musical Fidelity, Quad, Pioneer, Yamaha, Rotel, Wharfedale, Tannoy, Celestion and many more. Single spker rooms by appt.

NORFOLK

BASICALLY SOUND, The Old School, School Rd, Bracon Ash, Norwich NR14 8HE (0508) 70829. Arcam, Linn, Naim, Denon, Spenndor, 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.

BATA MARTINS HI-FI, 5 High Street, Kings Lynn. (0553) 761683. Est. 1968.

The Choice Dealer Directory

MARTINS HI-FI, 85/91 Ber Street, Norwich. (0603) 627010. Est. 1968.

BADA
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 any time for appointment. Access & Visa
SOUND APPROACH, 161a Unithank Road, Norwich. (0603) 622833.
Kuzma, Ariston, Castle, Denon, Exposure, Ion, Royd, NVA, Roksan, Ruark, etc. etc. Dem and home trial facilities. Mon-Sat 9-6.30. Free installation. Credit to £1,500. Visa, Access, Diners Club. Service dept

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 facs. 9.30-5.30pm
CLASSICAL SOUNDS, 84E Watling St East, Towcaster NN12 7BS. Tel. 0327 359588, call for details

NOTTINGHAMSHIRE

CHANNY 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 components derived from the following manufacturers: Systemdek, Goldring, Revox, Voyd, Audio Innovations, Snell, Audionote, SME, Helius, Impulse, TEAC, Deltac, Wadia, Ortolon Premier dealer, Pioneer dealer, Hupgens 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

BADA

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
AUDIO T, 19 Old High St. Headington, Oxford OX3 9HS. (0865) 65961, Fax (0865) 60415. Greathi-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 demo rooms, A/V dept. free del. & instal
BADA
OXFORD AUDIO CONSULTANTS LTD, Cantay Hse, Park End Place, Oxford OX1 1JE. (0865) 790879. Oxford Acoustics, Audio Research, Krell, Magneplanar, 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 Dogpole, 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.
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.

PAUL ROBERTS HI-FI, 32 North St., Taunton. (0823) 270000. For facilities see entry under Avon.

WATTS RADIO - the engineers, Jim Badman, 1 West Street, Somerton (0458) 72440. Aiwa, Castle, Dual, Denon, KEF, Ortolon, 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.

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 facs. Account and credit cards. Ring for opening times and free Fact Pack.

BADA
ACTIVE AUDIO, 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 facs. 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) 336555. 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
THE STEREO SHOP, 94 Norwich Road, Ipswich, Suffolk. (0473) 233832
Linn, Exposure, Musical Fidelity, Creek, Epos, Monitor Audio, Mordaunt Short, Marantz, Rotel, Philips, NAD. 2 single speaker listening rooms. Multi rooms specialists. Free installations. Service dept. Plus 3 year guarantee. Access & Visa. Licensed credit broker. 10.00-6.00 Tue-Sat. Thurs 10.00-8.00 (by appointment)

SURREY

AUDIO INC, 44 Walton Road, East Molesey, Surrey KT8 0DQ. (081) 941 4234. Acoustic Energy, Conrad, Johnson, JA Michell, Proac, Croft, VPI, Thorens, Pink Triangle, Rotel, Luxman. Single speaker demo room. Home trial facilities. Free installation. Access, Visa. Interest Free Credit on some items, standard credit terms. 10-6 Mon-Sat. 10-8 Thurs. 10-4 Sun.
AUDIO SOUTH, 24 (The Woolmead) East Street, Farnham, Surrey GU9 7DY. (0252) 714555. Audio Innovations, JPW, Luxman, Marantz, Ortolon, 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.

BADA
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
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. Tues to 8. Closed Wed. Service dept.

SURBITON PARK RADIO, 48 Surbiton Rd, Kingston-Upon-Thames, Surrey (081) 546 5549. 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. Marantz, Musical Fidelity, QED, Radford, Tannoy, TDL, Kelvin Labs, Gyrodec. Reference Imports, Acoustat, Basis Turntables, M.A.S., Rotel, Chord, KEF. 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, Nakomichi, Quad, Rotel, Tannoy, Dems. 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 facs.

BADA
LASER SOUND & VISION, 72 Terminus Road, Eastbourne, East Sussex BN21 3LX. (0323) 640911. Laserdiscs specialists P.A.L. & N.T.S.C. (new & secondhand). Phone for free catalogue, mail order throughout UK, Visa, Access. 9-6pm Mon-Sat
THE POWERPLANT, 66 Upper North Street, Brighton BN1 3FL. (0273) 775978. Roksan, Musical Fidelity, Onix, Marantz, Rotel, Yamaha, Bryston, 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.*

CHICHESTER HI-FI, 7 St. Pancras, Chichester, W. Sussex PO19 1SJ. Tel: (0243) 776402. Linn, Naim, Pega, Creek, Nakomichi, A&R, Denon, Roksan etc. Tues-Sat, 10-1, 2-5.15 (closed Mon).

BADA
MALCOLM AUDIO, 12 South Street, Chichester, W. Sussex. (0243) 787562. Sony, Technics, Denon, Yamaha, Sherwood, Mordaunt Short, Wharfedale, Allison, Dual, NAD. Appointments necessary. Home trial facilities. Free installation. Service Dept. Access, Visa. 9.15-5, Mon-Sat.

TYNE & WEAR

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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

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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 retail price is placed in its respective category in alphabetical order. For instance, the Acoustic Research *EB101* is presently at the beginning of the Turntables and Tonearms section; however, the Ariston *Superior* heads the Motor Units section as it is solid and was reviewed as a separate component - requiring a separate arm. Where there are several products with the same name but different model numbers these are in price ascending order.

Then come 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.

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 meritorious. 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. 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

(especially the electromagnetic elements - that is to say the cartridge and the speakers), system building is unfortunately not quite that simple. These ratings make a useful guideline for shortlisting 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.

The *Hi-Fi Choice Directory* is constantly updated with the latest reviews and price changes as well as having any discontinued products removed. If a listed product is updated to a 'mark two' form and the alterations are purely cosmetic or not too extensive, we sometimes leave the product in with its current model number, together with an asterisk in order to denote that it has changed since our original review was published

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.

Yet those who choose the separates route still have lingering doubts - usually completely unjustified - over the compatibility of components from different manufacturers. Gross incompatibilities are very rare nowadays, only likely to rear their heads amongst the most exotic components. Here the delicate art of 'supercompatibility' really takes over the major role and might be regarded as the key to 'real' hi-fi.

There are now three different prerecorded music media competing for the attention 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 separates purchasers may start with just one source, adding others or a tuner when funds permit.

There will always be controversy over the relative qualities of LP, CD and cassette. LP is still the choice for ultimate sound quality - particularly for those prepared to spend a substantial sum on a good quality turntable system.

Cassette has never really challenged vinyl's superior quality, but it is a multiple role format, offering 'go anywhere'

flexibility, a uniquely 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 latest challenger to these two established media, using a digital instead of analogue storage format. The sound quality remains controversial, hailed as near perfect by its fans but derided by vinyl freaks, so it is probably fairest to say that CD is fine for most listeners, but may not suit everyone; certainly the lack of background noise, defects and deterioration are major strengths.

While there will always be arguments about the different music storage and transmission formats available to the hi-fi listener, there is also controversy over the relative importance of the different components which make up the system chain - by which is meant the source, the amplification, and the loudspeakers (and for the pedantic the room itself, though there's often little that can be done here).

For many years the 'weakest link' theory proposed that the loudspeakers needed the most attention, that amplifiers merely had to have sufficient power, and that turntables were pretty well perfect. However, this perspective has become steadily discredited by an alternative 'theory of precedence', which stresses that

no subsequent component can make up for the inadequacies of its predecessors - all it can do is supply its own additional degradations. In such a context it is not uncommon to find more than half the system budget allocated to the record player, with scrimping and saving made on amplifiers and loudspeakers.

Choosing the components of a system is only part of the task of getting the system as a whole working as well as possible. Good turntables and loudspeakers both benefit to a surprising degree from proper support - from stands that enable them to give their best performance, whether floor-standing or wall mounted.

Siting of components within a room can play a significant role, as can the room itself. Some people may prefer an acoustically more 'live' room than others, but most will agree that the larger it is the better, because this tends to provide smoother and better extended bass reproduction. All rooms create reflections and standing waves, and the effects of these are more severe if all opposing walls are parallel, similar distances apart, and with hard reflective surfaces. Provided that the loudspeakers can be placed fairly symmetrically, slight asymmetry elsewhere in the room is usually helpful.

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 similar immediate acoustic environment, unencumbered by other furnishings and

structure, and a similar distance from each listener, 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 being closely mechanically coupled via proper stands to the floor.

Mixing and matching the components of a record player to get optimum results can be something of a black art, over and beyond the fairly simple business of choosing a cartridge of roughly the right compliance to suit the arm effective mass. Certainly the combining of turntables and tonearms is not a simple matter, and this is where a good specialist dealer will come into his own, both in terms of recommending good combinations from the models he holds in stock, and then in correctly carrying out the sometimes tricky set up procedures which are often required to get the best results.

The key to getting the best results from a separates 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 so that it can be used by *Choice* readers as a buying guide. A guide in the sense that that you should use the information in it to make a shortlist of equipment suited to your needs and budget, and then audition it at a dealers' before taking the plunge. Because tastes inevitably differ it would be unwise to buy purely on the basis of our recommendation and 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-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
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		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 2 £195	Good Good +	Very confident, convincingly musical and punchy sound that sets the standard for other budget amps	41W, 4 line and MM inputs	BB	68
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 R/- line inputs + coax/opt digital input.		92
Arcam Delta 60 £300	Good Good +	Very refined and highly detailed sound via MM and CD without any of the harshness 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	R	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 Amplifier £1499/2950	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' and lacking in welly with inefficient speakers	12W, MM and 4 line inputs	R	77
Audio Note 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
Cambridge P50 £200	Good Average +	A pleasant enough sound with full bass yet with a slightly mechanical quality that reduced its sense of 'naturalness'	56W, 4 line inputs + MM/MC + tone		85

The Directory

AMPLIFIERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Carver CM-1090 £495	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		100
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
Conrad-Johnson PV-10 £1100	Excellent Excellent	Pricey, 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
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
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		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
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 DAP-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 brill!	172W, monobloks Opt/Coax dig + 2 tape, 4 line and MM/MC inputs		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 pr.	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
DNM 3A From £1000	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
Dual CV-5670 £250	Very Good Good	Magnificent build and prodigious output to its credit, the CV-5670 still fails to capture the delicacy and enthusiasm of its cheaper companion	128W, 5 line, 2 tape and MM/MC inputs + loudness and CD Direct		97
Dual CV5600 £160	Good+ Very Good	Made by Rotel and possessing the highly articulate vocal/string quality of their best budget amps. Very communicative, especially with a good CD player.	57W, 3 line, 2 tape and one MM input. CD direct	BB	92
E.A.R. 549 £3628 pr	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		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.		92
Exposure VI/VII*/VIII £320/£500	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 R inputs with full rec-out switching	R	68
Exposure VII/VIII £430/£470	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		62
Exposure XI/XII/VIII Super £1600	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		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
Hafler DH120 assembled £360	Very Good Average	Sound quality results were decent enough, but this power amp won't set the world on fire at this price	60W		44
Hafler DH120 kit form £295	n/a Average	Er, we didn't build one; see assembled version above	60W		44
Hafler SE-100/SE-120 £365-375/£375	Good + Good +	The smallest of Hafler'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
Hafler XL-600 £1145	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		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		97
Harman Kardon HK6500 £380	Good+ 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

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AMPLIFIERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
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	Smother 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 -	There's a chance our power amp was a dud for the combo sounded very disappointing on the whole - glassy and uncouth	138W with plenty of current. Passive line inputs		85
Jadis JP30/JA30 £4145/£4200	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 frequency extremes, in lab, and re cartridge matching	30W 2-box pre-, monoblok power, MM-only, 4 line inputs	R	60
Jeff Rowland Coherence One/Model 7 £3950/£9900	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
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
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/£595pr.	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	BB	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-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
Lescon 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
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 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
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-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/£525 each	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
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
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 pair	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
Naim Separates £750 plus	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 achieves fine musical communication	40-70W, MM/MC etc	R	60
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
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
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 FA890 £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
Philips FA960 MkII £300	Good + Average	The MkII '960 still failed to grasp our listeners' attention, but it remains a competent amp nonetheless	122W, 6 line & 2 disc inputs + tone controls		68

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MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
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/blamp 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 pr	Average Good +	Monstrous valve monobloks which represent good value. What they lack in musical subtlety they make up for in sheer muscle. And these are Lumley's small monobloks!	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
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-X9110G £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-F630ESD £350	Good Average	Based on the '530 but equipped with PDM D/A convertor. Amp is competent but DAC sounds truly magnificent!	130W, as above + opt. and coax digital inputs	R	74
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
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
Threshold FET 10e system/Stasis SA-4 £5824/£6028	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. '90
Woodside SC26/STA35 £1931/£1323	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
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-550 £240	Very Good Good	Beautifully built and offering the flexibility of remote control, the AX-550 sounds tidy and neutral yet lacks the ability to involve on an emotional level	131W, 5 line + MM/MC. Pure Direct + remote control		97
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/£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

"The Lecson Quattra is the most radical & innovative amplifier for years" Paul Messenger, Hi-Fi Choice, October 1991

"We were all struck by the wonderfully open and deep sound soundstage that seemed large and tactile enough to walk into."
Paul Miller - Hi-Fi Choice



"What I didn't expect to find was an animal, capable even in bi-amping mode of yielding acceptable levels (if somewhat restricted in dynamics) from Apogee Stages and - are you ready for this? - the Sonus Faber Extremas"
Ken Kessler - Hi-Fi News, December, 1991

THE £349 LECSON QUATTRA. THE FIRST INTEGRATED AMPLIFIER TO OFFER BI-AMPING. LISTEN TO IT. THE CRITICS HAVE.

Audio Magazine Germany - The Quattra has a higher rating than Linn Intek, Naim Nait, Mission Cyrus Two.

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The Directory

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	Smoother 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 (underminated 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	Screened, 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	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	A good general-purpose solid-core, though too bandwidth limited for high-end applications.	0.65mm single strand, webbed PVC dielectric		64
Exposure £2.50 per metre	Average	Sounds great in some systems	56 OFC strands, webbed PVC dielectric	R	64
Furukawa FS-2F09 £3.50 per metre	Good Average +	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	Multi PC-OCC stranding, PVC dielectric	R	83 Supp.
Furukawa FS-2T15S £50 per metre	Good + Very Good	Some loss of bass weight but otherwise offers a fresh and open sound. Good value	Single 1.5mm Super PC-OCC	R	83 Supp.
Kimber 4VS £7.15 per metre	Average + Average	An advanced solid-core cable with a highly fluid, detailed and inherently musical sound	Open-weave, multistrand, PVC ins.		83 Supp.
Kimber Kable 4PR £54 - 5m pair	Average	Similar construction to 4TC but dissimilar materials infer a slightly tizzy sound	4 x 7 copper strands per conductor, PVC diel.		64
Kimber Kable 4TC £17.65 per metre	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	OF copper, PTFE dielectric	R	64
Linn K20 £2.95 per metre	Good Average	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	56 OFC strands, webbed PVC dielectric		64
Monitor PC Silverline PC4 £5.75 per metre	Good Average	Subjectively, it erred on the forward and bright side of neutral but enjoyed an essentially clear and punchy delivery	2072 x 0.07mm silver plated copper strands		64
Monster Original £3.49 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	Multistrand		64
Monster SCI 16-4 £3 per metre	Average	Original sounded relatively congested and murky at higher frequencies but possessed weight and conviction in the bass	4 x 16-gauge conductors, OFC strands		83 Supp.
NVA LS1 £6 per metre	Average + Good	Not as thick-sounding as early Monster cables but still slightly unbalanced. Versatile construction	7 x 0.25mm silver alloy strands, PTFE	R	64
QED 79-Strand £1 per metre	Average + Good	A light and breezy sounding cable best suited to short lengths, NVA benefited from a clear and transparent outlook	79 strand, PVC dielectric	R	64
QED Flat 200 £2.20 per metre	Good Good	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	200 strands, flat webbed PVC dielectric	R	64
QED Incon Graphite £2 per metre	Average + Average +	I detected a degree of confusion at low frequencies but this did not stifle the acoustic atmosphere which remained open and positive	OFHC, polymeric screen		64
Rotel Supra 10 £8.95 per metre	Good + Good	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	2,562 OFC strands, webbed PVC dielectric	R	64
Rotel Supra 4 £3 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!	1,036 OFC strands, webbed PVC dielectric	R	64
Solid core lighting cable 36p per metre	Average + Good	Ideal for both long and short runs, it furnishes a big sound that benefits further from a smooth, unfatiguing treble	1.5mm square, 3 cores, PVC dielectric	BB	64
Townshend Isolda £400 - 5m pair	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	8 coax cables per conductor - very thick	R	64
van den Hul CS-122 £6.50 per metre	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	19 x 0.45mm silver plated strands, rubberised dielectric	R	64
van den Hul D-352 £12 per metre	Good Average +	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	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 +	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	19 silver plated strands of 12 different guages, PTFE dielectric	R	64
van den Hul SCS-2 £99.95 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	665 silver plated matched crystal copper strands, PTFE dielectric	R	64
Vecteur R-CV30 £5.40 per metre	Average Good	Overall it was commendably neutral and transparent but nothing less would be acceptable bearing in mind the tremendous cost of a stereo pair	4 x 0.8mm LC-OFC PTFE insulated strands	BB	64
		Subjectively the better of Vecteur's cable line-up offering a neutral overall perspective but slight loss of detail resolution at both frequency extremes			

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	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	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 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.		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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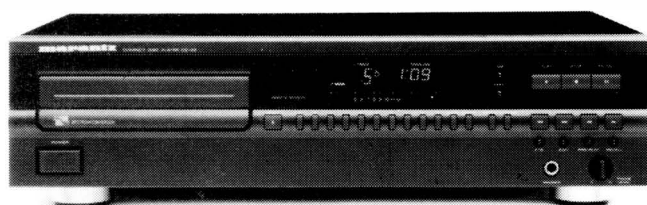
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The Directory

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 socket	R	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, disc file. Sony PLM DAC.	R	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-1000D £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
Memorex CD1650 £200	Poor Poor	An overpriced music centre 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	R	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	BB	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 scarf + 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

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CD PLAYERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
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-9658X £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-P6200A £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 £5614/£6641	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 C0X-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 C0X-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

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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 converter 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 other transports	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. Its dynamic and crisp sound is best realised with Wadia DACs, otherwise it's 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
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 which add £100 to the price.	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 PDM2 £2000	Excellent Excellent	State-of-the-art technical performance with a pristine sound to match. Repertoire includes a solid, thunderous bass allied to a transparent midband and sparkling treble. The tops!	Coaxial and optical inputs, phase invert, two-box DAC7	R	101
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 a stage further Meridian have also tempered its vibrancy and 'life'. Fickle reaction to different 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
Stax DAC-Talent £1400	Excellent Good +	Natural, refined and never over-zealous, the DAC Talent is also capable of sounding very spicy and dynamic. A little expensive but capable of wielding a maturing influence over a light or bright-sounding system	Coaxial and optical inputs, phase invert, mute, 20-bit DACs		101
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*	Our (demonstration) sample had not been thoroughly checked before dispatch, leaving us to identify various technical faults. Once redressed, 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 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 and cost-effective upgrade	BNC coaxial input (no optical), 16-bit 4x	R	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 out		87

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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	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	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-

tack 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	
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 Z022 £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

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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
Audio Dimensions Classic 2 £110	4 leg Average	Built in the heavyweight tradition and damped with chalk. Solid, stable, tactile sound	20.3 x 20.3 x 52cm	R	83 Supp.
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
Monotrak Engineering M1 £58	1 leg Good	The M1 gave the mid and treble a commendably smooth and detailed presentation but bass sounded rather lacklustre and muddy.	19 x 18.5cm 48cm		58
Monotrak Engineering M4 £58	4 leg Very Good	Begging comparison with Heybrook's HBS1 the M4 maintained much of the openness and forthright detail of that model.	23 x 21.5cm 53cm	R	58
Monotrak Engineering M4S £58	4 leg Very Good	Its stature and stability would seem to mark it out as most suitable for smaller, lighter cabinets. The M4S possessed an open midband and clear treble.	20 x 17.5cm 53cm		58
Origin Live Advanced £145	3 leg Good	One of three related tripod-like stands. Stable sound with good sense of depth and power	22 x 20.6 44cm		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
Partington PP4 £60	1 leg Good	The PP4 offers a rather mixed performance, though when damped with sand infill it was less ready to embellish the overall sound and low frequencies became tauter and quicker.	18 x 16.5cm 48cm		83 Supp.
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
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

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HEADPHONES

MODEL PRICE	FIT SOUND	COMMENTS	TYPE	VALUE	ISSUE
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
Jacklin 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
Jacklin 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
Jacklin 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
Realistic Pro-X £25	Poor Average -	Robust, unanimously uncomfortable and heavily veiled in sonic terms - not a great success	Supra-aural, closed-back, dynamic		75
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 £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-75B 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 Energisier £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 £764	Good Very Good	To the author's knowledge, the most awesomely dynamic and articulate miniature ever made	29.5 x 18 x 25cm semi-open space	88dB/w 60Hz	R	59
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 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 space	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 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
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

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LOUDSPEAKERS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	ISSUE
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
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 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
Dahlquist DQ8 £850	Good Good	Large floorstander uses out-of-box tweeter to give delightfully out-of-box presence and treble; bass is much less impressive	100.5 x 36 x 28cm floor, free space	88dB/W 30Hz (in room)	R	94
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
Doxa 5 - 2 £900	Average Good	The high sensitivity and seductive midband makes an obvious partner for valve amplifiers, though obtaining a good room match may prove a little tricky	98 x 21 x 28cm floor well away from walls	91dB/w 30Hz (in room)	R	82
Duntech PCL1000 Crown Prince £6120	n/a 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
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
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
Goodmans Maxim 2 £90	Average + Average	More wham-bam-thank-you-mam sound that imitates much bigger speakers when you let these babies yell. (A well-controlled yell)	26 x 17 x 19cm near wall on shelf or stand	86dB/w 85Hz	BB	59
Harbeth HL Compact From £539	Very Good Average	The clean and neutral sound lacks resolution and gives rather unsubtle 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

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MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	ISSUE
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 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
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 high-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 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 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 TLX12 £149	Good - Average	This smart near-miniature has a 'boppy', lively bottom end, but beware of the fizz in its top	37 x 23 x 23cm stands 0.5m from rear wall	87dB/w 55Hz	R	71
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
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
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

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MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	ISSUE
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 MG1c 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 761 £140	Average Good	One helluva speaker for the price, if a shade small and short of subtlety and refinement - should prove a worthy successor to the 70 and 700	38 x 21 x 21cm stands near rear wall	87dB/w 60Hz	BB	66
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			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
Mordaunt-Short MS 3.10 £110	Average Average +	Probably the liveliest and most communicative miniature around, this beautifully presented design is probably better suited to budget 'real hi-fi'	28.5 x 17.5 x 20cm	88.5dB/w 48Hz	BB	78
Mordaunt-Short MS 3.20 £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	35.5 x 18 x 20cm open stands against wall	85dB/w 50Hz (in room)	R	82
Mordaunt-Short MS 3.30 £200	Average Average +	A little too mid-forward for neutrality or formal recommendation, this attractive, good-sized model nevertheless has more than enough appealing	46 x 23.5 x 27cm high stands 1-2ft from wall	87dB/w 38Hz (in room)		78
Mordaunt-Short MS 3.40 £260	Average + Average	It looks pretty and sounds civilised, but the 3.40 failed to ignite any degree of enthusiasm amongst our listeners. Low frequency stand and room matching is	57 x 23.5 x 27.5cm stands in free space	87dB/w 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
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

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MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	ISSUE
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 infree 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
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 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	87dB/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
SD Acoustics DBS £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 civillised 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
Snell Type C £2350	n/a Very Good	Pricey, yes, but an extremely capable loudspeaker. Musical and transparent; excellent bass extension which improves with the addition of a Pirate plinth	112 x 38 x 33cm free standing, free space	90dB/w 35Hz	R	65
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)	R	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
Sony APM-66ES £700	Average + Average +	Powerful heavyweight sound with a brilliant midband - clear articulate and transparent. But bass is on the boomy side and the treble can sound grainy	66 x 38 x 36.5cm low stands, free space	89dB/w 60Hz		59
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
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 E11 £140	Average Average -	Fundamentally turgid and slow, thanks to leaden upper bass and 'shut in' treble, though stereo images are convincing, as are the reasonably uncoloured vocals	39 x 21 x 22cm stands, free space	87dB/w 45Hz (in room)		82

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LOUDSPEAKERS

■ MODEL ■ PRICE	■ LAB ■ SOUND	■ COMMENTS	■ SIZE ■ PLACEMENT	■ SENSITIVITY ■ VALUE ■ ISSUE ■ BASS FROM
Tannoy J95 £520	Good Good	Substantial cabinet engineering explains the unusually authoritative bass delivered by this big, good value floorstander, though the upper range is a bit dull and shut in	93 x 26 x 32cm floor, freestanding	90dB/W 30Hz (in room) R 94
Tannoy M15 £190	Good Average +	Somehow lacking the magic of its predecessors, the M15 remains a fine value compact that needs careful set-up to give optimum results	50 x 25 x 21cm Blu-tack to stands	88dB/w 40Hz (in room) R 78
Tannoy M20 £260	Good Good	Alongside fine build and presentation, the M20 provides an unusually clever combination of the 'traditional' virtues of transparency and low coloration	50 x 25 x 22cm stands in free space	87dB/w 25Hz (in room) R 86
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
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) R 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, the quest for size for its own sake compromising the performance of both enclosure and main driver	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) R 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 R 46
Toshiba SS33-M £100	Average Average	Providing a benchmark for budget loudspeakers, this Toshiba-inspired but UK designed and manufactured model is a lot of loudspeaker for the money	40 x 26 x 21.5cm stands in free space	86dB/w 55Hz BB 68
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) R 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) R 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
Visonik David 6001 £173	Average - Poor	Sharp styling a classy looking miniature makes, but the complex grillwork 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 R 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 uninvolved	34.5 x 22 x 22.5cm stand against wall	89dB/W 45Hz (in room) R 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 £499	Average Good	Compact, beautifully finished and extravagantly engineered box sacrifices bass extension in the cause of high midband sensitivity; communicative	48 x 26 x 26.5cm stands 1ft from wall	91dB/w 48Hz (in room) R 82
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

PERSONAL STEREO

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	■ 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

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PERSONAL CASSETTES

MODEL PRICE	SOUND	COMMENTS	FEATURES	VALUE	ISSUE
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
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	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		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.

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TUNERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Harman Kardon Citation 23 £600	Good Very Good	Fine performance, interesting features and ease of use are this tuner's forte, 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
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 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 cartridge 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
Audioquest AQ 404i-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 DL 103 £99	Average Good	This classic spherical stylus model gives a lively sound with powerful bass, and is popular in broadcast studios	6-16g Low, MC	R	48
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

Excellent names, superb sounds.



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TURNTABLES - CARTRIDGES

MODEL PRICE	LAB SOUND	COMMENTS	ARM EFFECTIVE MASS OUTPUT/TYPE	VALUE	ISSUE
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
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
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-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 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
Grado ZF3E + * £47.50	Average - Average	Downfilling 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	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
Nagaoka Stilton TS10 £50	Good - Good	Stilton-designed solid body (with three-point mounting) certainly gives remarkably resonance-free sound, but tip and generator are less good - a little rough at times.	5-10g Normal, MM	R	85
Nagaoka Stilton TS11 £70	Good - Good	Differs from TS 10 in having Vital stylus with better tracing but still some high frequency harshness.	5-10g Normal, MM		85
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 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 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
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
RATA RP70vdH £99	Average + Good	Able to retrieve bags of musical detail (thanks to the vdH stylus), RATA's top cartridge ranks as one of the most articulate MM's available	11-18g Normal, MM	R	67
Rega Bias £34	Average Average +	Difficult to mount in some arms due to its shallow build, the bias offers a gentle, 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

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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.

INTEGRATED TURNTABLES

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 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 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 CS503-2 £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
Dual CS505-4 £170	Good - Good -	The old-time favourite which never gives up. Sound is enjoyable if not perfectly clear, all-round value is excellent	Semi-auto, belt drive	BB	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
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	R	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	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 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
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
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
Revolver 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, prefitted cartridge		55
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 IIX £248	Good Average +	Poised, clean sounding deck, forward and explicit in character. A good value deck under £250, and a relatively cheap and satisfactory suspended model	2 speed belt drive manual turntable and arm, 11g	R	67
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 unsubtle 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 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 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. 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.	Manual 2-speed, damped, suspended arm, 7.5g	R	67

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INTEGRATED TURNTABLES

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES ARM EFF. MASS	VALUE	ISSUE
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
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
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 T00 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 IIXE £248	Good Very Good	Fine, honestly specified and well built player which easily betters its closest stablemate, the IIX. Frankly, at the price it's a sonic bargain	Manual 2-speed, external PSU	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. A thoroughbred	Belt drive, 3 motors, subchassis, outboard PSU	R	72
Voyd Valdi £868	Good - Very Good	Recent power supply upgrade has resulted in alround 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

TO NEARMS

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 targetted 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

The Directory

TELEVISIONS

The standalone television set is rapidly evolving into a key component in integrated home entertainment systems.

NICAM digital stereo sound is now being broadcast for many hours every week, although you will have to check to see what is available in your area. The IBA are quite open about it, but the BBC tend to be more secretive.

Most up-market stereo CTVs are now equipped with NICAM decoding and rather more attention is being paid to the built-in amplifier

and speakers.

NICAM is also available on Hi-fi stereo videorecorders (see above), and this is usually the more practical route for hi-fi system integration, as well as allowing favourite musical events to be saved on tape. To both watch and record with stereo sound will require NICAM on each of course, but the decision to update one or the other first will probably have as much to do with the age of the respective components than the convenience of the interconnections.

The ten CTVs tested so far are all luxury stereo models with 'flatter squarer' 59cms tubes of various kinds. Best suited to a viewing distance of about 7ft, these are one size up from the most popular 51cms size sets and take about 23 per cent of the top 30 per cent of the market.

All have remote control as well as Fastext (enhanced teletext), and many have on-screen graphics and flexible in/out socketry.

MODEL PRICE	LAB SOUND	COMMENTS	SCREEN SIZE, FEATURES	VALUE	ISSUE
ITT Nokia £629	Average + Average -	Bulky square-rigged shape helps deliver a respectable standalone sound quality at a modest enough price. A versatile set with good handset but no on-screen graphics, the picture quality of our sample lacked fine detail resolution, lending a 'soft focus' effect	59cm FST, NICAM, Fastext		76
JVC AVS250 £500	Average + Average -	This compact and delightfully versatile non-NICAM set has respectable on-board stereo sound and lovely screen graphics, along with an infernal handset. Our sample suffered a tuner problem which marred a picture quality which was pretty good when monitoring baseband signals off tape.	59cm FST, Fastext, o/s graphics		76
Panasonic Prism TK-24 W1 £699	Average + Average -	Handsome but bulky set delivers serious standalone sound quality. Lovely ergonomics but off-air picture quality marred by tuner section noise on our sample (works fine as a monitor.) Good NICAM (SCART) output.	59cm FST, NICAM, Fastext, o/s graphics		76
Philips 9752 £500	Average Average +	Detachable speakers ought to be an asset, but those supplied are too cheap'n'cheerful. Picture quality is nicely balanced, if a shade 'soft', the handset is nice, but the on-screen graphics are a bad joke	51cm FST, NICAM, Fastext, OSG, S-VHS socket		86 Supp.
Pioneer SD-21AV1 £599	Average + Good +	The set that can do anything if you've the patience to find out how to drive it: fine picture, decent sound and good flexibility in a neat compact monitor package, plus a handset that deserves its own instruction manual	51cm FST, NICAM, Fastext, OSG/LED	R	86 Supp.
Sony KVX 2132U £530	Average - Average +	This is an attractive, ergonomic and competitive package, trading picture resolution in favour of stability. The on-set sound is naff, so Trinitron fanciers should use it as a monitor alongside a hi-fi system	51cm Trinitron FST, NICAM, Fastext, OSG	R	86 Supp.
Toshiba 217D9B £480	Average Average -	A superficially impressive looking package for the price, picture quality was disappointing on our sample	51cm FST, NICAM, text, OSG		86 Supp.

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

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

I have finally been forced to confront the fact that it's time to retire and put out to pasture my ancient Naim *NAP250* power amps. Something like fifteen years of distinguished and exceedingly reliable service is a very impressive record indeed, but the events of the last month leave me little option.

My confidence was first shaken, though only slightly stirred, by an exceedingly pretty pre-/power combination from Alchemist Products. This new brand has certainly been getting the audiophile rumour mill churning recently, and looks like being one of the hottest UK upmarket amplifiers for years —

Forget the Christmas rush this year . . . Paul Messenger has been trying out a few new amplifiers and is looking forward to a rather more passive yuletide.

though it runs nice and cool in practice, I should add.

Placing the monoblock power amps up by the speakers and linking everything with hawser-like cables makes it a bit fussy in its way, as do the entirely separate volume controls for each channel. But the sound has a delightfully transparent sweetness through the voice band that I found most beguiling, and which made my *NAP250* sound like it had caught the first cold of the winter. The treble is polite and self-effacing, and I couldn't work up quite so much enthusiasm for the bass end of things, but I didn't have the combo for very long, and should have liked to have done some extra fine-tuning to the (separate) vinyl disc stage, to get a better match to my record player.

A real cracker

The AP combo reminded me in a way of the characteristics that have sent an increasing number of enthusiasts knocking on the doors of valve amplifier makers these past few years, though the next stage in this saga rammed home the thermionic message in an altogether more convincing manner.

At the end of a hard day's *NAP250* blind listening tests, and with a pair of Heybrook *Sextets* making some very pleasing noises down the end of the room, panellist Guy Sergeant of Audio Innovations mentioned he had an amp or two out in the *G-wagen* and would like to try driving the Heybrooks with them.

Even the power stage of the comparatively humble (£995 integrated) *Series 500* proved a pretty startling experience. It dragged me right back fifteen years to when I'd finally plumped for a *NAP160* after agonising for hours over retiring my much loved and tweaked valve-driven Radford *STA25*. Once again I was confronted by the extraordinary believability of the valve experience, which particularly applies to the voice band, and which somehow renders limitations elsewhere towards the bandwidth extremes irrelevant.

It wasn't an easy decision then, and it isn't any

easier to make today. Guy next compounded my dilemma by the powering up *AI's First Audio*, a £1,500 stereo power amp much admired by JK of this very magazine.

One could say the *FA* blew my ageing but quite recently serviced *NAP250* into the weeds, but I'm not in the mood for motoring analogies right now, so I'll content myself by noting that my '250 sounded comparatively coloured and shut in, despite its good timing and control. A Moment of Truth had finally and irrevocably arrived.

Definitely no turkey

There remains an interface problem between the *First Audio* and my *NAC52* preamplifier that I'm still waiting to get sorted out, but I spent several days basking in that triode glow and simply enjoying the system, whilst trying to puzzle out what to use for the rest of the loudspeaker assessment work.

Much as I like the sound of the *First Audio*, I couldn't really regard its meagre seven watts of triode power rating and transformer coupling as a responsible starting point for comparing twenty six pairs of mainstream loudspeakers.

By lucky happenstance, Doug Graham and Alexis of Naim Audio had come by a couple of weeks previously, primarily to make sure that the rather tricky assembly and installation procedures for the *SBL* loudspeaker were carried out correctly. We had an enjoyable time running them in during the afternoon, but I suspect they were more impressed by the seafood than the power amps, as Doug's parting shot was that I ought to try driving the *SBLs* passively with a pair of *NAP135* monoblocks, instead of actively with my old *250s*.

A week or three later a pair of *135s* arrived, immediately proving his point and restoring my high opinion of Naim amplifiers — would that I'd had them in time for the blind speaker tests. Certainly there was no sign of the shut-in boxy constrictions, and both bandwidth and dynamic resolution were much improved over my old warhorses, to the point where I could put hand on heart and say that I actually preferred them to the *AI FA* — albeit with my fingers crossed behind my back some of the time, and in some respects.

The icing on the Christmas cake

The voice of reason points out that a pair of '135s should offer some advantage, since they cost twice as much as a *First Audio*. In order to compare like for like (or like with unlike), I really need to get hold of a pair of *Second Audio* monoblocks, with the right input characteristics to match the *NAC52*. And now that a pair of passive crossovers have arrived for the giant and very sensitive Naim *DBL* loudspeakers, the experience should be very interesting indeed.

I'm also eagerly awaiting the imminent appearance of a pair of even bigger and more sensitive Tannoy *Westminster Royales*, which is a real incentive to get a good triode power stage sorted out and ready in time for Christmas, so I can put on slippers, point feet towards the fire and sit back and enjoy the hi-fi system, instead of having to listen to it all the time.

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