

# HI-FI CHOICE

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

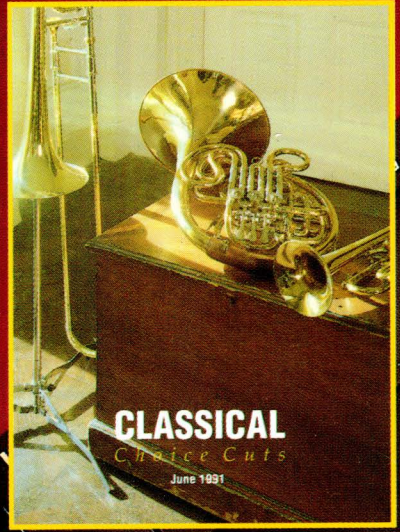
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THE WORLD'S No.1 GUIDE TO BUYING HI-FI

# HI-FI CHOICE

ISSUE NUMBER 95: JUNE 1991

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# Menu

As we reported in last month's *Hi-Fi Choice*, Nipper, the fox terrier immortalised on EMI's HMV record label, has gone to that great dog pound in the sky.

What, you may ask, did the poor little canine do to merit such harsh treatment. I suspect the answer to that is quite simple, it's not so much a question of what the dog did, more a question of what he did it with. Poor little Nipper made the big mistake of being seen listening to a record, something EMI is trying very hard to forget all about at the moment. Had Nipper flexed his claws over one of those nice profitable Compact Discs then I'm sure his future would have been assured, but no, Nipper chose black vinyl, as did many millions of people in this country when they came to purchase a top quality hi-fi source.

Nipper's story is rather prophetic. When Francis Barraud painted the original picture, Nipper was listening to an Edison cylinder type phonograph. Apparently Barraud couldn't sell the picture and decided that the only thing to do was to replace the cylinder phonograph with what was then all the rage, Emile Berliner's Gramophone. This picture was subsequently sold to The Gramophone Company, which used it for its 1900 catalogue. Funnily enough, the story came full circle when Emile Berliner bought the US rights to the picture on behalf of the Columbia Phonograph Company, where they have been causing a problem for EMI ever since.

Just as Nipper had to change with the times due to commercial pressure, it looks as if EMI has decided to put yet another nail into the coffin that it is preparing for vinyl.

That EMI, and indeed the other record companies, should be caught in such an unsightly rush to bury the humble record speaks volumes for the relative profit margins of each format, as well as reminding everyone concerned that the music business is a lot more about business than about music.

I've tried very hard not to be Luddite about this issue, I use CD more than I use vinyl at home. Although there are quite a number of turntables on the market that sound appreciably better than equivalently priced CD players, CD is a lot easier to use and for casual listening I am frequently unable to overcome the sheer ease of use offered by CDs. However I have the choice of what I listen to and I would like it to remain that way. If the demand for vinyl falls off by all means decrease the supply but to implement a prohibitive pricing structure coupled with an increasingly poor availability and then turn round and say that the format is dying rather than being killed strikes me as a bit rich.

Andy Benham



Photography by  
Chris Richardson



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Niro Nakamichi, the man behind the marque - see page 16.

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*Paul Miller delivers his verdict on this little lot in this month's main review.*



*Yours for £3,500: but you could also win it in this month's competition.*

you through what was done, how it was done and what the results mean.

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### THE CHOICE DIRECTORY

At a glance information including features, prices and comments on all the current products that we've tested in past issues of *Hi-Fi Choice*.

Because of the increase in VAT, which occurred just as we were going to press, some of the prices may be slightly incorrect - sorry.



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PM has finally succeeded in his quest to obtain a pair of Epos *ES14* speakers and is well impressed by Robin Marshall's best known creation.



# Update

## PRODUCTS

### Naim goes digital

Few specialist hi-fi manufacturers have been more consistent and vociferous in their criticism of CD than Naim Audio. However, its implacable opposition to the new medium was no more successful than Cnut's attempts to keep his socks dry.

But like it or not, CD is steadily ousting vinyl from the music emporia of the developed world. And wherever sources of music should choose to go, hi-fi manufacturers have little choice but to follow.

That at least is one of the rationales used to justify Naim's introduction of the NA CDS CD player - and no ordinary CD player at that. Expected on the market this June, the near £3,000 price tag ensures that this is among the most expensive British machines available, and also one of the most original.

Instead of separating a two box player into both transport mechanism and DAC, the CDS owes more to the (even more expensive) NAC52 preamplifier. Both transport and DACs stay in the one chassis, while the second box contains a multiplicity of power supplies, feeding the main player via a massive multi-way umbilical.

The player has just the usual basic facilities, accessed from a simple row of buttons and duplicated (and some-



*The Naim CD player, complete with external power supplies.*

what extended) on the remote control handset. Unusually, it is a top-loader. A perspex flap the size of a jewel case covers the front right hand corner, keeping dust off an unusually carefully and elaborately spring-decoupled disc drive. Discs are placed directly onto the drive spindle 'platter' and secured by a digitally actuated magnetic puck.

The press release mentions a number of technical areas where innovation has replaced normal industry engineering practice, though in many fundamental respects the player sticks quite closely to the design specifications of the well respected Philips sourced main components.

Our roving reporter dropped in to Naim's Salisbury headquarters for a quick listen to a prototype. It sounded quite unlike any other CD player he has heard, which alone should win some new converts to the silver

disc. But it doesn't sound like analogue LP either, we're still talking about trying to compare apples with pears. Certainly this is a CD player that well-heeled vinyl junkies should try and get to hear.

volume control.

All the systems feature full logic control whereby an action such as selecting a radio station will turn off the CD player and activate the tuner.

On the CD player front, the company will be launching a new flagship product, the CD850MkII as well as the £159 CD618, a Bit Stream replacement for the CD610. The company has also announced a new amplifier, the FA890 which will enter the market at £229 including full function remote control and which will be featured in next month's amplifier issue.

Something to look out for later in the year is the AZ6819 CD personal, along with infra-red remote control and digital signal processing. This



*At 17.9mm, Technics' latest CD player is the thinnest yet.*

### Philips gears up for the future

Philips used this year's Brown Goods Show as a launch pad for a plethora of new products to see it through to next year.

The Series 300 range, due for launch in June, is billed as 'a major assault on the CD based systems market' and consists of three models, the 2 x 55watt F310, the 70watt F330 and the 100watt F330, the new units are priced at £399, £499 and £599 respectively. All offer programmable CD, digital tuner, twin cassette deck and full remote control including a motorised

interesting unit will come equipped with wireless headphones.

### Technics slims down

Technics chose this year's Brown Goods Show to unveil what must be the world's thinnest personal CD player. The astonishingly thin SL-XP700 is only 17.9mm thick. Technics has achieved this by means of a new laser assembly based around a single piece collimator/objective lens and by using an extremely thin diffraction grating as a phase rotator



*Philips' CD flagship, the CD850 MkII.*



rather than a conventional prism.

The new player, which will retail at £199, is also reported to be capable of producing six hours of playing time from its internal Ni-Cad battery packs and comes equipped with Amenity Sound Control, a device aimed at stopping high frequency noise polluting the atmosphere around the user.

Technics also looks like creating quite a stir with its *E10* lifestyle system. The unit offers CD, tape and tuner along with various time control functions and a two way infra-red control which can display a wealth of information about the system while you sit in the comfort of your armchair. The *E10* will cost around £1,000 and will be available in August.

Other new additions to the Technics range include a £550 CD equipped mini system and no fewer than three new double cassette decks ranging in price from £290 to £150.

## Revolver stands up

Revolver has launched a range of loudspeaker stands aimed at the audiophile market. The new range, which comes flatpacked for home assembly, consists of two models, each available in a number of different finishes. The 16-inch stand weighs in at 7kgs while the



The supporting cast - Revolver's new speaker stands.

larger 22-inch model is a more massive 9kgs.

Prices depend on the finish you require, for black texture, black ash, blue marble and white marble the smaller stand will set you back £65, the larger model £100, while if your aesthetic tastes are more inclined towards ebony, russet, or blue or red high gloss finishes, then the prices are £75 and £125 respectively.

The design features an open central column which can be filled with either sand or ball bearings if required.

## Compact, budget B&W

B&W has launched two new models, the compact £160 *DM-600* and the slightly

larger £200 *DM-610*. Both incorporate 25mm metal dome tweeters and a moulded polymer front baffle that is rebated into the cabinet. As with the HF units the 165mm and 203mm polypropylene mid/bass units are designed and manufactured by B&W at its Worthing factory. The woofers, as they used to be known, use a low hysteresis rubber surround and a high temperature voice coil wound on a Kapton former.

As with many a B&W loudspeaker, both incorporate twin terminals for those of you who have discovered the wonder of two sets of speaker cables. Visual design is by the company's favourite industrial designer, Kenneth Grange at Pentagram.

Meanwhile, in the R&D department up the road in Steyning, the company is working on a system of digital equalisation for the effect that room acoustics have on the behaviour of loudspeakers. If things go to plan, the company could be bringing out a digital preamp in the new year. Watch this space.

## Lord copper

It's unusual to see a \$39Bn a year company launch something like a new loudspeaker cable, but the

Japanese mining and smelting firm Furukawa is keen to impress audiophiles. PCOCC (pure copper Ohno continuous casting) Evencap cables are made of some of the cleanest copper around. Furukawa's own method of production gives a grain free, single crystal, oxygen free 99.9999 - or six nines - copper conductor. Purer copper, according to Furukawa, gives better capacitance and less resistance with low transmission loss and distortion and a better resolution to sound quality. Basically there is a freer flow of signal and better bass response.

Three Evencap cables are available, priced £4.50, £12.00 and £22.00 a metre. The more expensive types include a non-magnetic strand down the centre to reduce variable electrostatic capacitance there.

Furukawa is principally an OEM (original equipment manufacture) brand supplying the likes of telephone and cable laying companies. It is one of only two corporations in the world making six nines cable using a continuous casting method, and one of only a tiny handful of hi-fi names which researches, designs and manufactures its own cable.

Furukawa is available through Quantum Audio, Kilmarnock. Tel: 0563 71122.

## Linn: Kairn do

Development continues apace at Linn Products, with the launch of a new preamplifier for the month of May.

The *Kairn* preamplifier is priced at £1,295 - more than twice the price of the company's first preamp - the *LK1*. Extras for Linnophiles, or anybody else, include a dedicated incorporated power supply similar to a *Dirak*, and multi-room capability. The fully remote *Kairn* was described as 'musically much better sounding than its forebear', by Uxbridge Audio - which supplied the mega Linn system featured in *Aspirations*



Another excellent Pentagram design job joins the B&W stable.



this month. In fact our featured host Neil is said to have bought one already.

We'll have a photograph and more details when they are released by Linn.

On another note, the rumour mill has been consistently churning out the news that Linn is poised to launch a CD player. Millers claimed a two-box system of Teac transport/cut-down *Numerik* goodies would be offered to discerning audiophiles for around £6,000. The mill churns out chaff according to Linn: "it's a complete rumour," we were told (though how complete remains to be seen).

Better, or more substantial news comes in the form of price reductions for several Linn items. The falling price of the Linn *Intek* amplifier from £548 to £398 was mentioned in April and has been followed by price drops for the *Axis* and *Basik* turntables. The *Akito* tonearm, sourced from Japan and supplied with the turntables now costs less to produce according to Linn. "We have paid for all the tooling costs and are able to drop the price on both turntables by £35," Linn said.

The price drops beg the question of whether Linn is feeling the pinch of a pecuniary High Street pinch, but company spokesperson Anne Young emphasized: "There is no question about this more aggressive pricing of entry level products - the reductions are related to production costs."



The XC-700 - Bit Stream for the masses at a mere £180?

### Aiwa launches low-bit players

Aiwa has launched two new CD players, the XC-700 and the XC-500.

The XC-700 is based on a Philips SA7350 Bit Stream chipset, while the XC-500 relies on Matsushita sourced MASH decoding chipsets.

Prices for the new players are £180 and £150 respectively, for more information, and a full review of the XC-700, turn to page 56 of this issue.

### JVC's controlling interest

JVC has introduced the first of what is intended to be a range of units designed to form the heart of a sophisticated home entertainment system.

The RX-505(L)TN receiver features built in Dolby Surround decoding as well as the necessary rear channel amps so the user has only to provide the rear speakers. It is also intended to control a vast array of JVC components such as VCRs, TVs, CDs etc via the built in CSRP

(COMPU-LINK Source-Related Presetting). Users can adjust parameters such as level, balance and equalisation for each video and audio programme source and store the results in memory.

### Parking fine for Sony

Sony recently hired out most of Battersea Park to unveil its product range for 1991, but when you consider the vast quantity of products on display the choice of venue makes a lot more sense. Sony's drive to capture a bigger share of the separates market will be spearheaded by no fewer than ten new CD players and 11 new cassette decks, while the personal stereo front is set to receive no fewer than 21 new models, when you include perennials such as the Walkman *Pro* and the sports models, this means that there are a staggering 30 Sony Walkmen to choose from.

On the CD front, the whole range now employs single bit conversions techniques courtesy of Sony's proprietary pulse conversion

system. Six new standard models are included as well as two multi-disc machines and couple of new *ES* machines. Prices range from £139 for the CDP-491 to £399 for the CDP-X333ES

The new cassette range is made up of five new double cassette decks, four new single decks and a pair of *ES* models, plus some of the better models from last year which retain their places. The top of the range double deck, the £299 TC-WR870 includes two sets of Dolby encoding/decoding circuitry rather than the more usual single set, something Sony claims to be unique to this model. On the single deck front, the most interesting aspect is the pricing. Like most of the major players in the tape market, Sony has reduced the price of most of its new cassette decks, three head machines can now be had for under £200, Sony's offering at this price point, the TCK-570 costing £199.99.

Sony will also be pushing DAT very hard in the coming months with a new four head full size unit, DAT in-car unit and a mini sized unit, although this latter unit is not scheduled until the autumn. On the fun front, two pairs of cordless infra-red speakers, the IFS20K and the IFS50K are priced at £159 and £299 respectively.

### Kenwood goes bananas

In a fit of activity Kenwood has launched 27 new products, including not only the company's bread and butter midi and mini systems but a whole host of separates as well. Top of the tree come five CD players incorporating Kenwood's first low bit DACs which it describes as third generation one bit. Most affordable is the £150 DP-2030 which incorporates second order noise shaping, plenty of features and remote control. The rest of the range utilises third order noise shaping and the CDM-19



RX-505(L)TN might be a bit of a mouthful, but JVC products have no problem addressing it.



transport. Reviews of the middle and top priced *DP-4030* and *DP-7030* can be found in this issue.

Alongside other Japanese majors, Kenwood has launched a £300 audio/video amplifier incorporating Dolby Pro-Logic and more socketry than a mixing desk! There's also a new domestic DAT player called the *DX-7030* that weighs in at £700 and complements the *DX-7* portable that we checked out in May (Issue 94).

And there is, of course, a plethora of new amplifiers, tuners and cassette decks with which we hope to be filling our main review sections in forthcoming issues.

coloration according to Ruark. Sensitivity is rated at 87dB RMS making it suitable for amplifiers producing between 20 and 100 watts power.

The new model stands some 38cm high and is designed to be used with stands. It is finished in a real walnut veneer which is balanced for symmetry.

### Don't go back to Rockport

Audiofreaks has announced that it will be importing and distributing the Rockport Technologies *Sirius* turntable and arm from Maine, USA.



*Yours for a mere £149, Sansui's new turntable.*

The deck, which bears a resemblance to the two Versa Dynamics models, has an air main bearing and a vacuum platter which clamps the record by suction. The parallel tonearm is likewise an airbearing'd device.

The combination was designed by Andrew Payor, whose past work includes the Well Tempered turntables and arms, and the sandwich construction of the *Sirius* plinth is similar to that incorporated in the Well Tempered TT. The price of the set up is as exotic as the player looks, £13,500.

Audiofreaks is also distributing the Wheaton *Triplanar II* tonearm, a particularly esoteric design that allows VTA adjustment during playback and incorporates Cardas wiring.

Not content with attempting to take over the high-end turntable market, the company is distributing a new range of loudspeakers from Hales Audio, another American company, that

produces two substantial (four inch thick front baffles!) models called *System Two* and *ST Reference*. Both are four foot high two way designs, they cost £3,000 and £5,500 respectively and the latter *System Two Reference* features an external crossover that sits in a sand filled, spiked box. Serious stuff.

*Hales Audio, the latest name on offer from Audiofreaks.*



**Swordsman Plus, ideal for Highlander fans.**

### Swordsman addition

Speaker specialist Ruark is launching its *Swordsman Plus* loudspeaker onto the UK market this month. The £279 two way model does not replace the *Swordsman* which remains priced at £239. The *Plus* is said to improve on the original by offering tighter bass control and giving better space and detail in the mid band.

It does this by using a 'one-inch' polyimide dome tweeter and six and half inch treated paper cone bass/mid driver. Internal bracing within the (15mm) medite cabinet makes the enclosure more rigid and reduces



## In Brief

**G**rahams Hi-Fi is holding a series of musical evenings in May and June. The London launch of Meridian's new all digital loudspeaker, the *D6000* will take place on May 14. Priced at £7,000 it's not for the faint-hearted or small walleted, but features a novel crossover which divides signal to the drivers in the digital domain.

On May 21 there is a Linn Products evening featuring the new preamp - see news story - and on June 11 Grahams will host a NICAM, surround sound and DSP evening with Yamaha and Akai. Times etc from Grahams: 071 226 5500.

**T**he Quad 606 will in future be available in a new green finish. Before you do a double take, the green in this connotation refers to an new environmental friendly paint which will be used in preference to the original Nextel type finish which the company has decided to withdraw due to its 'environmentally unfriendly nature.' The new paint is visually very close to the previous finish and Quad doesn't anticipate any matching problems with other items in the range.

**S**ansui is to return to the analogue market with the launch of the *SR211G*. The £149 turntable comes complete with cartridge and has been jointly developed with Dual, who will also be manufacturing the unit for Sansui.

**T**annoy's *System 215* DMT monitor loudspeaker system has won Japan's prestigious Golden Sound award for 1991. The award is given annually by Japan's premier audiophile magazine, *Stereo Sound*.



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FROM THIS AMP"

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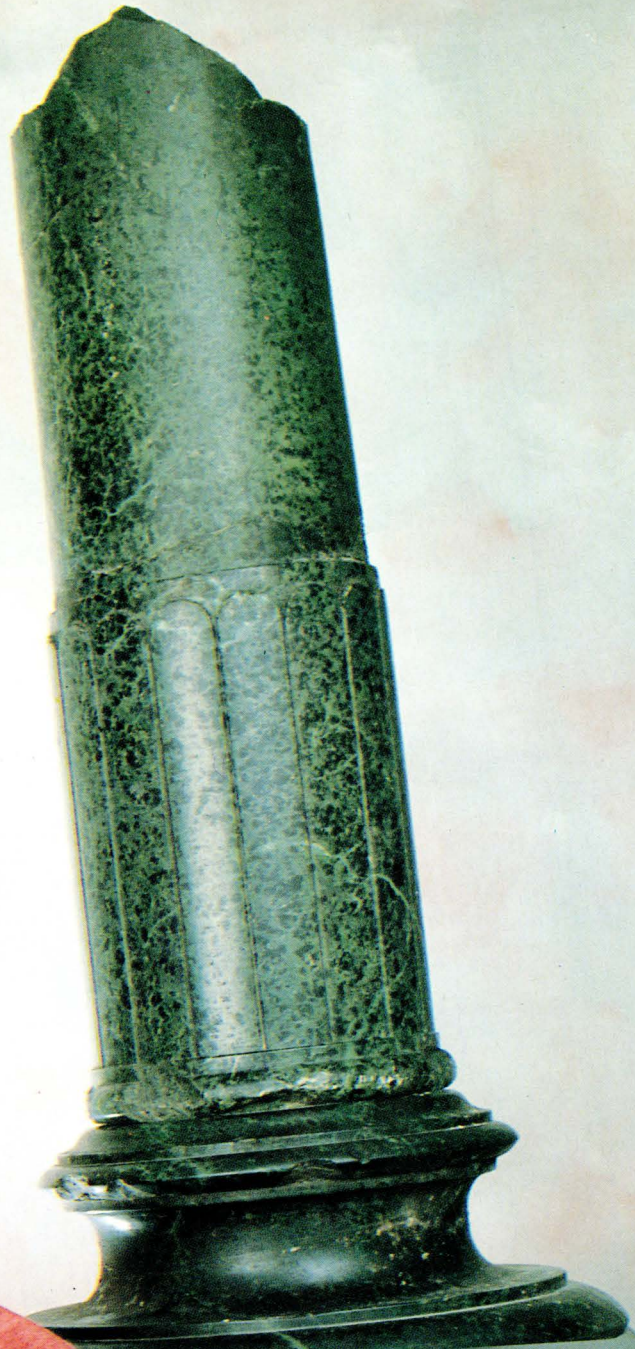
A-227 — "A SOLID PERFORMANCE AND SIMILAR BUILD  
QUALITY MAKE IT A BARGAIN FIRST TIME BUY"

What Hi-Fi? November 1990





ENCE  
INT



*Integrated Stereo Amplifier*  
SUPER LINEAR CIRCUIT

OFF SOURCE  
TUNE  
TUNE  
TUNE  
SELECTOR

DAT TAPE 1 PHONO  
TUNE 2 TUNER  
TUNE  
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VOLUME CONTROL  
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MM MC

A-400  
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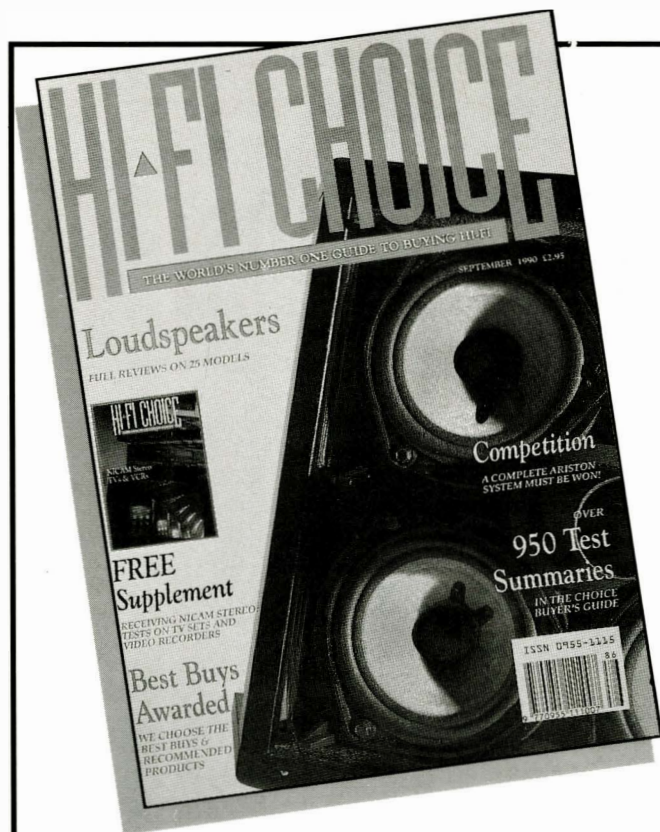
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<b>CHESHIRE</b>	
Car & Home Stereo 42 Sunderland Street Macclesfield	0625 32707
Cobalt Hi-Fi Centre 106 Bridge Street Warrington	0925 36215
Tomorrow Studios 30 Northgate Street Chester	0244 320414
<b>CORNWALL</b>	
Truro Hi-Fi 25 King Street Truro	0872 79809
<b>CUMBRIA</b>	
Kenneth Gardner 70 Dalton Road Barrow in Furness	0229 820308
<b>DERBYSHIRE</b>	
Active Audio 12 & 16 Osmaston Road The Spot Derby	0332 380385
Stuart Westmoreland Limited 2C Albert Street Derby	0322 372494
<b>DEVON</b>	
Bernard Smith 107 High Street Barnstaple	0271 43503
Upton Electronics 3 Torquay Road Paignton	0803 551329
Radford Hi-Fi 107 Cornwall Street Plymouth	0752 226011
Radford Hi-Fi 28 Cowick Street St Thomas Exeter	0392 218895
<b>ESSEX</b>	
Peter Foulkes 122 High Street Colchester	0206 767428
Chew & Osborne 148 High Street Epping	0378 74242
Waters & Stanton 18/20 Main Road Hockley	0702 206835/204965
Waters & Stanton 12 North Street Hornchurch	04024 44765
Chew & Osborne 26 King Street Saffron Walden	0799 23728
KA Cheeseman Sir Isaacs Walk Colchester	0206 46808
Peter Foulkes 104 High Street Maldon	0621 853148
Woolfmans	
Upper Mall Eastgate Shopping Centre Basildon	0268 285922
ACL Radio Services 1 North Mall Grays	0375 374666
Peter Foulkes 20 Exchange Way Chelmsford	0245 491479
<b>GLOUCESTERSHIRE</b>	
Hutchinsons 295A High Street Cheltenham	0242 573012
<b>HAMPSHIRE</b>	
Bryants Hi-Fi 81 High Street Aldershot	0252 20728

Sinclair Youngs 9/11 Church Street Basingstoke	0256 28623
Now That's Hi-Fi 24 Arundel Way Portsmouth	0705 811230
Southampton Hi-Fi Centre	
37 Bedford Place Southampton	0703 228434
R Upfields	
6 Locks Heath Centre Locks Heath Southampton	0489 885122
Now That's Hi-Fi 174 Fratton Road Portsmouth	0705 811230
Cristavision	
7 Thackery Mall Fareham Shopping Centre Fareham	
<b>HERTFORDSHIRE</b>	
Hypertec 6 Bancroft Hitchin	0462 452248
Hypertec 4 Park Place Stevenage	0438 318218
Chew & Osborne 70 South Street Bishop's Stortford	0279 56401
Herts Hi-Fi 93A/93B High Street Hoddesdon	0992 441172
<b>HUMBERSIDE</b>	
Superfi 4 Dock Street Hull	0482 24051
<b>ISLE OF WIGHT</b>	
Russells 40 Upper St James Street Newport	0983 523864
<b>JERSEY</b>	
Fotosound (Jersey) Limited 5 Charing Cross St Helier	0534 59990
<b>KENT</b>	
Kimberley Hi-Fi 193 Broadway Bexleyheath	081 304 3272
Panatec Sound & Vision 83B High Street Gillingham	0634 573141
KAC Electronics Limited	
53/57 Camden Road Tunbridge Wells	0892 23242
VJ Hi-Fi 29 Guildhall Street Folkestone	0303 56860
VJ Hi-Fi 119 High Street Margate	0303 56860
<b>LANCASHIRE</b>	
Clearstone 235 Blackburn Road Bolton	0204 31423
Wigan Hi-Fi Centre 13 Centre Arcade Wigan	0942 37977
Romers Hi-Fi Limited	
94/96 High Street Rishton Blackburn	0254 886382
Kenneth Gardner 30/32 New Street Lancaster	0524 64328
<b>LEICESTERSHIRE</b>	
Mays Hi-Fi 27 Church Gate Leicester	0533 625625
Stuart Westmoreland Limited 2 High Street Oakham	0572 755600
Stuart Westmoreland Limited	
9/10 Cheapside Melton Mowbray	0664 411511
Stuart Westmoreland Limited	
58 Castle Street Huncley	0455 637605
Hi-Fi Choice 10 St Mary's Road Market Harborough	0858 433601
Hi-Fi Choice 5 Town Square Melton Road Syston	0533 696996
Parker High Fidelity 49 Baxter Gate Loughborough	0509 269888
<b>LINCOLNSHIRE</b>	
Superfi 271A High Street Lincoln	0522 520265
Stuart Westmoreland Limited 49 High Street Grantham	0476 78108
<b>LONDON</b>	
Covent Garden Records 84 Charing Cross Road	071 379 7427
Kamla Electronics 251 Tottenham Court Road	071 636 4611
Hi Way Hi-Fi 315 Edgware Road	071 723 5251
Hi Spek Electronics	
344/346 Regents Park Road Finchley Central	081 349 1166
Light & Sound 166 High Street North East Ham	081 472 1373
Babber Electronics 158 Uxbridge Road West Ealing	081 579 6315
Spatial Audio 29 Tottenham Court Road	071 637 8702
Myers Audio 6 Central Parade Hoe Street	081 520 7277
Stereo Regent Street 245 Regent Street	071 491 7922
Brians Hi-Fi 19 Tottenham Court Road	071 631 1109
The Studio 133 Tottenham Lane N8	081 340 7775
<b>MERSEYSIDE</b>	
Beaver Hi-Fi 20 22 Whitechapel Liverpool	051 709 9898
Tisdalls 76 Tulketh Street Southport	0704 531500
<b>MIDDLESEX</b>	
Heathrow Hi-Fi Limited 90 Staines Road Hounslow	081 572 1135
<b>NORFOLK</b>	
Martins Hi-Fi 85/87 Ber Street Norwich	0603 627010
Adcock & Sons Limited 30/34 High Street Wotton	0953 881248
Martins Hi-Fi 5 High Street King's Lynn	0553 761683
<b>NORTHAMPTONSHIRE</b>	
HG Rapkin 11 Kettering Road Northampton	0604 37515
<b>NOTTINGHAMSHIRE</b>	
Forum Hi-Fi & Video Centre	

600/602 Mansfield Road Nottingham	0602 622150
Superfi 15 Market Street Nottingham	0602 412137
Parker High Fidelity 70 Long Row Nottingham	
<b>OXFORDSHIRE</b>	
Witney Audio Centre 28 High Street Witney	0993 702414
<b>SOMERSET</b>	
Telefringe 2/3 King Street Frome	0373 62598
Paul Roberts 32 North Street Taunton	0823 270000
Yeovil Audio Limited 1 Glovers Walk Yeovil	0935 25430
<b>STAFFORDSHIRE</b>	
Active Audio 29 Market Street Tamworth	0827 53355
Active Audio 95 Stafford Street Hanley	0782 214994
<b>STOKE ON TRENT</b>	
Purkiss Hi-Fi 51/53 Piccadilly Hanley	0782 265010
<b>SUFFOLK</b>	
Peter Watts 1B St John's Street Bury St Edmunds	0284 703045
System Sound 91 North Street Sudbury	0787 72348
<b>SURREY</b>	
Cosmic 244/256 Station Road Addlestone 0932 854522/851753	
Tru-Fi 10 Church Street Leatherhead	0372 378780
Tru-Fi 2 Central Parade Redhill	0737 766128
<b>SUSSEX EAST</b>	
Smythe & Barrie 31 Langney Road Eastbourne	0323 29192
Sunderland Electronics	
52 Norfolk Square Western Road Brighton	0273 774113
<b>SUSSEX WEST</b>	
Sussex Audio 163/165 Church Road Burgess Hill	0444 242 336
Sunderland Electronics	
43 Broadwater Street West Worthing	0903 201187
Cristavision 60 East Street Chichester	0243 775444
<b>TYNE AND WEAR</b>	
Bill Hutchinson Limited	
87A Clayton Street Newcastle Upon Tyne	091 230 3600
<b>WARWICKSHIRE</b>	
Carvels of Rugby Limited 3/7 Bank Street Rugby	0788 541341
<b>WEST MIDLANDS</b>	
Bridge Hi-Fi Tudor House Bridge Street Walsall	0922 640456
Naam Hi-Fi Vision 122/123 New Street Birmingham	021 633 4944
Superfi 67 Smallbrook Queensway Birmingham	021 631 2675
Coventry Hi-Fi Church Lane Walsgrave Road Coventry	0203 440529
Naam Hi-Fi Vision Lower Precinct Coventry	0203 632086
<b>WILTSHIRE</b>	
In-Phase Audio	
21/23 Faringdon Road Swindon	0793 520948/526393
PR Sounds 58 Castle Street Trowbridge	0225 777799
<b>WORCESTERSHIRE</b>	
David Waring Cameras & Hi-Fi	
Marmion House High Street Worcester	0905 27551
<b>YORKSHIRE SOUTH</b>	
Superfi 1 Rockingham Gate Sheffield	0242 723768
<b>YORKSHIRE WEST</b>	
Amrik Electronics Co Limited 57 Orley Road Leeds	0532 752285
Superfi 7 King Edward Street Leeds	0532 449075
Amrik Electronics Co Limited	
57/59 North Parade Bradford	0274 722530
<b>S C O T L A N D</b>	
<b>GRAMPIAN</b>	
Autosonic 168 Holburn Street Aberdeen	0224 573777
<b>MID LoTHIAN</b>	
Bill Hutchinson Limited	
43 South Clerk Street Edinburgh	031 667 2877
<b>STRATHCLYDE</b>	
Bill Hutchinson Limited 43 Hope Street Glasgow	041 248 2857
<b>W A L E S</b>	
<b>CLWYD</b>	
Owens Colwyn Centre Colwyn Bay	0492 530982
Lloyds TV, Video & Hi-Fi 30 Lord Street Wrexham	0978 364168
<b>GLAMORGAN</b>	
Tele Electrical Services	
9 The Brackla Street Centre Bridgend	0656 654156
<b>GWENT</b>	
Hi-Fi Western Limited 52 Cambrian Road Newport	0633 262790
<b>GWYNEDD</b>	
Owens The Mall Wellfield Shopping Centre Bangor	0248 362951





# The contented Linnphomaniac



*Just how far along one path is it possible to go?  
Dan Houston visits the home of a Linn active Isobarik  
system employing no fewer than six power amps.*

**T**hink of a one-name system; the most obvious brands that come to mind may be Technics, Kenwood or Sony. Now think of a one-name high-end system costing around £17,000. It's a little more difficult, and besides, with that kind of money to spend, who would find source, amplification and speakers from a single manufacturer all to his or her tastes?

Like fashion, hi-fi with street credentials is a mix and match game where you can start at the lowest end of the market with products (of varying price ranges even) from different manufacturers which often sound better than the sum of their parts.

The skill - and half the fun - in assembling such a system is getting the synergy right; can you really get away with an Armani jacket over Levi jeans for instance.

And as you upgrade towards the high-end stuff that the audiophile big boys play with, there are some standard synergistic partnerships. The Voyd, Au-

dio Innovations and Snell combination enjoys its fans as does the Goldmund, Audio Research/Krell and Apogee set-up. And of course with an established reputation, the original trail blazers of the Seventies: Linn and Naim.

Walk into many a specialist dealer in Britain (especially BADA members) and you'll see the aspirational goal: Linn turntable, Naim amplifiers and take your pick between Naim or Linn loudspeakers. Prices for entry systems start at just under £1,000. It's been a cosy relationship for many years; synergy has been everything and Naim even developed tweaks for Linn turntables - the famous *Armageddon* (impedance matched transformer drive) and more recently, and perhaps rather less harmoniously, the *Aro* tonearm.

You'll notice that CD players are off the end of a fairly flat earth for these guys; according to this philosophy digital just doesn't make the grade in terms of sound quality.

Glasgow-based Linn Products has made amplifiers for years, though dealers and reviewers will tell you (and not behind a cupped hand) that the best sound is still via Naim amplification.

## All things equal

This month we're visiting a music lover who bucks the trend; who has bought a complete Linn system, the only exceptions being his Nakamichi cassette deck (to make tapes for the car), Sound Organisation equipment tables and Audiotech turntable table. His system has been tweaked to make it a true six-way set-up with six mono amplifiers per channel; which is about as far as you can go while adhering to solely Linn equipment

He's a shy cove, wouldn't let us photograph him, and doesn't see how his surname will add to the article. He runs a company, he says, involved in printing and framing pictures. He lives in West London, is called Neil and is 29 years old. Neil says he isn't an audiophile, but his hi-fi and his attempts to create a proper





listening room belie this. Neil moved into his house two years ago and has had to redecorate from top to bottom. He doesn't spend much time here he revealed, and the place looks a little like an Ideal Home Exhibition show house; there wasn't a blemish in his Smallbone kitchen.

The ground-floor listening room is at the back of the three bedroom house, with French windows onto a garden. From that end the listener sits on the only sofa facing the loudspeakers with the system to hand on the right.

The Linn *Isobarik* speakers are positioned either side of the door, with the floorboards reinforced with concrete underneath them. The room is sparse, with a plain oatmeal woollen carpet, cotton curtains and a couple of framed black and white posters. Apart from the sofa and hi-fi, the main piece of furniture is a hardwood record case, made for Neil by a carpenter friend.

### Stopping the rot

"When we moved in we discovered some rot in the floorboards here," Neil explained. "So we were going to have to replace them anyway. I had decided to

*The ultimate rack system? The Linn Sondek peaks out from behind the massed ranks of Linn power amplifiers.*

buy the active system by then and so it was a chance to improve the acoustics of the room as well.

"We did a lot of work in here. The plaster was stripped off the walls, the door had to be shifted by two or three feet to get the *'Bariks* in, and each of them stands over a column of concrete about a metre square. I couldn't afford to concrete the whole room so the rest is still a sprung floor with a couple of feet of space below, but all the joists that run across were also strengthened."

Neil's dealer, Uxbridge Audio, had helped with the room, by suggesting the strengthened floor. Another aspect of the redecoration was being able to run a separate spur to the mains electricity supply, and, knowing he wanted an active system, to install eight double sockets for the hi-fi.

That was slightly ambitious at the time because Neil apparently hadn't decided how active he wanted his system to be. But the hi-fi now uses all 16 sockets!

He tells his upgrading story: "A few years ago I had a basic system of *Revolver* record player, *Cyrus 2* amplifier and *Mission 780* loudspeakers. I've always collected records and I was always into getting something good for playing them. I tried a CD player, and took a Marantz *CD 94* home for two weeks, but when I compared my records with the CDs it didn't seem to make any difference to the *Revolver*, even though the CD player cost £900 more.

"I ended up listening to the *LP12* at Hi-Fi Experience in central London and the difference in sound quality was obvious - though I had to take it home and set it up myself, something which I wasn't very impressed with.

"At that time most magazines were saying that Naim amplifiers and *SBLs* (speakers) were the best around and I listened to a Naim six-pack at Uxbridge Audio - but I didn't want to spend that much money then. And when they set the *Isobariks* up the difference was staggering. I thought I could see the same thing happening over and over again; slowly upgrading and messing about when I wanted something better.





### What's in a Naim?

"When I first heard the Naim system I thought the sound was great but over two or three sides of a record it was wearing me out. The Linn equipment seemed more subtle, and to have a more subdued sound, but I thought I could get more out of it over a longer listening period. I actually ended up with a passive Linn system, at that time (three years ago) but didn't buy it in the end because I was moving."

Neil says that he arrived at his choice by a circuitous route; he'd listened to many different systems at different dealers to try and get the sound he was looking for. The painstaking work paid off, and when he moved house decided to buy the active Linn system.

"The improvement in sound quality of the active system just blew my mind," he enthuses. He ended up with the basic active system, consisting of Linn's

*Probably the most aktiv Isobarik in the world.*

preamplifier, *Aktiv* crossover and three *LK280* power amplifiers feeding the *Isobariks*.

The source was the *LP12* turntable, *Ittok* tonearm and *Troika* cartridge combination which he already owned.

### The missing spark

"I'll be honest and say that yes, it blew my mind and I loved it. But when I put certain tracks on, especially some of the vocal music in my collection, it still sounded a bit sharp or bright. I put an *Ekos* arm on and that made a difference again, but then Linn brought out the *Spark* power supply for the *LK280s* which effectively turns them into dual mono power amplifiers. I bought three *Sparks* last summer."

Neil found happiness with this sys-

tem, but was obviously by now tuned into the Linn upgrading philosophy which is one of the company's marketing strengths. Linn believes none of its equipment should become obsolete and has always tailored technology advances into existing product profiles. If you had bought the original turntable back in 1973 you would have been able to replace just about most of it by now, taking advantage of the new and better platters or bearings as they were developed.

### Speaking the right lingo

One of Linn's major developments of last year was the *Lingo* - a two speed outboard power supply for the *LP12* which found its aficionados despite an outrageous price tag of £496. Neil bought one. "My first feeling was it means you don't have to change the drive belt every time you play a 45rpm record. But from the point of view of sound quality I found it made a difference as well - though I'm not technically minded enough to know why!"

He also invested in two of Linn's *Dirak* power supplies - one for the *LK1* preamplifier and one of the crossover in November, and embarked upon the final upgrade.

This was to turn each *Isobarik* into a true six-way system, by re-wiring the speakers internally and putting extra speaker cable binding posts on the back. And it meant buying three more power amplifiers and three extra *Sparks*. Jas Sehmi, of Uxbridge Audio, was overseeing the upgrade which was to be an experiment, twelve channel systems being a bit thin on the ground.

"I thought the active system was incredibly good," Neil said, "and the improvements after the initial system were small although they did help to take the sound further. I had the feeling that we would have another minor improvement in getting towards the ultimate sound I wanted... but I never thought I would get perfect sound.

"So it was to be an experiment that I wouldn't have to pay for if I didn't like it. All I would have to pay was the £65 to have the speakers rewired by Linn. It was all set up and all I can say was that the difference was absolutely staggering - there was a cataclysmic leap forward. This wasn't governed by the law of diminishing returns like most upgrades; it achieved what I was looking for. Even my girlfriend, who has never been critical about the sound quality, said it was amazing."



## On the right track

Neil now finds himself listening to music all the time he is at home. He methodically went through his record collection of about 1500 discs to find tracks the system couldn't cope with, but so far hasn't been dismayed. "A friend and I had felt that there was no system which could play every record; each different system had its own strengths, but I think this is the final statement, I don't think you could improve upon it. I'm not an audiophile, I'm simply into getting the best out of my music collection, and I've got that. And I don't think it's overkill; some people aspire to an expensive car but I've bought this."

Neil explained some of what he was looking for in a music system. "I went to a New Order gig at the University of London in the mid-Eighties. They created a wall of sound which was very deep with guitars bringing up layer after layer of music. And I've always been obsessed with that sound but never been able to create at home." Er . . . until now.

There's no doubt about the bass capabilities of this system. After listening to some of Neil's favourite Van Morrison

*This wasn't governed by the law of diminishing returns like most upgrades; it achieved just what I was looking for.*

tracks we heard *Technique* by New Order and my notes mention feeling the bass through the sofa and through our backs rather than our feet.

With some Lester Bowie (*The Great Pretender*) a trumpet sounds as though you're standing next to it - the system certainly moves air. The feeling may be a little 'up-front' or close for some, but how do you feel after a live rock gig?

In the end Neil has followed the Linn upgrade path as far as it is possible to go and certainly seems more than happy with the results. As a music lover who tried the alternatives in search of his own type of sonic grail, he's that rare breed that's achieved everything he hoped for.

*Even the bedroom has its own system, no prizes for guessing the manufacturer.*

### The System:

LP12 record player:	£688
Ekos tonearm:	£1097
Troika cartridge:	£798
Lingo power supply:	£496
LK1 preamplifier	
+ Dirak power supply:	£870
Aktiv crossover + Dirak:	£1275
LK280 power amplifier (x6):	£639ea
Spark power supply/power amp conversion (X6):	£625ea
Isobarik loudspeakers:	£2062
Isobarik stands:	£200
K20 loudspeaker cable:	£2.90/M

**Installed by:** Uxbridge Audio,  
278 The High St, Uxbridge, Middx.  
Tel: 0895 30404.





**N**iro Nakamichi is a man with three heads. He undoubtedly has a head for business, he has a proven head for technological innovation and, perhaps most important of all, he has a head for music. He runs the Nakamichi Corporation, which from the early days of cassette decks has led the field for audiophiles wishing to get the best results from a magnetic tape. He's also a rich man; he patented the three head recording system before he was 30 years old.

The Nakamichi headquarters and research and development centre is 20 km west of central Tokyo in Kodaira prefecture. It's an impressive building, not least because of its residential surroundings. You arrive here off the expressway through a claustrophobic maze of nine-foot wide streets, the one or two storey houses and shops hung with paper flags and lanterns. To negotiate such roads the dustcarts look like Dinky toys compared with the British or American version.

The Nakamichi building rises like a space age giant from these streets, with its own comparatively vast lawn and driveway. The building is 13 years old and houses 180 employees - the majority of them researching new technology. It was designed by the architect Mr Morita and is as much a show case as the hub of the Nakamichi empire. On the first level there is a 100 seat concert theatre with its own grand piano, harpsichord and electric pipe organ. This is pretty neat for the office Christmas party and is also used for entertaining visitors, but its real function is to provide Nakamichi engineers with a proper acoustic hall where they can record live music before playing back a tape in one of the two listening rooms.

While the Nakamichi brand name reputation rests securely on the shoul-

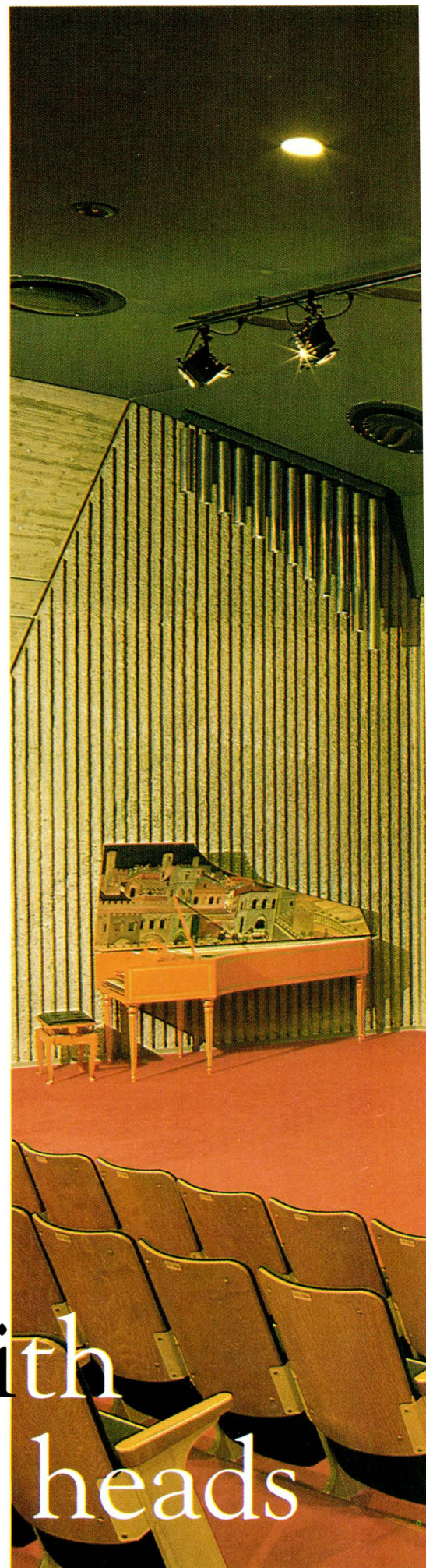
ders of its cassette deck business, 35 per cent of its turnover is from In Car Entertainment systems and it enjoys a 90 per cent share of the market with its commercial optical disc media evaluation system - the OMS 1000. Hi-fi separates arrived in the late Eighties with amplifiers (power and pre), tuners, receivers and CD players. Nakamichi's £5,000 1000 DAT machine was born in 1989 and was one of the first consumer players available outside Japan. Last year the company launched its *Music Bank* CD player range with an internal CD magazine feature. The company was almost embarrassed, we were told, to see sales of Music Bank CD players overtaking cassette decks in 1990. The corporation has been listed on the Tokyo stock exchange since 1984 and currently has paid-in capital worth £23.5 million.

### In the beginning

It all began in 1948 when Etsuro Nakamichi, Niro's older brother, founded an institute dedicated to research and development in electromagnetism, computers, acoustics and magnetic recording. Niro was six years old and still in shorts. He was the second son born into a family of twelve brothers and sisters in Aomori prefecture in Northern Japan.

Now approaching 50, Niro still looks in his prime, which reflects his zest for life; his stated hobbies include scuba diving and skiing, and as a lover of Baroque music he plays Bach on the clarinet. He is also a practising Jodo Shinshu buddhist he says.

Considering his achievements in the field of audio he is an atypical boffin, wearing a crisp white shirt with monogrammed double 'N's on the sleeves. His free-thinking style sits incongruously with the physical bearing and poise com-



# The man with three heads

*The 'Choice in Japan' series  
continues with Dan Houston and*

*Chris Richardson visiting Niro Nakamichi.*







mon among many senior Japanese managers. Nakamichi is a family business, Niro's younger brother Osamu is senior MD and his nephew, Etsuro's son Ted Nakamichi is Chief Manager of Product Planning.

After gaining a physics degree at the Science University of Tokyo, Niro joined the Oki Electronics Industry Company, the reason being that he wanted to work with a doctor studying AC/DC current bias recording technology.

At Oki he got involved with some government work and designed a navigation system for a missile before working on a series of open reel tape recorders.

At the same time, Nakamichi was also developing tape recorders and supplying the likes of Harman Kardon with know-how and OEM products. 20 per cent of the company's business was already concerned with the compact cassette medium by 1965.

## Rites of passage

In 1968, at the age of 26, Niro swapped little fish/big pond status for the opposite and hitched his wagon to the Nakamichi caravan. He describes the move as almost a shadow line or rite of passage and says he suddenly began taking work seriously (as if designing missile navigation systems was child's play!). He didn't start at the right hand of the brother though, and says jokingly that Etsuro apprenticed him as a 'head' designer.

He quickly realised, he remembers, that heads were to be everything with the new cassette medium. He could see that cassettes were poised to take over the world although the hi-fi community of the time regarded them as purely for dictation purposes.

Disappointed with the performance of the early compact cassette players, he decided he would make it his challenge to turn them (rather than tape itself) into a hi-fi product.

Speaking through his nephew Ted Nakamichi, Niro told me how he developed the three-head principle which was to change the company's direction.

## Adding an extra head

"It only took a few weeks to come up with the basic idea of three heads; I tried to keep the problem with me all the time, even in my subconscious so that while I was asleep or driving or just reading, anything could act as a trigger to the solution. I remember that I had the idea while eating breakfast one morning, but I don't think it was because I was eating three eggs!"

With a two head machine, one head is used for erasing and preconditioning the magnetic structure of tape, while the other plays both the recording and playback roles. Both these roles require a different size of gap (for magnetic flux strength) to do their jobs properly. In a two head system the record/playback head is always set at a compromise point between its two functions. The three head machine has one head dedicated to playback and one to recording, allowing the optimum gap to be set for each.

But even with three heads the quality of material available in the mid Sixties still left something to be desired.

Niro continues: "Most people were working on a larger recording head to improve the fidelity of the compact cassette recorder, but miniaturisation is the art of Japanese craftsmanship. And I knew there was a very new material, which might be suitable for a recording head, that was just being developed in Japan. Normal heads use a permalloy, but there was an engineering professor in a famous laboratory of the time who had developed a hard permalloy which gave much better sound quality. We went to him."

It's as simple as that; Nakamichi cassette decks still use Crystalloy, a refined version of that first material.

The change in the company's direction came when they tried to sell it. Niro remembers being stonewalled by the industry who told him it was far too expensive. Even Sony's top man in the States told him he would only be able to sell 60 decks a year.

With no alternative but to go it alone, Nakamichi established its own brand at the end of 1972, with the very first models 1000 and 700. These featured three heads, user adjustable azimuth for tape matching and a frequency response to 20kHz, adding 7kHz on top of the audio range of an average deck of the time. The development landed Niro the job of Chief Engineer.

"We were able to sell 10,000 of those first models and 30,000 if you include the subsequent generations," he said, "being turned down by the industry was a blessing in disguise." The decks were first sold in the States, although they appeared in Japan and Europe the following year. The decks were expensive, close to \$2,000. More affordable versions - the 500 and 550, appeared in 1974.

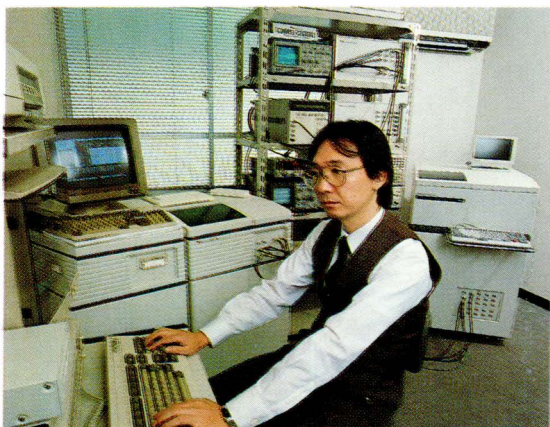
Nakamichi ceased OEM work in 1976, by which time it had become a household name to audiophiles in Japan, Europe and America.

## Enter the dragon

Niro began work on his most famous product - the *Dragon*, which was to be the ultimate cassette deck for the serious home taping audiophile. The current version is still the top of the range, with the unique combination of automatic azimuth correction and auto reverse capability along with a host of other goodies.

Niro told me Etsuro had been as excited about the *Dragon* as he was; it was to be the flagship for the medium as well as Nakamichi. His brother died in 1982, the year the *Dragon* was introduced. Niro took over the reins.

He describes his management style as



*Pride of place is given to the OMS1000 optical disc evaluation system (left), while final product testing takes place in one of the well equipped listening facilities (note the B&W loudspeakers).*



free, and therefore different from most Japanese corporations. He doesn't have much truck with high-flying graduates and believes that the will will find a way in technical innovation.

Nakamichi managers are allowed to hire their own people and the company philosophy is that engineers should be allowed to follow their own paths in developing products.

The standing on your own two feet philosophy applies to family as well as company. When Etsuro died the E Nakamichi foundation was born (in the USA to escape death duties) to sponsor concerts of Baroque chamber music, his and Niro's favourite classical period. In 1987 the endowment stood at over \$66 million which makes for a lot of performances of music which is otherwise too expensive to stage. The same will happen when Niro dies; family tradition forbids inheritance.

### The vinyl solution

One of Niro's last projects as Chief Engineer had been to design a turntable. The TX1000 was launched in 1981 featuring the 'absolute centre search system' which was to record decks what azimuth correction was to cassette decks. "Most vinyl records are slightly eccentric," Niro explained, "the hole for the spindle isn't dead centre, and often they are worse than specified standards which caused phase shifting and ruined the stereo image. My deck used a very heavy chassis with two motors and two tonearms. One of the tonearms measured the eccentricity of the record as it played and the platter was moved by the two motors to compensate for that error.

The turntable even featured a computer which digitally analysed and compensated the problem to achieve concentricity to within 20 microns when eccentricity could be as much as 0.34 millimetres.

By all accounts it was a breakthrough product, and one that Niro still regards as a milestone in his creative career. By applying know-how gained from developing cassette decks, he had addressed one of the vinyl enthusiast's main bug-bears: wow and flutter. But it was expensive, and a new medium promising 'perfect sound forever' was on the horizon and consumer interest was evaporating.

Niro immediately turned his attention to the compact disc medium and began work on the recordable CD system which was to result in the OMS1000. The company teamed up with the Hechst corporation in Germany which is producing software for the Optical Disc Evaluator.



*Niro Nakamichi poses with his twin box DAT player, while nephew Ted waits in the wings.*

With a 90 per cent share in the commercial market, Nakamichi stands poised to take advantage of the CD recording medium when it reaches the domestic marketplace. Niro also oversaw the development of Nakamichi's first CD players which appeared in 1984, closely followed by separates. Thus Nakamichi fans could assemble a complete system, all apart from the speakers.

### A systematic approach

This hole in the Nakamichi product range is neatly filled by a reciprocal agreement under which the company distributes B&W Loudspeakers. This deal arose from Niro's friendship with the late John Bowers - the 'B' of B&W. Pictures of the two men adorn the company's plush Tokyo offices in the central Shinjuku area.

With all the digital activity of the last few years, I was surprised to hear Niro say that the medium wasn't as good as analogue. At home he uses valve amplifiers and prefers listening to vinyl.

As he explained: "If you listen to a 30 IPS analogue master tape and then to the

CD made from it, the difference is really obvious," he said, "the CD misses the air and ambience of a recording. I would have preferred it if they had made the standard 18- rather than 16-bit."

As such he regards his most recent milestone product the 1000 DAT (digital audio tape) machine as the best of a bad job. But I think that's his musical head talking!

### Curriculum Vitae

Niro Nakamichi

Age 49

1963 Graduated Science University of Tokyo, joins Oki.

1968 Joins Nakamichi (founded 1948)

1972 Launch of Model 1000 - world's first three-head cassette deck. Niro becomes Chief engineer.

1977 R&D centre at Kodaira established.

1982 Nakamichi Dragon arrives. Etsuro dies, Niro becomes president.

1984 Nakamichi CD players and optical disc media evaluation system. Firm listed on Tokyo stock exchange.

1989 Launch of 1000 DAT machine.



# Choice Sessions

*This month we've been listening to a flexible amplifier system, a new version of a classic speaker and a CD lens cleaner.*



## Musical Fidelity P180 & CRPS

*Although it may take him a while to get around to telling you so, Alvin Gold has been playing with a new amplifier from Musical Fidelity which grows with the owner as his requirements change.*

You need to know the man before you know the product. In Musical Fidelity's case, the man is Anthony Michaelson (for once I thought I'd let my computer spell-checker have its way with Anthony Michaelson's name) whose legendary abrasiveness is second only to that of 'Ivory' (Ivor) Tiefenbrun, boss of Linn Products. Over the years, AM has largely lost interest in the mechanical nuts and bolts of sound reproduction. He reportedly hardly ever opens a hi-fi magazine, for example, except to decide who to issue a writ against next. Not for Anthony fiddling around for hours trying to extract the last microgramme of perfection from his CD player or tuner.

Anthony Michaelson's way of dealing with hi-fi is to bring it home, plug it in and go. He expects it to deliver the goods. If it doesn't, he takes it back to the factory the next day - and god help anyone who crosses his path.

Despite his lack of patience, AM has a keen and well-tutored musical ear and a disc collection I'd give my right arm for, and his house has excellent, lively acoustics. What does this most prolific of amplifier producers, Musical Fidelity, mean for you? A range of increasingly listenable, no-nonsense amplifiers that work, that's what. He said he'd sue if I wrote anything else . . .

Lately, I've been spending some time with the Michaelson Audio (AM's exclu-

*The Musical Fidelity P180, the basic building block for a sophisticated amplifier system.*

sive high-end brand) valve amplifier, which consists of a preamp, preamp power supply, two monoblocks, Art Deco aesthetics, loadsamoney - the works. The stuff also has an enormous footprint and can't be stacked, which means you'll need a stately home to find the room, and admission charges to buy it in the first place.

I quite liked the way it sounded, but I confess I was less than bowled over. There are amplifiers out there that come out and shake you by the balls, always an engaging experience, and the Michaelson Audio valve stuff didn't really do that. Nevertheless I persevered because in a low key way it seemed rather promising, and slowly it took root. There didn't seem to be anything else I preferred listening to. That is until the day came when it was required to let it make way for another high grade amplifier - I forget which one. Suddenly I realised what I was missing. The Michaelson valve amp was that kind of amp that made music without drawing attention to itself, and I only really grew to appreciate it when it was replaced.

## Get on with it!

The simplest way of understanding the P180 (the *real* subject of this piece though it may have escaped your attention) is that it was built with one eye on the very same Michaelson Audio valve amp. Anthony was aiming to build an amp which just 'played music' as he put it to me, and which came as close to sounding like his valve amp as he could contrive.

The P180 can be bought in a number of configurations at price levels ranging from £799 for the basic amplifier to about £2,600

for a fully expanded system. The basic P180 comes in a neat slimline box which contains a basic circuit which is claimed to be similar to the big A370, apart from the power supply of course.

A typical Musical Fidelity product in many ways, the P180 has five pairs of MOSFET output devices per channel, a 100 watt/channel rating and 50 amps peak current capacity. The amp has a power supply which is housed in an external box for all the usual reasons, it is connected with an umbilical terminated by an XLR connector.

The amp is also fitted with a mono switch, which parallels the two channels for extra current output, rather than the usual bridging for extra watts. The two features just named - the detachable power supply and the mono switching - are the key to the P180's upgradability. One obvious way to do so of course is to buy another P180 and use both of them as monoblocks.

The other part of the P180 system is the CRPS - Choke Regulated Power Supply - which comes in a similar size box, and which costs £499. To use it, the power amp is plugged into a socket on the back of the CRPS, which in turn is connected to the power amp supply. One CRPS can drive one or two P180s, though in its ultimate form, you would dedicate one CRPS to each P180.

For reasons of expedience, AM left me with a full features preamp called the P172 as a way of getting the P180 system running. I soon changed to my own DNM Primus as a phono step-up and a Krell KSL for line level use (the Krell lacks a phono input) after discovering that although the P172 was pleasant enough, it wasn't in the same league as the P180.

Auditioning the various permutations



and combinations proved to be a slightly bumpier process than I had anticipated. I had the use of one *P180* for a considerable period and a second one for about a week and a half. The *CRPS* however, was a problem. One was bought round to my place for a couple of days intermittent earballing at the start of the process, but it was not possible to get hold of one for longer term listening until very late in the day, after this copy was due to be completed in fact.

At this very late stage, I struck lucky and was given two *CRPS* units which allowed the full system hierarchy to be assessed. But I had only one weekend to do the job, which was not enough to break the *CRPS* add-ons in properly. They changed in sound quite dramatically throughout the weekend, and only at the end of that time began to sound reasonably stable.

### A logical place

Starting at the beginning, the solo *P180* is a civilised and sometimes enthralling box of tricks. The one thing it didn't lack was blood and thunder, and I confess that for a while I wasn't sure what an expanded version was going to do. I harboured thoughts that performance might even deteriorate as the system was built up, because I'd encountered the same problem elsewhere.

Even a solitary *P180* has a good deal of what I'm used to in my own *A370* (rarely used these days as there are so many big amps being reviewed) including fine imagery, explicit tonal colouring, good but not outstanding resolution and a fine sense of 'grip' - a sense that it is in command of events and of loudspeakers.

What sets it apart from some of the big amp competition however, is something that transcends these things. Quite simply, it sang. It flowed. Like many AM products but perhaps a little more so than usual, the *P180* has an organic response to music. The opposite of organic in this context I suppose is that onomatopoeic term, a bag of nails. We all know amplifiers that sound like that.

One question that interested me was which upgrade to go for as a first step - a second *P180* or a *CRPS* (which is £200 cheaper by the way). My answer to this was the former.

The benefits of using two *P180*s are a larger, but more stable and focused stereo soundstage and for reasons I cannot begin to fathom, a more explicit sense of detail.

The differences are useful and not by any means subtle, and they are a prereq-

uisite if the most is to be obtained from the addition of a *CRPS*.

### Really choked

The benefit of the *CRPS* was more difficult to put a finger on, though it can be sensed immediately. Although my first brief listen had been positive, that reaction had been based on a very limited music sample, and the new units with the unformed capacitors had the disconcerting effect of increasing image scale and depth, darkening and enriching tonal colours - but apparently reducing resolution so that at certain times the music took on a peculiar detached, floating quality. Slowly however, as the *CRPS* settled in, the sound regained its focus and composure, and it started to sound like what it clearly was - a big amplifier in every sense and one that went some way to matching the rather special if slightly laid back charms of the Michaelson Audio valve amp.

Does the expanded *P180* match the valve amp? To my regret, it doesn't even come close. But it is also somewhat tauter and certainly more useful with difficult loads, and can be bought to its ultimate form in stages, whilst remaining a fine amplifier even in its simplest configuration. The bottom line? I intend waiting a

while to see how it develops before I pass that final, definitive judgement.

### Born again

*Snell Audio has stopped producing the Type JII loudspeaker, but this classic design hasn't disappeared, it's back in action and fighting fit. Jason Kennedy has been investigating.*

Audio Innovations has been manufacturing valve amplifiers and importing Snell loudspeakers (in its Audio by Design guise) from America for quite some time now. In fact, this amp and speaker combination, along with turntables from Voyd, has become one of the established mid and high end set ups. It's probably fair to say that Audio Innovations' amps have been largely developed using classic Snell designs such as the substantial *A3* and more practical *Type K*.

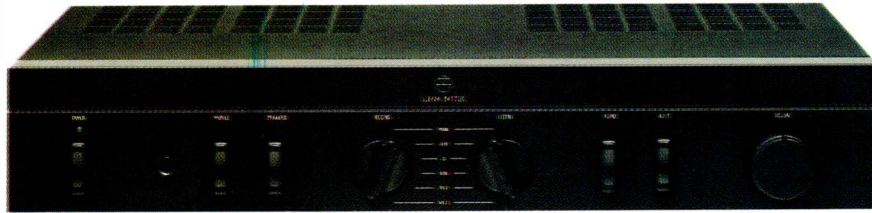
However, five years ago the leading light behind Snell Audio, Peter Snell, died and the company ended up in the hands of Kevin Voecks, a man who believed it was time to bring the companies image up to date. There followed a gradual al-

*The Audio Innovations Model J, the Snell Type JII reborn.*





# TWO AMPLIFIERS ARE BETTER THAN ONE.



## WELL, YES AND NO.

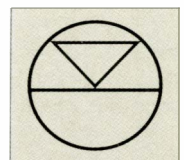
It is widely recognised that to get the best music from your system you need separate pre and power amplifiers. So why is Linn recommending this single amplifier? The reason is that it's not actually a single amplifier at all. The new Linn Intek is a separate pre amp and power amp in the same unit. Of course all integrated amplifiers must incorporate pre and power stages but the Intek is unique in the way the two parts are isolated from each other. Indeed, they have separate power supplies and can be used individually as well as together. This makes it easy to improve or expand your hi-fi system. Unlike most integrated amplifiers the quality of the pre amp section makes it particularly able to cope with both delicate and high output signals. This means that the Intek will retrieve all the information from records (with their delicate output signal) and CDs (with their very high output signal) to give superb sound quality. It is equally effective with tape, tuner and even TV and video inputs. The power amp is a sturdy piece of electronics. It can drive virtually any loudspeaker over long periods without any degradation to sound quality. The Intek incorporates only the highest quality parts. Double sided circuit boards are used for stronger, more direct connections. The two phono input stages are switchable from moving magnet to moving coil and are of a quality rarely encountered in integrated amplifiers. This allows you to upgrade your cartridge without changing your amplifier. In short, the Linn Intek is an extremely powerful amplifier that outperforms all in its class and many significantly more expensive models. It is remarkably versatile, looks good and works well in any system. But perhaps the best thing of all about the Intek is the price. At just £398, could the Linn Intek be the best value integrated amplifier available? The answer to that question is yes. Telephone Linn on 041-644 5111 for your nearest dealer. He'll be pleased to give you a demonstration so you can judge the Intek for yourself.

Linn Products Limited, Floors Road, Waterfoot, Eaglesham, Glasgow G76 0EP.  
Please send me more information on Linn Hi-Fi by return of post.

Name \_\_\_\_\_ Address \_\_\_\_\_

\_\_\_\_\_ Postcode \_\_\_\_\_

My present system is \_\_\_\_\_



**LINN**



teration in product design that resulted in loudspeakers that Audio by Design no longer felt confident with. For the last year or so the company has managed to get Snell to produce the *Type K*, *JII* and *E* stand mounted models that we know and love, despite the fact that in the US updated versions of these models are on sale. Inevitably the point came when Snell was no longer interested in producing relatively small quantities of the old designs and Audio by Design was faced with finding a replacement or building its own.

Being unable to find a suitable replacement, the company went ahead with the idea of building the old designs itself. Initially it tried to license the design and the name from Snell, but faced with a distinct lack of co-operation from across the pond, it eventually went ahead and started work on building its own versions.

This was not easy, it took Guy Adams several months to work out how Snells tick, but he eventually came up with an equation of sorts that meant he could not only replicate the sound of these speakers but tailor them without losing their illusive 'non character' as well. A result of this experimentation is the new Audio Innovations *Model J* (£799) which has a paper cone in its mid/bass unit, Snell's *JII* featured a doped paper unit.

The cabinet is apparently exactly the same as the *JII*, although Innovations could tidy up the four binding posts and the graphics on the inset back panel (apparently full production samples will be somewhat neater), but the veneer and paint finishes are up to the same high if understated standards.

## French or English?

The crux of the matter however, is whether Audio Innovations *Model Js* cut the mustard when it comes to translating electrical impulses into sound. Being a seasoned Snell user, *JII* and more recently the floorstanding three way *Type C*, yours truly was elected to put them through their paces. I even got the *JII*s in for a pre review familiarisation session, after the *Cs* they were a bit bass light but just as involving and dynamic as they used to be. Removing them, or most of them (the Black tack on the stand helped itself to another small piece of veneer!), and setting up the *Model Js* in their place initially resulted in a drier, more open sound. As listening progressed, however, more open became bright and bright became uncomfortable. Something was not right. Replacing the Marantz amps with

Innovations kit helped matters but the problem persisted, until eventually the source of the irritation was tracked back to the Ortofon *Quasar* cartridge. Possibly the latter wasn't happy feeding the step up transformer between it and the phono stage or, more likely, the somewhat knackered bearings on the well travelled Heliuss *Aureus* were encouraging its top end to grate more than might be expected. In the end, changing to the less ambitious and very competent Audio Technica *OC5* produced a more even response that encouraged further listening. The Arcam *Alpha CD* likewise sounded evenly balanced if still much like a CD player.

What Innovations has in fact done, is to produce a more revealing product than the Snell, the mid and high frequencies are more open and capable of reproducing HF harmonics and the bass is considerably tighter and drier. In my present listening room, this latter factor was the cause of some concern, the room isn't particularly large but it's low on soft furnishings and carpet, and speakers with a well controlled bottom end can sound distinctly lacking in welly when partnered with a reasonably neutral system. The slightly fat bottom end of the Snells suited it quite well, but it must be said that in previous rooms they have tended towards chubbiness if not sited well away from the walls. The *Model J* probably has a flatter response and demands more of the system, but it also gives more as well, it is incredibly open and reveals harmonic and ambient detail that most speakers completely ignore. Low frequencies are

equally well handled, although they initially sound dry, recordings with genuinely low or powerful bass come across with the weight and depth that is required, but without the slight overhang and loss of control that many speakers suffer from. The latter is often deliberately engineered into a small or medium sized speaker to give the impression of greater bass power, and it's not unappealing, but there is a significant trade-off of dynamics in the process.

## Walking my bag

What Audio Innovations has managed to do is reproduce and refine what was a very good speaker. The *Model J* has all the dynamic subtlety, transparency and effortlessness of the *Type JII* and then more. Its only noticeable weakness, compared to other box speakers, is in preciseness of imaging, which although very good, isn't in the same class as smaller designs such as the *SL700* or *AE1*. But this is a small price to pay for its numerous strengths.

If dynamic and tonal naturalness are your bag and you have got the sort of system that can take serious exposure, give the *Model Js* some time. I don't think you'll regret it.

## CD lens cleaner

*Andy Benham has been cleaning his lenses and getting a clear view of Audio Technica's latest CD accessory.*

If your CD player is getting bit long in the tooth and could do with a spring clean, the Audio Technica CD lens cleaner may



*Polish up your laser with the Audio Technica CD lens cleaner.*



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be just the thing to put it back in the pink.

Back at the launch of CD, the phrase 'its got fluff on the laser' became something of an in joke, to the extent that it even became a popular euphemism for someone thought to be a few sandwiches short of a picnic.

However, as the medium has aged it has become clear to even the casual user that a laser lens is nearly as prone to picking up dirt as a record stylus or tape head, although the digital format does tend to ameliorate the effects of such contamination somewhat. Dealers across the country are rubbing cotton buds across laser assemblies as part of their regular check-ups and repairs.

## Playing safe

You'll probably have noticed that a lot of CD players carry the notice that under no circumstances should the humble user attempt this sort of clean up operation themselves.

The reason for this is quite simple and lies in the fact that the focusing assembly for the laser head is a very delicate affair, rather like a loudspeaker drive unit, whereby the head is moved backwards and forwards by a magnetic field operating across a gap. Should the fumble fingered DIYer fill the aforementioned gap with cleaning fluid then the CD player will probably not be too happy.

So how do you go about keeping your laser lens in the, hopefully, pristine condition in which you bought it? The answer could well lie with the latest goodie to exit the Audio Technica accessory stable, namely the £16 AT6078 wet/dry CD lens cleaning system.

The system consists of a standard five-inch CD, the playing side of which has been drilled to accept eight tiny little brushes. The CD is loaded like a conventional disc and contains the information required to drive the lens to the correct position as well as ten seconds of muzak to distract the user while the cleaning process takes place. One of the brushes on the disc, clearly indicated with a black arrow, has single drop of cleaning fluid applied to it and the other seven then clean away the dirt loosened by the fluid and dry the lens.

The device proved to be extremely easy to use and for its first victim we chose an old CD ghetto blaster (or the reference system as it is known in the office) languishing in the corner of the *Choice* office. One of the commonest symptoms of a dirty lens is CDs which skip or decide to play exceptionally fast. Both of these

symptoms had been displayed by the aforementioned CD ghetto blaster, which had gone even further and refused to play some CDs altogether.

## Sorting the reference system

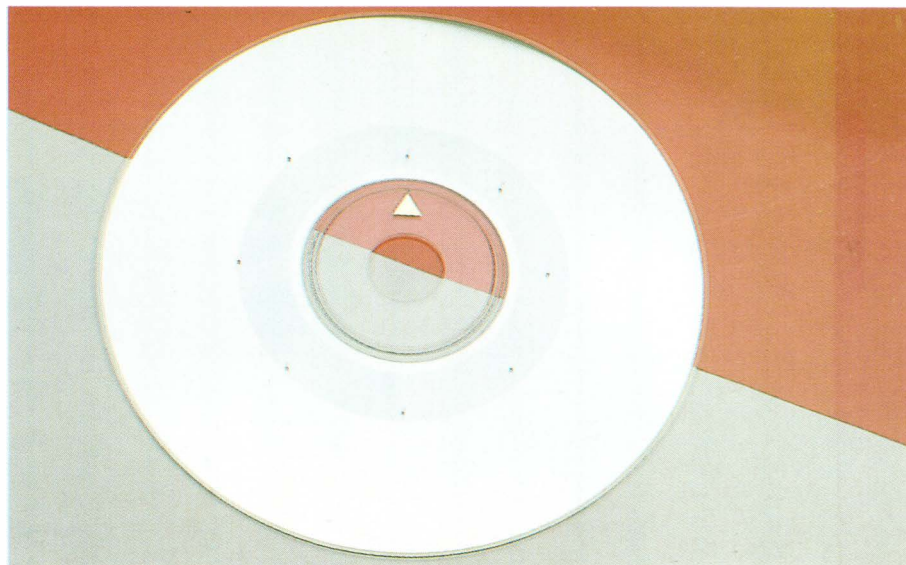
So one drop of cleaning fluid and ten seconds later we gathered around the machine and inserted an errant disc. Looks of amazement all round as the supposedly dead blaster came back to life and made a valid attempt at the disc, an uninterrupted four tracks showing that quite a change had taken place. It should be pointed out, however, that the *Choice* office is an exceptionally trying environment with numerous heavy smokers and the inside of the ghetto blaster did look a bit like an ashtray, so perhaps it had taken a bit more stick than the average domestic player.

Unfortunately, due to the nature of working on a hi-fi magazine, you seldom have a CD player at home for long enough for the lens to get dirty, certainly cleaning the lens of the Revox player I was using at the time had no appreciable affect, but then the machine was only six weeks old.

At the time of writing we are looking around for an older machine that has been in continuous service for a while, so that we can see if cleaning the lens makes a difference to the sound quality of a machine which is not dirty enough to malfunction. I'll tell you the results of that as soon as one of my hi-fi owning friends agrees to donate their player to the tests.

However, given the results with the ghetto blaster, prevention would appear to be better than cure, so regular cleaning (Audio Technica suggests about once a month) would seem to be a good idea.

*How do you go about keeping your laser lens in the, hopefully, pristine condition in which you bought it? The answer could well lie with the latest goodie to exit the Audio Technica accessory stable.*





*We've a very mixed bag of hi-end stories this month. Roy Gregory examines the latest entrant in the 'if you have to ask you can't afford it' turntable stakes, Alvin Gold looks at the state of the AV art, Paul Messenger finds out that he quite likes his mid range drivers unclothed and Roy Gregory makes a second appearance explaining the benefits of sticking with a single family of cables.*

## Statements

**F**or a considerable amount of time, I have run two listening rooms, one of which is for mainstream high fidelity, and the other which acts as an office and is cluttered with the usual paraphernalia: computer, copier, fax, books, stationary and so forth.

Within the last year I moved family, cat and mountain bikes (actually we don't have any mountain bikes, but I know someone who does) to a new and improved hovel, and immediately set up a room for A/V purposes where I was able to institute such revolutionary improvements as siting the television between the front speakers.

I have kitted it out this medium size room with a JVC TV which I normally use with its sound set to zero, an S-VHS NICAM VCR, a separate Arcam Delta 150 NICAM TV tuner, plus a number of alternative sources such as CD, cassette, DAT and tuner. Speakers tend to be whatever comes to hand.

Finding electronics to make all these things tick has been a difficult, even intractable task. One of the main problems is the sheer complexity of the system. At first sight the number of inputs required appears extravagant and maybe it is. But in the real world many A/V systems will often be every bit as complex.

The other problem is less visible, but can be summed up in a single word: quality. Whilst the state of the art in high fidelity amplifier design has advanced more than somewhat over the years, A/V

amplification on the whole has failed to benefit, and the performance gap separating normal from A/V amplification has probably widened rather than narrowed in recent times.

### Simple and Complex

My personal quest for the perfect A/V amplifier has not come to a halt with my discovery of the Marantz AV-95C/AV-95M combination. Nevertheless, this two box solution from the house of Marantz is a landmark in the art of A/V system design, and an important one at that. It is nothing short of an honest and credible attempt at an A/V amp fit for audiophiles. It is also an uneven and at times infuriating one, so as you can see this is not an entirely straightforward story.

This is obviously a serious amplifier. You can tell this from the pale champagne gold finish, by the pared down facia with most of the controls squirrelled away behind full width flaps, and by the sheer weight of the things. Even the AV-95C, which is billed as a 'processor,' tips the scales at 13.5kg. The AV-956M, which is the power amp, weighs no less than 18.5kg. The power amp is by far the easiest of the two to get to grips with, and even here there are some surprises. In essence it is a six channel power amp, equipped with individual sensitivity controls for each pair of inputs and bypassable bass and treble controls for each channel pair.

Additional functionality is available by switching any or all of the three stereo

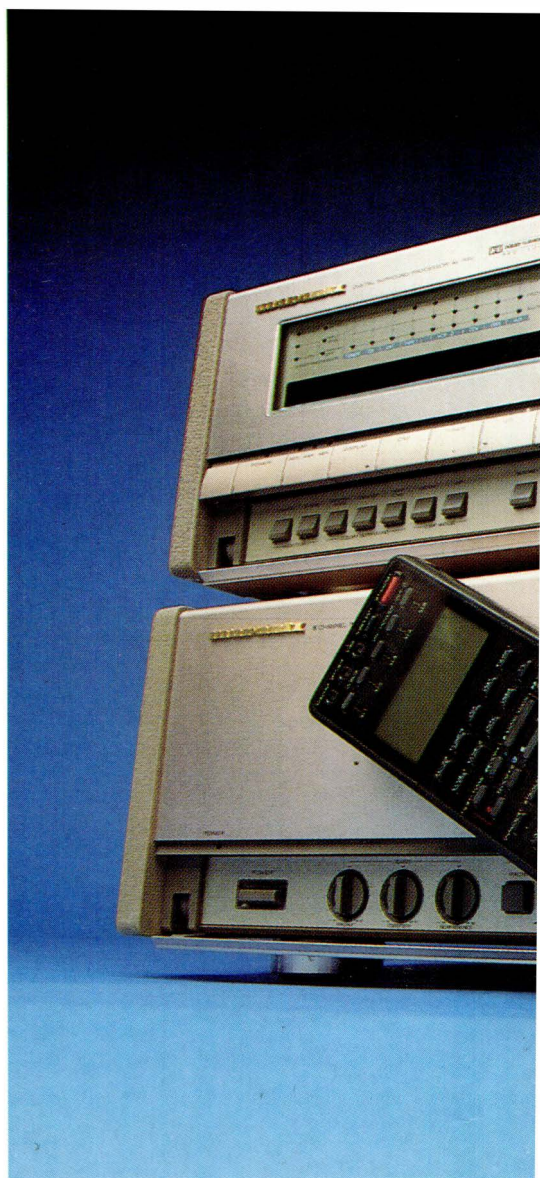
amps to BTL mono, which doubles the wattage from 40 to 80 watts.

The ultimate Marantz A/V system uses two AV-95Ms which can be powered from switched outputs on the back of the preamp, which means the system can be turned on or off from a single switch. This seems good, but sound quality is audibly improved if the amps are run straight to wall sockets. The use of 4mm loudspeaker binding posts (not of any special quality, admittedly) instead of wire clamps is to be applauded.

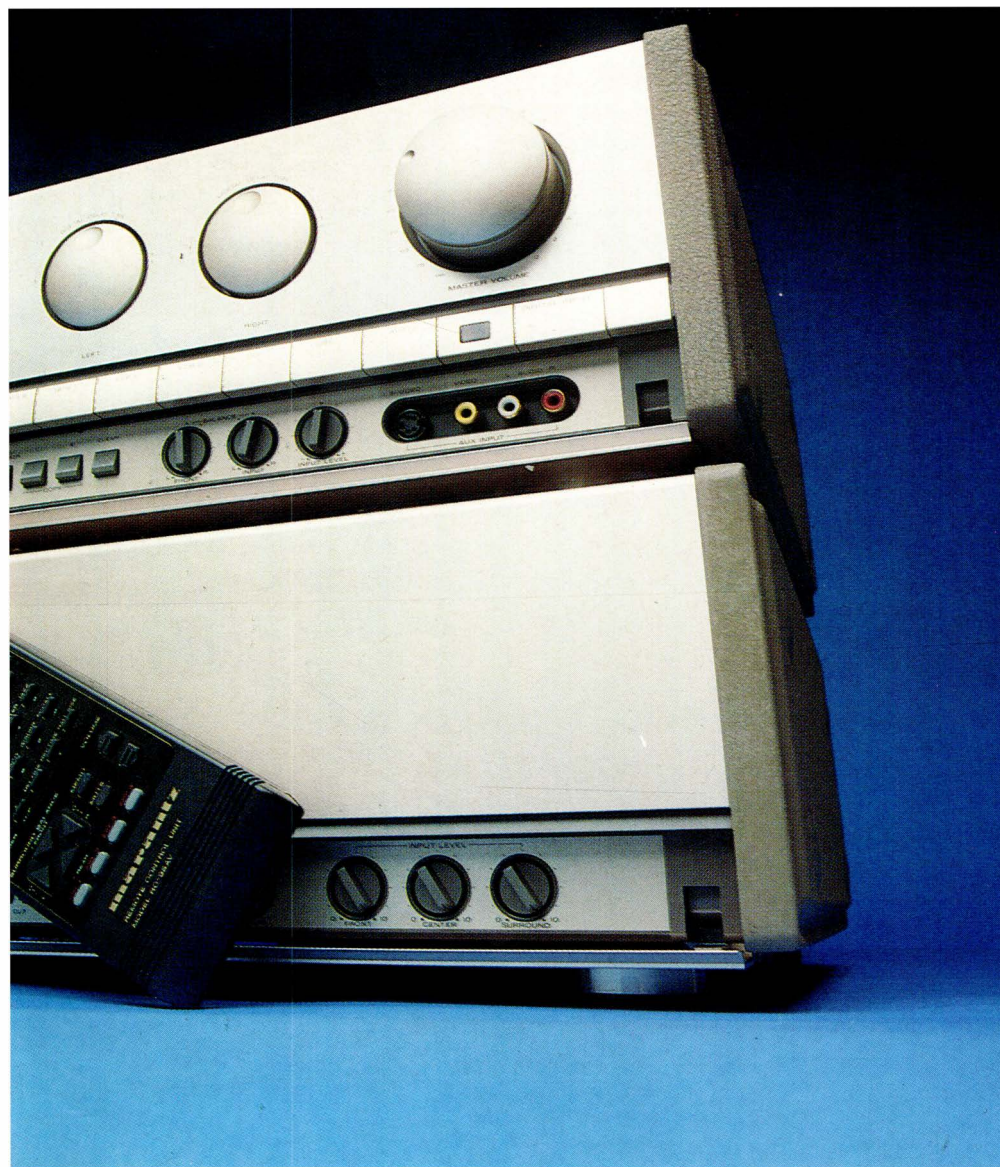
The heart of the AV-95 however, is the AV-95C, the full job description of which is digital surround processor, and which is capable of coping with a wide range of audio, video and digital sources. By any standards it is an extraordinary piece of kit with what must surely be unique flexibility, yet it almost succeeds in hiding its light under a bushel.

### A logical operator

As well as performing the role of a preamplifier, the AV-95 also provides full Dolby Pro Logic with the ability to drive four, five or six loudspeakers. The scheme adopted starts with a basic two front, two rear setup with an option of a







*Top Gun will never be the same again - enter the Marantz AV-95C/AV-95M.*

'phantom' centre channel or the more standard centre speaker, although with the Marantz even two centre speakers can be employed.

The AV-95C also has a DSP capability which can simulate the acoustics of a number of venues. Many will find this attractive as a way of making use of the extra speakers when Dolby Surround isn't required. Acoustics available include a concert hall, jazz club, live stage, theatre, disco and the inevitable stadium with a reverberation time measured in hours and minutes. A number of parameters such as reverberation and rear delay times, hall size and a certain amount of filtering can be used to modify standard settings, which can then be stored in user programmable memories.

All in all this facility is comparable to, but somewhat less sophisticated than, the DSP units produced by the market leader in the field, Yamaha. It appears, for example, that the effects programmed are nearly all mono (that is, they're applied equally to both channels), the single exception being rear channel delay, which is

individually adjustable on each channel, both for the DSP and the Dolby Surround features.

The flexibility of the AV-95C as a preamplifier is breathtaking. It will handle no less than nine separate source components including two audio tape decks and two VCRs, two other video source components, three digital sources and a set of DAT in and outputs. A video processor can be patched into circuit. Video signal handling is based on the new Y/C connectors (which separate the chrominance and luminance signals) or phono sockets (for composite video). Many older video players and recorders won't have Y/C socketry, but where available they should be used. Full video buffering and switching are provided. On the digital audio side, the unit is capable of handling signals at all the usual clock frequencies.

Not one but two separate circuits are provided for signal routing or copying. Operating them involves selecting a copy circuit, the source and the destination and minimum restrictions are placed on choice.

There are other omissions. There is no phono input for example. Maybe this isn't

so terrible; the A/V amp has yet to be invested that has a phono input worth the time of day, and there is a case for using an outboard stepup device of some kind. More important in my judgement is that there is no headphone socket either.

I also question many of the ergonomic decisions. The power amp is no problem here, not least because the controls are meant to be used on a 'set once then forget' basis, but I was much more concerned about other matters. To wit, Marantz has fitted long rows of visually indistinguishable and functionally diverse controls, both on the fascia and below the front edge flap.

The ones behind the flap are further handicapped since the control legends are invisible once you move off axis. The display, and especially the matrix of source and copy indicator LEDs is far from the clearest around, but perhaps this wouldn't have mattered had the remote control been a little friendlier. It isn't and I can foresee real grief after doing a few rounds with this device.

## Taking control

On paper, the remote handset has everything in its favour, not least because it can be programmed from other handsets. But there is a long learning curve with this unit. To give just one example, I still cannot quite figure why the group of keys responsible for steering the sound source appears to operate in the opposite sense to the one implied. There is a quid quo pro however, in that the two main components are very clean and simple in appearance.

There are comparable plus and minus performance related points, but the balance is firmly in the Marantz's favour - except in relatively peripheral areas. Rightly or wrongly I regard the DSP functions as being in the makeweight category. Many of the effects the unit was capable of superimposing on stereo recordings were very effective, but only when used with coherent (simply miked, unmanipulated) recordings already clothed in a realistic but not overbearing acoustic.

One particularly illuminating test involved feeding the Marantz some anechoically recorded music (from a Denon test CD) and adding digital reverberation. In general, the results were plainly over simplified and bland, and invariably the starkness of the



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unreconstructed original shone through, like a big toe through a holed sock. Adding the DSP overlay to a recording with its own identifiable acoustic tended to work better for reasons that are open to conjecture. Nevertheless, I had a lot of fun with this section of the unit. Elton John's *Candle in the Wind* (the sparse sounding version on the *Nikita* CDV) is breathtaking when transplanted into a massive stadium. The hush was almost palpable.

In its role as a DAC, the Marantz was also on slightly shaky grounds, but it is more than serviceable, and can act as an effective upgrade to many middle ranking CD players. Although Bit Stream equipped, the DAC is no match for the analogue output of a Philips *CD850* (interconnected with the Marantz from its analogue, coaxial and optical sockets).

The coaxial link sounded more positive and stable than the optically transmitted sound, but neither held a candle to the Philips converter in a number of areas. However, the marvel was that the Marantz was good as it turned out to be, not that it wasn't better still. The *850* is a very sweet CD player, and in comparison to the DAC stages of many other mainstream CD players, the Marantz compares much more favourably. Although not quite as open and as unforced as the best, the Marantz still sounds surprisingly open and unmanipulated, and resolving power remains high over a wide dynamic and tonal range.

## In the cinema

As a Dolby Pro Logic processor and as an amplifier the Marantz is beyond reasonable reproach. In some ways this Dolby circuit seems less obviously manipulative than others I have tried, with the result that phase anomalies and unexpected image shifts, especially to the sides, were less common than usual. This made the Marantz unusually easy on the ear with all the Dolby surround tapes I tried.

Again, the Marantz can hardly compare in quality when used in straightforward twin speaker stereo mode to, say, a Pioneer *A-400* or Marantz *PM-40SE*, but neither did it sound like other A/V amps I have used.

Both the pre and power amps have long legs and big lungs. There isn't the tight, constipated, even grainy feel endemic with products of this type, and the amps have a sense of solidity and authority at anything up to moderately high volume levels. I found myself blissfully content listening to this amplifier for ordinary stereo applications for long periods of time without feeling any need to

replace it with something better - and being a reviewer means there is rarely a shortage of the latter.

This, then, is a costly piece of kit, but in my judgement it is by no means over priced. It is a serious design which sets no new standard in purely audio terms, yet which brings high fidelity to an area of the market until now dominated by equipment that conforms to the worst stereotypes of commercial hi-fi. The ergonomic failings pale beside the astonishing flexibility of the beast, and its simplicity and style will also win it many friends. If Marantz could just do something about their god-awful instruction booklet...

Alvin Gold

As the CD juggernaut rolls remorselessly on and the vinyl LP slips gracefully from the realms of mass market relevance, the equipment dedicated to the replay of a dying medium gets daily more esoteric. There are an ever increasing number of record players which seriously vie for state of the art status. Most recent additions to the likes of Goldmund, Voyd, Townshend, Oxford and VPI are SME and of course, Basis.

Unfortunately, this mass of multi-thousand pound turntables (sans arm and cartridge, naturally) is of little relevance to the majority of enthusiasts, so it's nice to see some of the same companies also looking to provide more affordable offerings. While the Basis *Ovation*, at a mere £3,200, could hardly be described as cheap,

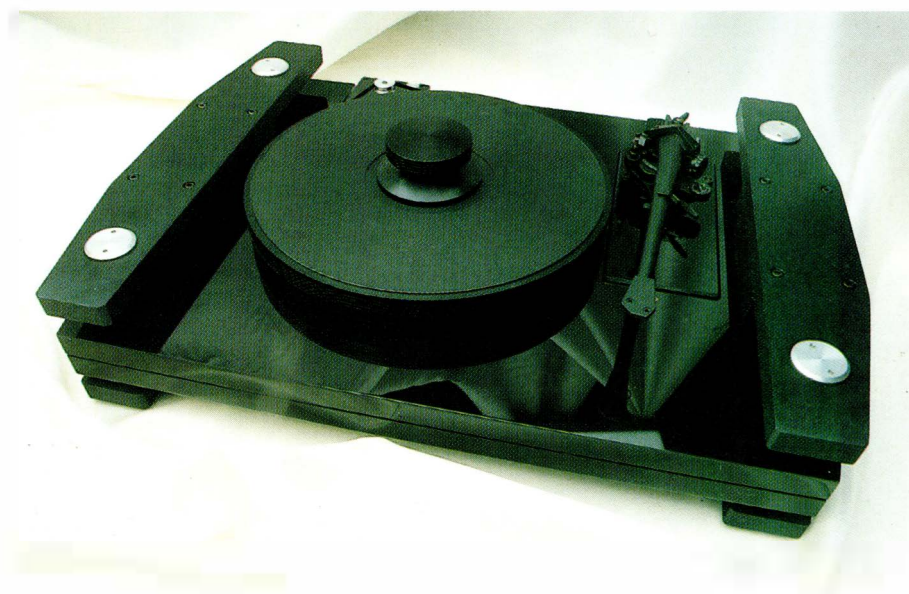
it is at least £2,000 more attainable than the *Debut Gold Standard*. Nor is it simply a "cut-down" version of big brother, as it's been designed from scratch to meet the lower price.

Setting up the deck is rather a difficult process to describe. Central to the simplicity of the operation are the suspension "cartridges", each one is a sealed, fluid damped, suspension unit. When you pull out its top plug, you extend the spring inside and the two halves float free. Once you have installed them, you screw in the cosmetic cap which, once tight, allows you to level the suspension.

The end result of your efforts is a 75lb turntable with a beautifully damped suspension. I hate silicon fluid with a vengeance, but I have to say that the sheer elegance of this arrangement could easily win me over. What's more, I feel the *Ovation* actually presents a far more elegant appearance than the *Debut*, a product which one acquaintance described as "looking like a fitment from the steam room at the Bangkok Hilton". I guess it's all a question of taste.

## Right on cue

In use, the *Ovation* is a joy. The damping is simple to use and the incredible stability of the suspension means that even a dipsomaniac with a bad case of the DT's could cue up your Koetsu. The armboard may only sit on three spikes, but it too shows no inclination to move. Want to change arms? Simply lift one out and drop the other one, ready aligned, straight in. In fact, there are only two operational concerns you need to consider. To play 45s you need to swap the motor pulley (let



Serious analogue mayhem ahoy! It's the Basis Ovation.



Lingo owners say just one word . . .) and more importantly you have to provide some form of dust cover. The *Ovation* is, like anything black and acrylic, a dust trap. I'd recommend either a dust sheet or if you've got any dosh left over, the base plate and dust cover that VPI makes for the *TNT*.

Mention of the big VPI brings up the question everyone is bound to ask - which one sounds better. The answer is that they sound very different. Sonically, the key word to describe the *Ovation* is control. This turntable holds onto the music with an iron grip, never getting flustered or muddled. It lets you hear exactly what is going on, giving you detail and definition at the expense of the life and dynamics possible from designs like the VPI or Voyd.

This is an old, old debate in hi-fi circles, and you'll probably know where your feelings lie. It's not that one is right and the other wrong, in fact, all three are extremely neutral in the tonal sense. It's more a question of presentation, like the differences between concert halls.

### Armless fun

Because I wanted to review the turntable with a known arm, and importer John Jeffries had a limited range of armboards, we settled on the *SME V*. In hindsight, this wasn't an ideal choice. The *Ovation's* designer, AJ. Conti, recommends pivoted-arms from Graham or Triplanar, or even better, an air bearing design, his favourite being the Air Tangent.

Listening to the *Ovation/SME I* was only too ready to agree with his recommendations. The Basis simply showed me, more clearly than ever, what I didn't like about the *SME V*. Listening around the *V*, I am certain that the freedom and air offered by arms such as the *ET II* and Air Tangent would produce an ideal match for the solid foundation provided by the *Ovation*. (We are promised a return date given the arrival of the long awaited Graham tonearm and a suitable armboard).

### The Krell factor

But despite the problems with finding a suitable arm with which to audition it, the turntable's precision and stability are reminiscent of the Krell amplifiers, offering the same calm authority. Given Krell's advocacy of the marque, perhaps that's not surprising. Nevertheless, the likeness remains uncanny, extending to the deep, solid, bass performance. Maybe not the power and weight of a *Debut* or *TNT*, but impressive for all that.

Essentially neutral, the confident and



MAS-terlink interconnects, colour coded for your further listening enjoyment.

fuss free nature of the *Ovation* allied to its superb finish, will be reason enough for many people to buy one. The poise and steadiness it brings to a system will be an added bonus, plus the fact that it should remain perfectly set up throughout a long and enjoyable working life.

Roy Gregory

While chatting to those nice people from Musicand Sound Imports, the American manufacturer of my favourite mains wire, they pointed out that the MAS-terlink name actually encompasses a range of cables "Of course" says I, "I've been using your interconnect as a digital link for ages!" "Which one?" came the response. Unbeknownst to me, they actually manufacture three different interconnects as well as a speaker cable. Samples were duly sent.

The interconnects are outwardly identical, apart from the colour of their woven sleeve. Blue is the cheapest, a three foot pair costing a mere £99. Next up is the more familiar black at £199 and finally grey at £399. Making the final connection you have speaker cable at £449 for an eight foot stereo set. Overall the range is flexible, unobtrusive and easy to use.

Coincidentally, the length of black interconnect that I had been using between CD transport and DAC, had been replaced by the all conquering Kimber *Silver Digilink*. Human nature being what it is, I immediately swapped that for the equivalently priced grey MAS-terlink. Sure enough, honour was more or less even. If the MAS-terlink couldn't match the extraordinary purity and fluency of the Kimber, it added a sense of precision, weight and sheer woomph in the bass which was certainly welcome.

Further experiment showed that these strengths were apparent whether you use the MAS-terlink in digital or analogue domains. Focused and controlled, they impart a sense of poise to a system, underpinned by that excellent bass.

### The complete solution

Cable a system right through with the MAS wire, blue interconnects, speaker cables and mains leads and the sound will be remarkably coherent and "together". Swap the blue interconnect for a black one and you'll have the same but more so. The sense of coherence and balance is retained, but with better focus, detail and bass. More again if you use the grey.

While all these cables will hold their own, price for price, with the competition, their hidden strength lies in a strong family identity, their "cut from a single cloth" character.

The importance of treating the cable loom as a single "system" is rapidly emerging as a major factor in cable performance. If you really want to get the best out of your system, a single cable "family" is well worth investigating.

Of course there are quite a few families on the market, what sets MAS-terlink apart from the others is its beautifully stepped range of price and quality.

You can use grey or black where it matters, blue where its less critical - and up-grading is trauma free too. But one word of warning. The phone plugs supplied are pretty dog-rough. If you speak to Moth Group (the importer), for an extra charge they'll terminate the interconnects with your own alternative. I'd go for the Odyssey or Kimber plugs on the Grey or Black, Arcam ones on the Blue.

Oh by the way, it's still one hell of a mains cable.

Roy Gregory



**A**s the name implies, the *SD1* was the first loudspeaker design to come out of Steen Doessing's SD Acoustics operation, setting a theme that three more recent introductions follow.

John Bamford made passing mention to the *SD1* back in Issue 83 (June 1990), however it's one of the more successful over-£1,000 models, and a speaker I've fancied having a play with for quite some time.

The £1,380 price tag is comfortably clear of the mass market, yet seems far from extravagant for what is one of the tallest models around. Certainly it scores well on perceived value, compared to obvious price competitors. A tall and assertive monolith that needs to be sited well clear of room walls, the *SD1* will appeal more to those who want their hi-fi to make a statement.

It's a design that's full of paradoxes, yet somehow full of charm at the same time. The slim shape and stepped profile make it pretty by monolith standards, especially if the veneer plinth and top plates are something other than regulation black. But a free-space model that works best when set at an angle should really look equally good viewed from the back, and not leave wires to dangle from tri-terminals halfway up.

Though large, the space has not been used particularly efficiently, nor in the single-minded pursuit of maximum bass performance. The bass section takes up little more than half the total height, and encloses a volume of some 40 litres. On top is fixed a triptych-shaped open-back baffle, to which the midrange driver and tweeter are fixed, the latter well above head height for the seated listener.

Although there are problems with this arrangement, there is no speaker known to the author that positions a midrange driver cone, by design, quite so far away from the nearest reflective surfaces. Operating as a dipole this open-back midrange should be quite unaffected by the pressure changes, standing waves and reflections that occur inside every box loudspeaker

Mounted above sits the little ribbon tweeter, which in turn has its own rather different radiation pattern. The bass is a (rather too) ordinary large reflex box, driven by two pretty muscular 150mm plastic cone drivers.

One result of substituting ribbon for dome tweeter is to increase the unevenness through the upper crossover region. The '1 shows a 5dB suckout around 2-3kHz, partly due to the rather strong output from the ribbon at 4-5kHz, though in other

respects the tweeter looks impressively smooth and controlled.

The broad midband from 200Hz up to 1.5kHz is very well balanced, if a shade uneven, but output in the octave below that (100-200Hz) was clearly too strong, while absolute bass extension is nothing special.

Although the *SD1* has a usefully high sensitivity this is compromised by an impedance that dips to around 3ohms at 110Hz.

Although recent revisions have made the *SD1* more neutral than before, the *SD1* is not what I'd describe as a neutral loudspeaker. There's altogether too much local unevenness for that, though the overall balance is now good.

## Sound quality

The bass may lack serious extension, but it's pretty quick and impressively powerful and authoritative, at any rate by reflex standards, while the subtle smoothness of the ribbon tweeter gives the top end a delightfully silky texture and transparency, marred somewhat by the way the lower treble 'bump' tends to exaggerate vinyl surface noise.

What really does set this loudspeaker apart from the crowd, however, is the

sheer delicacy of the open baffle midrange. Throwing away the box that normally encloses such drivers brings a tantalising glimpse of the unconstricted freedom and vocal range transparency that is normally only associated with considerably more expensive panel speakers.

Given a carefully chosen listening position, well back from the speakers and roughly eyeballing the midrange drivers, the *SD1* can come up with an imitation of a high end panel speaker that is very passable indeed.

The stereo sound-stage is set out with fair precision and impressive scale. Panel speakers seem to give this precision and transparency too, and likewise lack the coherent substance of a point source.

The measured presence region suckout seems subjectively innocuous, manifest only as a pleasantly laid back perspective. Indeed, vocals are particularly well handled, especially such difficult elements like sibilants and hard consonants, making even poorly recorded lyrics unusually easy to make out.

The sound overall is attractively quick and bouncy, and low level listening is particularly enjoyable. Things are already impressively loud by the time the volume control reaches halfway, thanks to the decent sensitivity. However, increasing level still further seems to coarsen the sound and reduce the coherence and delicacy.

Enjoyable though it is in many ways, at the end of the day the *SD1* remains something of a paradox.

In assessing value for money, I feel the *SD1* suffers rather by comparison with its *OBS* stablemate.

The smaller model has better tuned bass, albeit with a little less reach, and much the same midrange qualities, and is an altogether neater looking package too, lacking only the subtleties of the ribbon tweeter.

Perhaps an *OBSR*, complete with ribbon tweeter and selling at under £1,000, might be the best compromise?



The *SD1*: panel sound from an unconventional box.

Paul Messenger



# REVOLUTION



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In 1956, Dr Amar G. Bose set out to create the ultimate loudspeaker. He ended up making history.

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Bose, it looks and sounds incredible.

## **Extraordinary sound quality.**

The system is based around the Lifestyle Music Centre, a brushed aluminium case which contains an AM/FM tuner, a CD player and two pre-amplifiers.

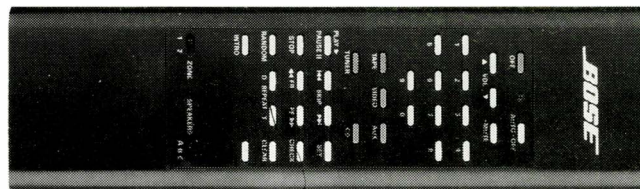
These two preamps send signals to two stereo 'Audio Zones,' and up

to six sets of powered loudspeakers can be connected to each zone.

Specifically for this system, Bose have developed a powered version of the highly praised Acoustimass



speaker system and an even more compact powered Lifestyle speaker system. The sound quality created



*Radio frequency remote control.*

by the combination of the music centre and the powered speaker systems really does have to be heard to be believed.

Equally, the versatility offered by the



*Lifestyle speaker.*

two Audio Zones is unprecedented.

So how do these two zones actually work?

## **Two Audio Zones.**

At the back of the Lifestyle Music Centre there are three sets of inputs, for Tape, Video and Auxiliary. When added to the CD and Tuner already in the centre itself the listener has a choice of five separate sources of music or sound.

Let's say that you want to listen to a radio broadcast in

your living room, which we'll call the first Listening Area in Zone 1. (For argument's sake let's also say

that the music centre itself is also in the living room.) You pick up the remote control,

punch in to any one of the 30 possible pre-set radio stations and music will fill the room.

At the same time someone else



# SEIZE CONTROL OF YOUR SOUND SYSTEM

could be listening to the CD player on another set of speakers in Zone 2 in another room.

Each listener has complete control over what he or she is hearing, and at any time can change to another choice of sound source.

The possibilities are almost infinite. You can listen to what you like, where you like, all from one system.

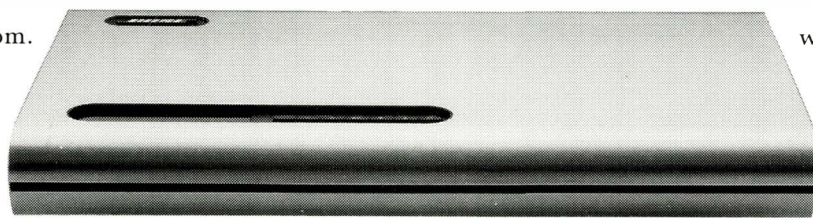
## **Complete control.**

This is all possible because of the versatility of the two Audio Zones and the unique remote control, which operates not by the usual infra-red, but by radio control. Because the Remote Control operates on a radio frequency signal there's no need to run cables all over your



house for infra-red remote control sensors, as with other multi-room systems.

Another advantage of the radio frequency system is that it's possible



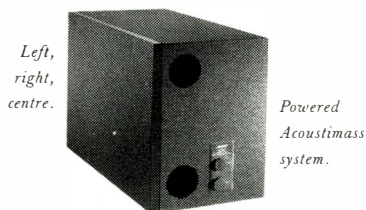
*Lifestyle music centre.*

to put the music centre itself in a cupboard, and together with the compact design of Bose speakers this gives you great sound from a virtually invisible system.

## **Another innovation from Bose.**

The basic Bose Lifestyle Music System comprises the Music Centre itself, a remote control handset and one set of powered Acoustimass loudspeakers.

You can add more pairs of



*Left, right, centre.*

*Powered Acoustimass system.*

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*Better sound through research.*

powered Acoustimass or powered Lifestyle speakers whenever you want, (so you can grow the system with time, or if you move to a larger home with more rooms).

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# Uxbridge Audio

Dear Sir

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Middlesex.

The EXCELLENT service, personal attention and professionalism I found with your staff, compels me to write this letter.

Having embarked on the daunting task of looking for the right music system I visited many Stores and purchased a lot of literature. I was attracted by your advertisement in What Hi-fi magazine. First class sound quality was my top priority and from another article in the same magazine I had made up my mind to purchase a system recommended therein.

A quick phone call to your Shop to find out whether you had them in stock and I was lectured on how a Music System should be purchased . . . "HAVE YOU LISTENED TO IT? HOW DO YOU KNOW YOU WILL LIKE IT'S SOUND? It isn't the same as buying a washing machine, when it has to be taken on faith that it will do the job as you want it. It is more like buying a musical instrument, where personal preference dictates. You do not need to be an expert, you only need to listen to it and decide for yourself . . ."

Not too keen on the lecture, I was, none the less, taken up by what he said, and decided to pay you a visit. This turned out to be quite an experience! After listening to a few systems I had already decided I would be buying my own combination and not the one recommended in the magazine. A MUSIC SYSTEM SHOULD, INDEED, BE LISTENED TO, BEFORE PURCHASING. In addition, the personal attention, friendly, untiring and "non pushy" attitude of your sales assistant, Jas, turned the daunting prospect of choosing the right hi-fi into A MOST PLEASANT EXPERIENCE.

When I first read the letter from a satisfied customer in your advert I didn't think it genuine. But after my experience I know just what he meant. I echo him in commanding you and your staff and I will not hesitate to recommend you. I, once again, thank you for the help in choosing my system and the excellent service and attention I have received at and since it's installation.

Wishing your Company every success

Mrs. F. Monteiro

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*The left corner; Meridian's 600 Series, in the right Wadia's multi-bit contender.*

connected using the same interconnect and the source selection switch was out of sight of the listening panel.

Each selection was played to the listening panel four times, in two sets of two. Thus the panel heard a piece of music, and then heard the same thing again. The process was then repeated using the same piece of music before we went on to the next selection. The panel was not informed what changes, if any, had been made to the source equipment until the end of the session.

The various permutations of equipment included a couple of false starts, namely the Meridian being followed by the Meridian and the Wadia being followed by the Wadia. The other four set-

*Back in February the Hi-Fi Choice team set up camp in a hotel room in Bristol. As part of HI-FI 91 we did a comprehensive demonstration of Bit Stream and multibit CD players and*

ups consisted of two sessions with the Meridian following the Wadia and a further two with the Wadia following the Meridian.

Once we were back in the office we went about compiling all the information that we had gathered, something that proved to be far more work than we had reckoned on.

The whole point of this exercise was not to set one machine up against another, but rather to see if the general public could pick out differences between the two machines, and if they could, to see if these differences were consistent. The answer, as with nearly all things statistical, is a definite maybe.

Before going into the actual results themselves there are couple of observations worth making, one of the most interesting being that it appeared to make a significant difference which machine was played first and indeed how many tracks had been listened to prior to that particular session.

### **Scores on the doors**

Session one consisted of a first demo of the Meridian machine versus the Meridian, followed by the Meridian versus the Wadia. In this context it appears that the Wadia has a significant advantage, doing considerably better in this test than it did when the Meridian was played second. When the Meridian was played first the comments about the Wadia ranged from

**T**he trials were held over a three day period at the Bristol show, with a total of eight listening sessions being held, each session comprising of twelve listeners plus the odd hanger on and visiting industry personality. In total we collected 89 entry forms.

The tests were organised into three sessions, each session employing a different piece of music. Prior to the start of the tests a selection of music was obtained from the Virgin Megastore on Oxford street, two copies of each disc being purchased at the same time, thus ensuring as far as possible that the two CDs were identical. The music used included the latest Chris Isaacs album, Madonna's *Immaculate Collection*, the Marty Paich recording from the readers offers page, Mission's excellent test disc (Mary Black) and Talk Talk's *The Colour of Spring*.

Both drive units had discs in them at all times during the test and both machines were playing the track, although obviously only one was selected at the preamp at any one time. The DACs were both

# Bristol's Digital Dilemma

*asked the public for thier comments on each format and whether they had a favourite.*



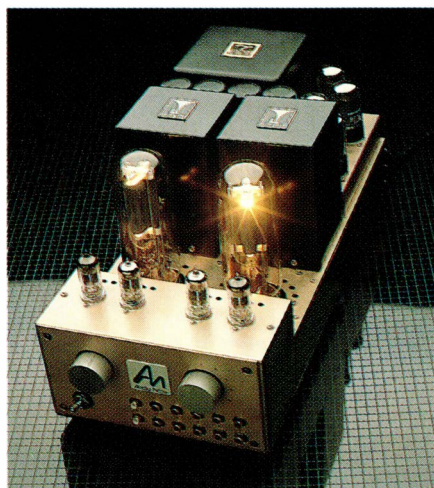
'much cleaner treble and better guitar sound' and a 'faster and fuller sound' to various comments such as 'a fuller bass' the word 'crisper' was also mentioned on a number of occasions. If, however, these are considered to be the up points of the Wadia combination, there was a significant, although slightly lesser number of people who described the Meridian as 'slightly richer' as 'fuller in the bass' and generally 'smoother'. In fact it soon became clear that it was going to be very difficult to sort out all the comments we had received. How, for example, were we to categorise the comment 'first machine much warmer sound, second one more presence but treble too unnatural' or alternatively 'first piece more relaxed, but also sounded more compressed than second, voice on second seemed to have more atmosphere around it.'

Obviously it is very difficult to decide which machine the listener preferred in these circumstances but it ended up with 27 people having a clear preference for the Wadia, 38 sitting on the fence or pulling out good points from both but preferring neither, and 20 liking the Meridian. Interestingly, only four listeners professed to be unable to hear a difference between the two machines.

The next session was the Wadia versus the Meridian, followed by a spoiler with the Wadia being followed by the Wadia. When faced with the machines being presented in this order, the consensus of opinion that had been built up in the first session, with the panel dividing into three quite clear camps, tended to fall apart somewhat.

The Meridian was easily the preferred

machine when heard this way round, with 30 people preferring the Bit Stream player, 39 sitting on the fence and only 21 remaining loyal to the Wadia. Comments from the Meridian camp included 'cymbals sounded more natural with the second player', 'the second machine seemed to be more rhythmical and kept time better'



*Ongaku: class A analogue gratification.*

and 'second sample hard, slightly nasal, and harsh.' The Wadia adherents countered with 'second machine has a soggy bass, first machine was faster' and 'second piece sounded less natural.'

In the third session, the two machines came head to head twice, first the Meridian followed by the Wadia and then the Wadia followed by the Meridian. Although the music we used was varied quite a lot, the third selection tended to end up being Madonna, particularly the track *Vogue*, which was used on no fewer

than six of the eight demonstrations. The synth bass on this track tended to show up the differences in the two machines quite well, although one disgusted participant scrawled across his paper 'what do I have to do to get away from Madonna.'

## Wot, no clappometer?

The results of the previous four tests were repeated in the third session. When the Wadia was the second machine the panel expressed a clear preference for it, some 35 people preferring the sound of the Wadia, 27 sitting on the fence and 24 expressing a preference for the Meridian. When the order of the players was reversed, so were the results, although the numbers were drastically decreased. A mere 15 preferred the Wadia when it was presented first, 21 went for the Meridian and 49 sat on the fence, while only four people couldn't hear any difference at all.

The comments here were perhaps also the most interesting. One perceptive listener summed up the problem as follows: 'the second machine was brighter with more apparent detail. I'm not sure whether I prefer it to the first.' However most listeners were more certain, especially in the first part of the session.

The Wadia came across as 'more forward and much more punchy', 'greater weight paid to the percussion' and 'more dynamic'. One even went so far as to describe the Meridian player as boring and point out that his feet only 'tapped' when the Wadia was in the driving seat.

Meridian fans generally countered with comments such as 'second machine sounded smoother', 'less dramatic and

## The equipment

The primary reason for our choice of such tasty equipment was that the differences between the two approaches would be more obvious with top notch sources and a transparent system. The secondary and from our point of view, perhaps more important reason, was that we were going to have to listen to the thing for three days on the trot.

So we went for Audio Innovations triode amplification in the form of the 15w *Second Audio* monoblocks, times four, passive preamplification from the same source and Audio Innovations née Snell *Type K* loudspeakers. The latter being chosen because of their transparency, and ability to perform in the sonically dubious surroundings of a hotel room.

On the digital side we wanted to go completely over the top but were held

back by the lack of an exorbitantly priced Bit Stream DAC, the top of the range Meridian *600 Series* was the best we could do. This restrained us a bit when it came to picking a similarly priced but top notch multibit DAC, in the end we went for the least expensive Wadia, the £1,995 *Digimaster X-32*.

Initially we intended using a single Teac *P2* transport with the Wadia and Meridian DACs in an attempt to cut down on the variables and make the demonstration as scientific as possible. However, talking to the people at Meridian and Acoustic Energy, which imports and distributes Wadia, it became clear that neither party felt that this approach would give its products the chance to give of its very best. So in the end we used complete transport and DAC combos from both marques, Meridian supplied a *602* transport and *606* Bit Stream DAC and Acous-

tic Energy supplied a Wadia *WT-3200* transport and the aforementioned *X-32* DAC. The latter combination costs a £1,000 more than the British competition which should be taken into consideration when evaluating the results.

We went to town on the ancillaries as well, blagging yards of Audio Note silver interconnect and loudspeaker cable from Audio by Design and twisting John 'Mana' Watson's arm until he lent us a three tier glass shelved table. Both the latter and several lengths of Sonic Link Super mains cable made significant improvements to the sound of the system.

In true hi-fi show tradition, the system changed at the last moment. We traded in the four *Second Audios* for an Audio Note *Ongaku*, which meant that the listening panels got to hear a £40,000 system. We didn't get any complaints.



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detailed in the second but the treble was sweeter and the bass deeper', 'music seemed to bounce along in second piece' and 'second machine is easier on the ear'. The piano work on one session caused a lot of comment, listeners referred to 'greater realism' and piano notes more clearly picked out.'

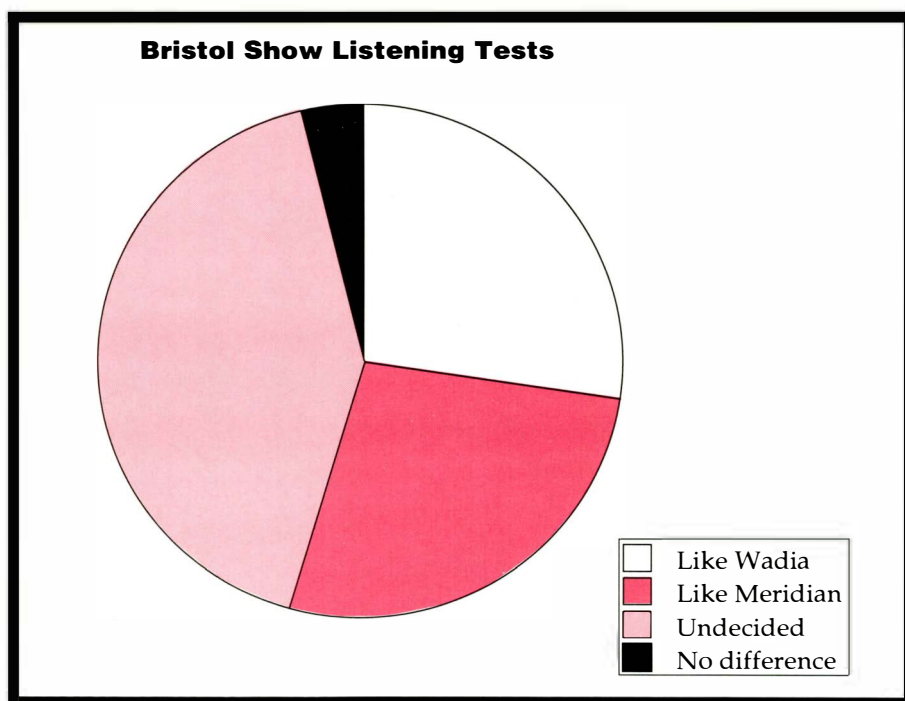
The grand total showed that the Wadia had 98 tests come out in its favour, the Meridian ended up with just three fewer at 95, and those that thought there were two sides to the argument came out easily ahead at 150, while a mere 13 were unable to detect an appreciable difference.

When it comes to comparing the comments a very clear correlation arises. The Wadia's sound was characterised by words such as dynamic, detailed, fast, up-front, punchy, crisp, clean and rhythmic. On the negative side this was turned round and written down as bright, brash, harsh or edgy.

The Meridian, on the other hand, was hailed as smoother, more natural, and easier on the ear.

### Conclusion

After reading through all the entries it was clear that the majority of those present could hear a difference between the two machines, although nearly half of those who heard a difference couldn't decide



wether they preferred one player to the other, only that there was a definite difference. Of those that couldn't decide, comments such as 'second piece (Wadia) more dynamic, bass more extended and tighter but high frequencies brighter and more stinging', 'second machine warmer but treble not as crisp as first machine which also had more presence', and 'second piece much warmer sound, second piece more presence but treble too unnatural.

Now everyone enjoys proving some-

body wrong, and I must admit that the first thing we did when compiling the results was to find out who had claimed to hear a difference when all we had done was to switch between identical players. We did this no less than 178 times, and 66 listeners claimed they had heard a difference. Although this is a surprisingly high 37 per cent there were only 7 forms which went into great detail about the non-existent changes, most forms just ticking the change box and refusing to be drawn any further.

*While Hi-Fi Choice was locked away in its listening room, the public were thronging the corridors. We asked one such member of the public, Christopher Berry, to put pen to paper and give us his views on the show.*

After the long haul from deepest Cornwall, I finally drove into the car park opposite The Holiday Inn. As myself and my two fellow hi-fi fanatical friends were early birds, we were able to collect our free copies of *Hi-Fi Choice*. The magazine is our reference source! (*that's enough crawling - ed*)

The show programme looked positively mouth watering, a stunning array of the very best in high fidelity, and it was noticeable that amid all the late hammering and stapling, friendliness and courtesy abounded!

In the KEF suite we were greeted by a magnificent display of speakers. The first demonstration was of the C15s and sub-woofers. The KEF men happily used our own demonstration CD and we were much impressed, both by the system and the personnel involved.

The next visit was a real discovery for me! The ATC speakers had escaped

my notice in the press. The Mozart coming out of the pair of ATCs on demo was really very truthful, and I have to admit to being loath to move on! We were keen to hear the little Wharfedale *Diamonds*, so this was our next port of call. It was very difficult to rate the speakers because of the choice of music! The lines "I feel better than James Brown now, how do you feel?" from the demonstration piece did not elicit a very positive response from any of us, which was unfortunate.

### Bliss on a budget

It was then that we made one of our discoveries of the day. We visited the Pioneer rooms and listened to the A400 driving KEF C15s and sub-woofers. The music coming out of this relatively inexpensive system was nothing short of a revelation!

In the light of what Pioneer could achieve with such a modest outlay, our return visit to hear the KEF 107/2 was,

therefore, of special interest. The sound that greeted us was open, huge and impressive but the feeling of relaxed pleasure was not there!

In the Sony suite we were given a splendid demonstration of DAT. The reproduction was outstanding, and DAT is certainly on my shopping list.

The day was rounded off by a visit to the *Hi-Fi Choice* blind listening tests. On the first piece of music I was completely wrong. On the second I was 50 per cent correct. On the final piece I was 100 per cent correct! Did this prove that I had learnt as we went along, or was it simply the fact that I knew the last piece of music quite well?

The roadworks on the M4 failed to dim our enthusiasm for a thoroughly great day out! We had learnt a great deal and discovered what we wanted next for our systems. Here's to next year's show!



# THE NAD 5440 COMPACT DISC PLAYER

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"Beats Technics at its own game by using the MASH bitstream chip to produce a richer and more engrossing sound."

*WHAT HI-FI? MARCH 1991*

"...this player had an exceptional subjective performance, displaying greater transparency and revealing more insights into the music than any of the other players."

*WHAT HI-FI? APRIL 1991*



NAD'S new generation Classic Series Model 5440 Compact Disc Player is a traditional NAD design; a no-frills unit finished in sleek gun-metal grey with cool soft-orange glowing fluorescent displays. Beneath the neat minimalist fascia lies an impressive array of high-tech electronics which ensure that the 5440 has a sonic performance that equals or exceeds that of far more costly players. The 5440 is equipped with a highly accurate MASH D/A converter, separately regulated power supplies and is assembled using only high-grade audiophile components. The result is a player with a superior sound quality which is a joy to operate, either from the infra-red remote control unit or by using the straight-forward, simply laid-out rocker switches on the front panel. NAD is a company dedicated to reproducing music. If you want to hear music from your Compact Disc Player audition the 5440 at your NAD stockist today.



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# Readers Write

CHOICE ANSWERS

## Rumble

I have been buying *Hi-Fi Choice* on and off for about two years now, and have read it with interest (and occasional amusement) and gleaned much useful information. You are to be congratulated on your non-biased opinions and technical information which, as a sound engineer, I find fascinating.

I presently own a Linn Axis with Basik Plus arm and Audio Technica AT-F5, Naim Nait with Ortofon T5 transformers (these are on a Target TT2 table) and Gale GS301 speakers on Heybrook HBS1 stands. As you might imagine this sounds a little light on bass. I would like to increase the bass in volume and depth. A simple enough task I thought, erroneously as it turned out.

I consulted several dealers and each had a different idea and a different product to plug. Every item in my system has been discarded at one time or another by various dealers.

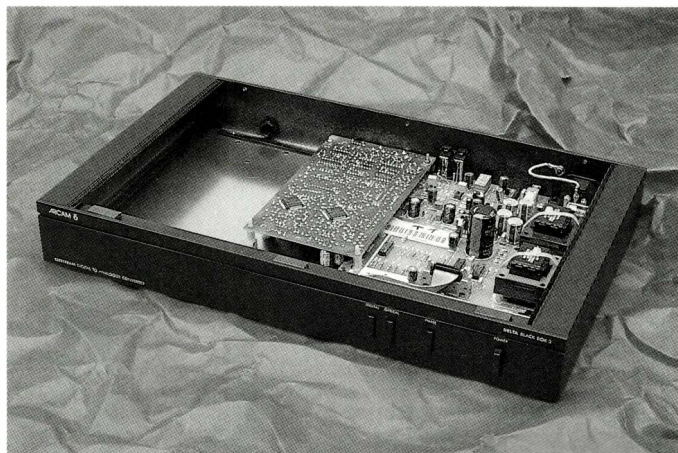
Please help me. I intend to

buy a Roksan Xerxes in the future but as I listen to tape (Denon DRM-500) and NICAM TV and am still not happy with the sound I would like the benefit of your advice. I am able to spend up to £600 plus any proceeds from selling redundant equipment.

Gareth Cutting, Watford, Herts.

*The most obvious bass limitation in your system is the loudspeakers, the 301s were never noted for their trouser flapping qualities, in fact the only quality they were noted for, in the old Directory entry at least, was unusual styling.*

*What you replace them with depends on your room and taste, but the following models would be well worth seeking out for a home trial. The stand-requiring Boston A120 (£349) and Mission Cyrus 781 (£250), the floor standing JBL LX33 (£259) and Tannoy J95 (£499), and the KEF Quattro 15 (£349) satellite and subwoofer combo. All are capable of grumbling away in a reasonably deep and entertaining fashion, though the Tannoy and KEF options are more adept*



Outboard DACs like Arcam's BB 3 offer one path to CD truth.

*at shaking the floor. Another component worth working on is the cartridge, the F5 combined with the Nait and T5 transformers is unlikely to be giving you much in the way of bass power. Replacing the Audio Technica with a good moving magnet would give a more balanced and gutsy sound, Shure's VST-V (£173) is very good, as is the Goldring 1040 which is about £90 but hard to come by.*

## Happiness lost

My present system comprises of Musical Fidelity MC-2 speakers, bi-amped with twin Rotel RB-850s, connected to an RC-850 preamp. My main source is CD and until recently I was happy with my Sony CDP-770. Then I connected my father's 557-ESD up to my system and it was a revelation.

My question is this, would £300-500 be better spent on a D/A convertor, such as the Black Box 2 or MF Digilog, or on another player? Daniel Habba, London W5.

*Recent blind listening with both CD players and standalone CD transports revealed that transports count, in fact they are as important as DACs. More importantly, mixing and matching transports and DACs within ranges, let alone from different manufacturers, is an unpredictable business. We won't go into the whys and wherefores now, (Paul Miller will be having a go at that next month) but it's probably safe to say that the only way to find a DAC that will significantly*

*improve your player is by taking it down to a well stocked dealer's dem room and experimenting.*

*Whether combining a separate DAC with your Sony is the best approach depends on the quality of the transport. You may well find that one of the latest generation of integrated machines proves to be a better bet. Listen to some of the more successful players reviewed this month, you might find them hard to beat.*

## Meaningful benefits

I have developed my hi-fi system over many years to the point where it provides much satisfaction and I have been able to balance expenditure on hardware with investment in software. The question is: where now? Would further equipment changes produce genuinely meaningful benefits?

I use an Arcam Delta 170 transport with a Black Box 1, Rotel RX-850AL receiver and a pair of IMF ALS40 speakers, the other sources are a Technics SL7 turntable and a NAD 6130 cassette recorder.

I have just acquired some Stax Lambda Pro headphones (SRD 75B adaptor) to keep both me and the family happy. I know that the tape deck is not equal to the rest of the system, but it seems silly to replace it until the new generation of Digital Compact Cassettes is available. The record player is not perfect by hi-fi standards, but with the demise of black

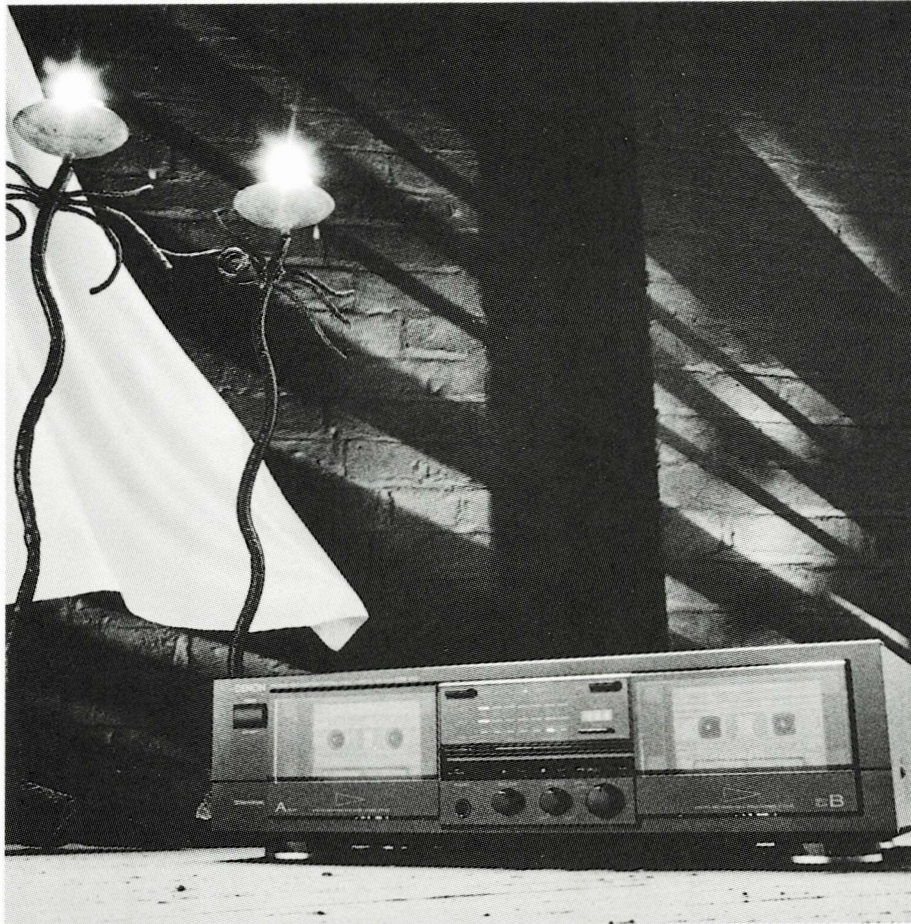


Tannoy J95s: well qualified to flap trousers and shake floors.



# *The DRW 650*

## *Twice the performance*



Denon's basic approach to the development of cassette decks has always been simply to be faithful to the original sound and to reproducing it.

As with the highly acclaimed DRW 750, the DRW 650 twin cassette deck was specified by Denon UK with performance and sound quality as the main design parameters. All the features are simple and usable. One set of transport controls operates both decks and one touch dubbing enables a tape to be copied with the press of a single button.

This outstanding operational convenience is maintained thanks to ergonomic design and high capacity microprocessors.

### **DESIGN FEATURES**

Hyperbolic profile SF heads • Each deck features a quality twin motor transport • Dolby B, C and HX Pro noise reduction • Variable bias +/- 20% • Two speed dubbing

### **WHAT THE PRESS SAY**

"...so good is the Denon with a decent metal tape that I'd almost go so far as recommending it at the price even if you don't want the extra tape compartment."

HIGH FIDELITY, MARCH '91

"...excellent value and is highly recommended if you value sound quality and the fundamental engineering virtues above unnecessary gadgets."

WHAT HI-FI, DECEMBER 90

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# **DENON**



vinyl, it doesn't seem worth making improvements to the deck, beyond perhaps a cartridge upgrade. I suppose the main question is what kind of speakers should I be considering to replace the IMFs and what kind of benefits might a change produce?  
Warren Newman, Greenwich, London.

*We were unable find a review of the ALS40s in back issues of Choice so it's difficult to compare them precisely to contemporary speakers. However, IMFs were renowned for their bass performance, and in this respect it may be difficult to improve on them without considerable expenditure. Areas in which modern speakers are likely to be superior include dynamics, openness and imaging, not to mention clarity. But the only way that you can find out how much better today's speakers are is to lump your IMFs down to a local dealer's dem room and make a few comparisons. See the Directory for our recommendations on models to compare.*

*The other part of your system that could be genuinely improved is amplification, the latest Japanese built British style amp from Pioneer, the A400 (£230) really is quite impressive and guaranteed to breath a sense of life into a system like yours. In fact, depending on the resolving capabilities of your speakers, this might prove to be the most cost effective way of retrieving more music from your software.*



## A Little Bit on the side

I have been replacing my old system in order to get a more involving sound and now have a Denon PMA-350 amp, Celestion 3 speakers, QED 79 Strand wire, Denon TU460L tuner, Technics SL-P770 CD player and a Little Bit on the side. These are on a Sound Organisation shelf, the speakers are attached to a solid window ledge with Bluetack.

After experimenting with various alternatives I'm using Tandy RG58/U TV coax (50p/meter) and Tandy nickel plugs (£1 for 2) as a digital interconnect. It gives a detailed, punchy, open sound that's slightly lacking in atmosphere, but preferable to the other cables I've tried, including some Furukawa.

I am considering buying a Deltec Digilink cable but have not seen a review of this type anywhere. I also intend to upgrade my DAC to amp connectors, maybe to Deltec Slink. Other ideas include speaker stands or a pair of Musical Fidelity MC2's.

I would appreciate your advice on the order in which

**Wharfedale's 505.2: still a competitive sub £200 speaker.**

to make these changes and the most cost effective options.  
Chris De Armit, Brighton, East Sussex.

*We suspect that you would get a greater overall sonic improvement by replacing the loudspeakers rather than the cables in your system. In most cases that would necessitate buying stands as well but the reward would be well worth the expense.*

*What you go for really depends on budget and taste, use the Directory to make up a shortlist and narrow it down with visits to appropriately stocked dealers. Those that have the same or similar gear to you will be the most appropriate. You'll need to spend around £250 all in to make a significant improvement over the Celestions, models like Arcam's Alpha and Wharfedale's 505.2 come to mind, but make your ears the final arbiter.*

## Roksan Interconnect Winner

### Churning them up in the swamp

Could you please help a lone survivor in the Swedish low-fi swamp. And when I say lone I really mean it, I am probably one of the last analogue enthusiasts in this country and one of the very few with an almost all-British system. My set-up comprises an LP12/Akito/Basik, a NAD 3020 (original 1980 vintage) and a pair of Royd Coniston Rs on Sound Factory stands.

As you've probably already guessed, I'm looking for a new cartridge because I'm tired of chewing up my records instead of playing them. Unfortunately I can't afford a better tonearm, like the Ittok for example, so the cartridge has to work properly with my Akito and the MM input of the 3020.

I also listen to radio a lot and would greatly appreciate any advice on a good sounding tuner without too many unnecessary facilities, and a high quality interconnect cable to make it sing. My budget is around £300 for both tuner and cartridge. Bowing in gratitude!  
Christian Moberg, Södertälje, Sweden.

*It's good to hear that someone's got the ears to be flying the analogue flag in the fjords. But to deal with the business in hand, on the cartridges front there are several options that are worth seeking out, for £50 the Glanz MFG-310LX is very hard to beat, for £100 the Roksan Corus Black is a good deal and for £173 the Shure VST-V is a killer of a transducer that should last you through as many upgrades as you can afford.*

*As for a tuner, we found a real bargain in our April review. The Denon TU-260L costs just £100 but makes some of the most open and appealing sounds out of broadcasts that we've heard from an affordable wireless. As for interconnect, why not try the Roksan pair that you've just won?*



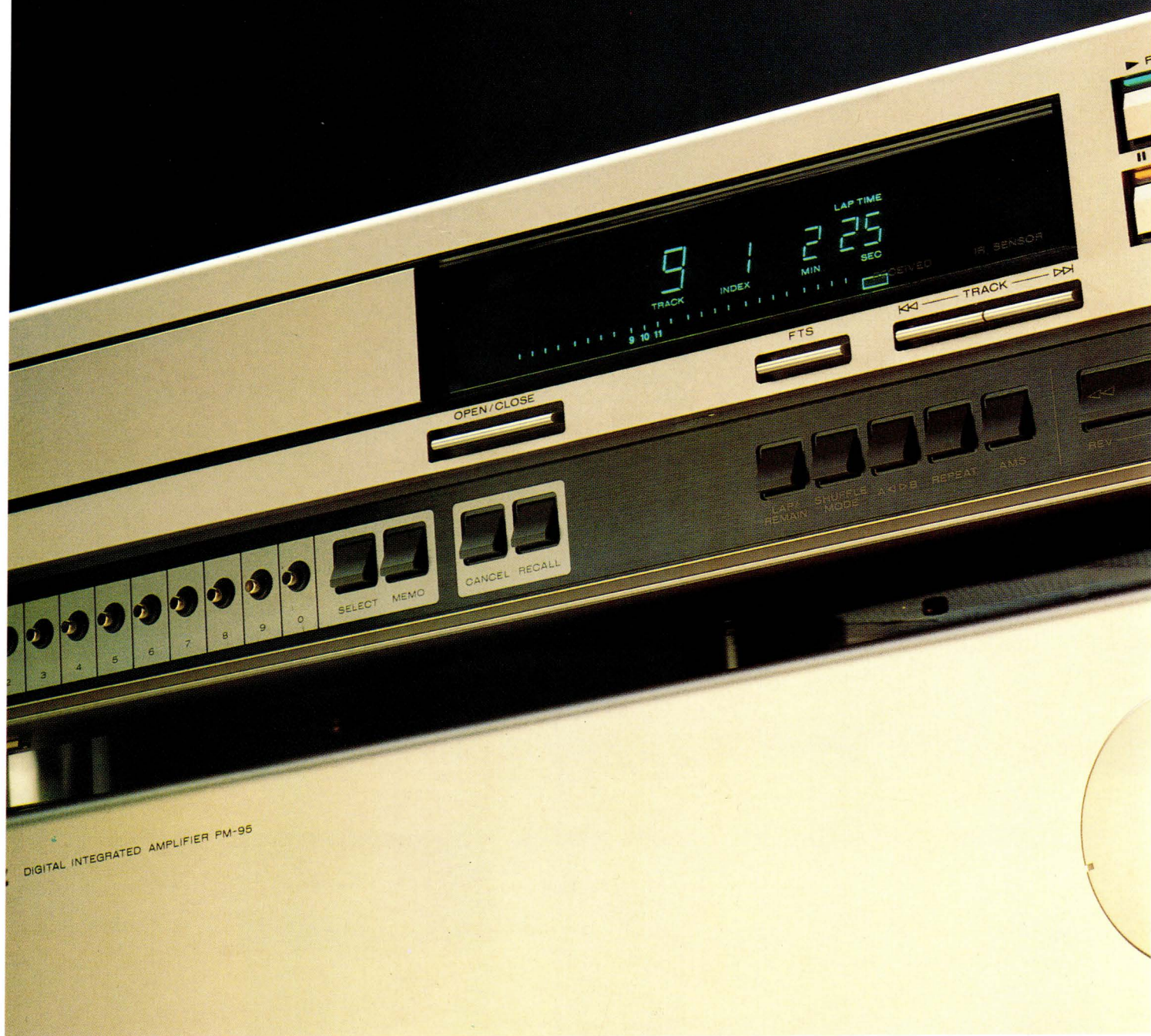
**Catch some waves with Denon's bargain TU-260L tuner.**





# Win £3,500 worth of Marantz digital goodies

*Another month means another fabulous free-to-enter competition in Hi-Fi Choice. This month we're giving away Marantz' top of the line CD transport, the CD-95DR, and the all singing PM-95 digital amplifier, a 125W, full remote control beast incorporating a 16-bit four times oversampling DAC.*





## 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 **Marantz Competition**.

## The Prizes

The first correct entry drawn from our mailbag after the closing date will win a Marantz PM-95 digital integrated amplifier worth £2,000 and a Marantz CD-95DR Compact Disc transport worth £1,500.

## The Questions

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

1. How many Linn poweramps does this month's Aspirational system feature?
2. What is the Basis *Ovation's* big brother called?
3. Name one Marantz product that has DSP capability.
4. What were used for the first time in this month's technical tests on CD players?
5. Which company unveiled a personal CD player that is less than 18mm thick at this year's Brown Goods Show?
6. Marantz manufactures two bitstream CD players, name one of them.

## Entry Form

NAME: .....

ADDRESS: .....

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HFC/JUNE/91

**Closing date: Monday, 1st July, 1991**

**Your answers:**

1. SIX (6)
2. DEBIT GOLD STANDARD
3. AV95C
4. ....
5. TECHNICS
6. CD-41

## COMPETITION RULES

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

Send your completed forms to:

**Marantz Competition, Hi-Fi Choice,  
Dennis Publishing Ltd., 14 Rathbone  
Place, London W1P 1DE.**



# "Cambridge SoundWorks May Have The Best Value In The World. A Winner."

David Clark—Audio Magazine

## Ensemble

BY HENRY KLOSS

Ensemble is a speaker system that can provide the sound once reserved for the best speakers under laboratory conditions. It virtually disappears in your room. And because we market it directly, it costs hundreds less than it would in stores.

Ensemble consists of four speaker units. Two compact low-frequency speakers reproduce the deep bass, while two small satellite units reproduce the rest of the music, making it possible to reproduce just the right amount of energy in each part of the musical range without tuning your listening room into a stereo showroom.



Introductory Price £299

Not all the differences are as obvious as our two subwoofers.

Unlike seemingly similar systems, Ensemble uses premium quality components for maximum power handling, individual crossovers that allow several wiring options and cabinets ruggedly constructed for proper acoustic performance. We even gold-plate all the connectors to prevent corrosion.

*Unlike satellite systems which use a single large subwoofer, Ensemble features separate compact bass units for each stereo channel. They fit more gracefully into your living environment, and help minimize the effects of the listening room's standing waves.*

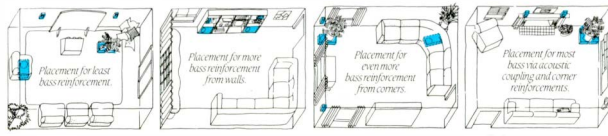
30-day money-back satisfaction guarantee.

At only £299—complete with all hardware and 100' of speaker cable,—Ensemble is the value on today's speaker market. America's *Esquire* magazine describes them by saying, "You get a month to play with the speakers before you either return them or keep them. But you'll keep them." *Stereo Review* said "It's hard to imagine going wrong with Ensemble." For literature, reviews or to order, write us at the address in the coupon, or call 0 800 622 862\* or 0 800 622 286\*

Your listening room works with Ensemble, not against it.

No matter how well a speaker performs, at home the listening room takes over. If you put a conventional speaker where the room can help the low bass, it may hinder the upper ranges, or vice-versa. Ensemble, on the other hand, takes advantage of your room's acoustics. The ear can't tell where bass comes from, which is why Ensemble's bass units can be tucked out of the way—on the floor, atop bookshelves, or under furni-

ture. The satellites can be hung directly on the wall, or placed on windowsills or shelves. No bulky speaker boxes dominate your living space, yet Ensemble reproduces the deep bass that no mini speakers can.



You can put Ensemble's low-frequency units exactly where they should go for superb bass. You can't do this with conventional speakers because you have to be concerned about the upper frequencies coming from the same enclosures as the low ones.

# "We Know Of No Small Speaker That Surpasses The Overall Sound Of Ambiance." —Stereo Review

## Ambiance

BY HENRY KLOSS

Ambiance is an ultra-compact speaker that proves high performance, small size and low cost need not be mutually exclusive. Ambiance is ideal for bedrooms, studios... or for use as an extension speaker or in surround sound systems. While no speaker of its size can provide the same low bass as our Ensemble and Model Eleven systems, Ambiance has more output in the

40Hz region than any "mini speaker" we've encountered. *Stereo Review* magazine described Ambiance as "...beautifully balanced, delivering a full-size sound image with not a hint of its origin in two small boxes... very few small speakers we have heard can match the overall sound of Ambiance, and we know of none that surpass it." Available in Nextel or primed for painting for £179 pr. Or in solid oak for £199 pr.—backed by our 30-day money-back guarantee—direct from Cambridge SoundWorks.



Ambiance is an ultra-compact speaker that proves high performance, small size and low cost need not be mutually exclusive.

"You get a month to play with the speakers before you have to either return them or keep them. But you'll keep them!"  
*Esquire*

**Inc.** Magazine  
"Henry Kloss brought Dolby sound, CR, cassette tape, and large-screen projection television into living rooms, and made the dominant speakers systems of three decades: Acoustic Research in the 1950s, KLH in the '60s, and Advent in the '70s. Now he's at it again: Cambridge SoundWorks, selling direct to the public."

"Very much in the Henry Kloss tradition... another hi-fi milestone."  
**Review**

"They were designed to play music—and make it sound like music. This they do very well, in a most unobtrusive way, at a bargain price... it's hard to imagine going wrong with Ensemble!"  
*Stereo Review*

## MODEL ELEVEN

BY HENRY KLOSS

Cambridge SoundWorks' Model Eleven is the world's first transportable full-range, high performance component system. It consists of a powerful 3-channel amplifier and two "satellite" mid-high-frequency speakers—all packed in a rugged "BassCase"™ that, when empty, serves as the system's subwoofer. Model Eleven's performance, when coupled with your portable CD or tape player, rivals that of the most expensive component systems. And because we market it directly from our factory, it costs hundreds less than it would in stores.



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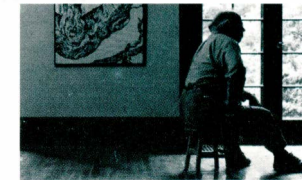


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Henry Kloss created the dominant speaker models of the '50s (AR, CR, KLH and '70s (Advent) as well as our highly acclaimed Ensemble and Ambiance™ speakers. While packing a stereo system into a suitcase before a holiday, he realized that an amplifier, a CD player and two small speakers take up the same space required for an ancient, expensive woofer reproducing muddy, deep bass. That was the inspiration for BassCase. Model Eleven's bass speaker enclosure which doubles as the entire system's carrying case.

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# 21st Century Fox

*This month Barry Fox considers the future for the humble compact cassette and the American underground hi-fi press.*

**T**he record companies are desperately trying to decide what new music recording format to back for the future.

Philips and Polygram are offering them DCC, a digital version of the existing compact cassette. Publicly Sony is committed to DAT. But privately Sony is offering Mini Disc, an erasable disc. MD is like a small size CD but incompatible with existing CD players.

US record company Warner Elektra Atlantic has now offered the industry a new idea, which adds to the considerable confusion. The system, called DIGalog was unveiled at the NARM conference in San Francisco at the end of March, and turns out to be a lot less new than the company suggests. A British company has been quietly using similar technology for nearly a year.

The decision by WEA to offer DIGalog is significant, because WEA has previously endorsed Philips' digital system, DCC. DIGalog is an analogue cassette on which analogue music is pre-recorded using all-digital technology.

DIGalog, promises WEA, "significantly improves the sound quality of mass-produced cassettes". The big bonus, says WEA, is that mass-produced cassettes "are playable on all existing analogue cassette players".

"Since DIGalog cassettes play on all existing analogue cassette players there will be no need for music retailers to carry a separate inventory", WEA President Henry Droz told retailers in San Francisco. Execs, bemused by the whole debate on new formats, can be excused for thinking that this means they can now have a new digital cassette that plays on old analogue cassette decks. And this they would love, knowing only that DCC nor DAT cassettes will not play on existing cassette recorders, and Sony's Mini Disc is not compatible with anything already

existing.

WEA claims that DIGalog gives "clearer sound than ever before possible in a mass produced audio cassette". But, without making any announcements, British company Ablex of Telford installed a similar system, made by Italian company Tapematic, in April 1990. Since then Ablex has mass-produced over 200 pre-recorded cassette titles. Ablex has produced these recordings for most major record companies, except WEA.

Conventionally pre-recorded "musicassettes" are mass-produced by copying the master recording (whether digital or analogue) onto an analogue tape which is formed into a continuous loop. The loop is stored in a large bin through which it runs in circles at up to 100 times its normal playing speed to produce music at 100 times normal speed and pitch. At the same time analogue slave recorders, running at matching high speeds, copy the recording onto cassette tapes. When customers play these cassettes at domestic recorders, the music plays at its original speed and pitch.

Inevitably the fast-moving master loop soon wears out, with high frequencies lost first as it wears.

The new process does not use a tape loop. Instead the music from the master tape is stored as digital code in an enormous solid state random access memory. The digital code is continually read out of the memory at up to 100 times the speed it was read in. High speed digital-to-analogue converters convert the code into analogue sound. This analogue sound is then recorded on cassette tapes running at matching high speed.

The system is known as a "digital bin". There is no tape loop to wear out and no loss of high frequencies. The result is a much cleaner sound on the mass produced cassettes sold to the public.

WEA acknowledges that it has no patents on the process. WEA's only legal right is in an application to register the trademark DIGalog. Although digital binning improves recorded sound, the fact that Ablex has been using the technology for a year without anyone noticing suggests that it is no real substitute for a digital recording medium.

Pre-empting the WEA announcement, Philips revealed that it is already making pre-recorded DCC cassettes on a test production line at Baarn in Holland, using a digital bin. There is no need to convert the high speed digital output back into an analogue signal before recording onto the DCC digital tape. The slave recorders are conventional, but fitted with thin film heads to record the parallel tracks of digits on which DCC relies.

**I**n America, the underground hifi magazines tend to be very tame, with advertisers trying to control editorial comment. This is what spawned the underground press, with magazines pledging to write what they truly believe.

Stereophile is not exactly an underground mag, but it prints what it believes is the truth. And recent events prove how this can be a very dangerous business in the USA.

A Court in Seattle recently issued a legal decision which, by Stereophile's choice, is a public document. Like most legal documents it makes heavy reading, and means little without any background explanation. But it's an important decision because it shows what can happen when an American hifi magazine criticises a manufacturer's product. For obvious reasons my background explanation must be in neutral words.

In late 1989 a reviewer for Stereophile wrote a none-too-flattering piece about a

Carver power amplifier. Stereophile sent a pre-print of the review to Bob Carver so that he could comment for publication. Instead, Carver placed an advertisement in the May/June 1990 issue of The Absolute Sound which included an edited version of the Stereophile review, along with criticism of Stereophile.

Stereophile rode the criticism, but sued Carver for copyright infringement. Magazines and authors do not like to see edited versions of their copy re-printed as adverts, without permission. On more than one occasion I have made manufacturers pay a donation to charity when they have done it to my copy. But a federal judge in Seattle held that Carver's use of the edited re-print was "fair use".

Carver then sued Stereophile for defamation and a string of other complaints dating back to reports and reviews published since 1985. Because Stereophile had another Carver amplifier review in the pipeline, the amount of damages claimed reached \$7 million.

In November an article by Roger Skoff in Sounds Like News, referred to the dispute as the "great hi fi hair pulling contest", and suggested that Stereophile would do better to settle than fight it out in court.

Agreement was duly reached in Seattle in late December 1990. Stereophile asked for the court settlement to be made a public document. In a nutshell what it says is this. Neither side admits any liability. Neither side pays any money to the other. Carver recalls all remaining copies of the unauthorised re-print for destruction. With the exception of third party advertisements Stereophile agrees not to mention in print Carver the man, Carver the company or Carver products for a cooling off period of three years starting 1 January 1991.

Those are the facts. Form your own opinions.







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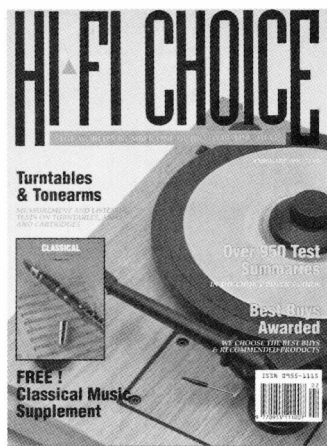






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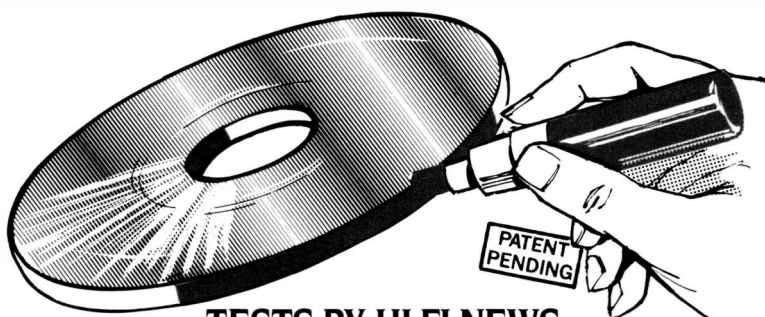
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# Choosing and Using . . . CD Players

*CD players are now the most popular component in the hi-fi chain. For the uninitiated, Hi-Fi Choice explains what's what in today's machines.*

**C**ompact disc has come a long way in eight years, and is now starting to represent a significant percentage of hardware and disc sales (particularly by value). Rather surprisingly, the UK has proved one of the slower growing markets, though this partly reflects a greater difference in price between a CD and its LP or musicassette equivalent than in some overseas markets.

Whereas disc prices have only reduced slightly since the format was launched (one or two budget labels notwithstanding), player prices have dropped to a third of those charged when the system was first launched. £160 is now a typical budget price, some machines cost as little as £120, and cheap mechanisms are built into systems and portables.

CD certainly has a number of advantages over its rivals. It is inherently rugged and unaffected by playing, free of surface and background noise and wow and flutter effects, while signals kept in digital form are theoretically immune from degradation. This said, a book could be written on how the theoretical incorruptibility of digital signals has proved to be something of a red herring. Regular observers of the hi-fi scene will be well aware of the 'discovery' that in CD replay even changing the interconnect cable used to transmit digital data between disc transport and standalone D-to-A converter can alter the perceived sound.

The addition of data channels allows complex preprogramming and accessing, while other CD applications include adding video (CDVideo~, interactive A/V (CDI) and the CD-ROM compute\_ software format. In-car, portable and personal players are in the shops, though there is still the

nagging doubt that tape is inherently more immune to the shock and vibration of such applications, while the wide dynamic range and inaudible background noise can be almost an embarrassment in a noisy environment. Doubters notwithstanding, the format clearly is here to stay, which is an achievement in itself when one notes the enormous historic difficulties encountered by those trying to create a successful new domestic format, not to mention the current problem~ facing DAT, touted as the tape equivalent to CD. Indeed, DAT may well be a total non-starter now that CD-R (recordable CD) is just around the corner.

## The Discs

Only five inches in diameter and attractively silvered, the compact disc currently costs up to twice the price of an LP or musicassette (in the UIC) and should resist damage or wear. It can carry more than an hour of music and comes packaged in an irritatingly fragile and awkwardly designed 'jewel case', containing additional printed 'sleeve' information.

For the record companies in particular, establishing a brand new format is an exceedingly difficult task, in view of the vast inventory needed to represent a play only format effectively, and in this instance, the technical problems of pressing with necessarily great precision. Inevitably there was a learning curve in the disc manufacturing processes, and full quality potential is still not reached in many cases. However, the range of titles available on CD has grown spectacularly, now exceeding those available on vinyl as more and more LPs are being deleted, emphasising~ the commitment of the record

companies to the format.

From the general consumer's point of view, price is still a key factor. While early CD users were clearly prepared to pay a 100 per cent premium, the pricing of CDs has now become something of a political issue as consumer pressure groups are becoming incensed at the lack of freedom of choice.

History has shown that the broad base of recorded music sales is very price-sensitive but not especially quality conscious - musicassette purchasers who were attracted by the convenience of that medium were not deterred by sound quality substantially inferior to LP.

## The Players

The conventional CD player may simply be plugged into any hi-fi system, as one would a tuner or cassette deck. The amplifier's 'aux', or 'tape' inputs will be perfectly adequate, though the results might be a little loud through the speakers, and require a lower volume control setting than usual. Many more recent amplifiers have a 'CD' input, and this may have a more appropriate sensitivity. Some specialist amplifiers have taken the trouble to connect the CD input directly to the preamp volume control, so as to minimise interference of the signal.

There is also a mild risk that a CD user will find his amplifier no longer seems to go as loud. The reason for this is that the digital CD medium is better at preserving the high loudness peaks in music which analogue systems 'squash' downwards. Consequently for the same peak output, the mean (average) output from CD with the same recording will be slightly lower than before. One can of course compensate by cranking up

the volume, but if an amplifier is already being used close to its limits, the CD peaks could cause premature 'clipping', for which the only solution is to obtain a more powerful amplifier.

The prospective purchaser faces a wide range of choice at wildly varying prices, starting below £150 and going up to above £2,000. Players are available for in-car use, are incorporated in large portables, and exist as tiny personals, with some doubling as unconventional domestic machines.

The mains models can be manual or remote controlled, and simple or complicated in terms of ergonomics and programmability. Autochanger variations can accept and play from a caddy of half a dozen discs, selected and programmed remotely. For enthusiasts looking for top quality performance, there is now a preponderance of 'two-box' players, where the disc transport and complex digital-to-analogue circuitry are physically separated and have independent power supplies.

Despite protestations of 'perfect' sound, CD players show significant audible and measurement differences, and these are discussed in detail in our reviews. That said, most machines measure very competently, showing occasional weakness at the cheapest end of the market and among low voltage portable machines.

Though correlation with measurement still proves elusive, listening tests prove quite capable of consistently distinguishing between the different decks. While the poorer examples can make the new medium sound quite unpleasant, the best can provide eminently satisfactory results with refreshing repeatability and the promise of longevity.



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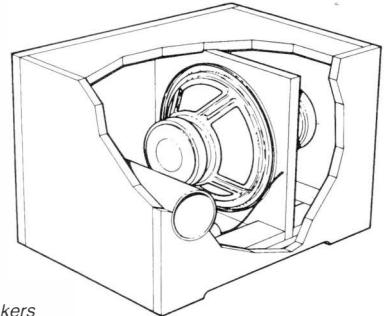
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# Acoustic Research CD-06SE

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Take one CD-06, slap in a new analogue board and - hey presto - you've got yourself a *Special Edition* player. Marantz began all this 'SE' malarkey though maybe the concept is starting to wear a bit thin now. After all, you can only milk a good idea for so long . . .

The slanted alloy fascia is certainly very distinctive and has been designed to complement other AR separates. Likewise the large plastic knob to the right, which in this case is not a volume control or tuning wheel but a rocker switch for play and pause! Other facilities like track and index skipping, intro-scan, repeat and program play are provided by two rows of rather fiddly buttons located under the display.

Pressing 'load' causes the disc tray (plus half the alloy fascia) to emerge slowly into view. However, the mechanism will not accept CD singles without the supplied adaptor, an oversight that rather dates this player. A simple remote control is provided, and it's possible to adjust the output level by first juggling with a couple of wire-links on the rear panel.

The CD-06SE is essentially a basic Philips 16-bit four times oversampling digital 'front-end' with extensive post-DAC revisions. Pride of place is reserved for a discrete I/V convertor potted in black epoxy resin to prevent inspection, which according to the test results, is not a little suspect.

## Lab Report

Whatever the contents of this anonymous black box, the end result looks very similar to that obtained when various commercial (and equally anonymous) 'CD filters' are pressed into service. Those that I've tried present a fairly capacitive load to the player, causing stress to the output op-amps and distortion to rise at high frequencies. It could be coincidence of course, but the output of the CD-06SE looks pretty similar, with a marked

increase in distortion (0.035 instead of the more typical 0.0015 per cent), rising to 0.13 per cent at 20kHz.

The 3D plot shows a spray of 2nd-6th harmonics plus a series of very high order stop-band intermodulation products tracking across towards the top of the picture. The 0dB frequency response shows signs of overload while the effect of AR's filter can be seen in the 0.5dB drop at 20kHz. The player doesn't really begin to settle into the standard 16-bit distortion pattern until -60dB and lower, but even at -70dB the 1kHz plot is not as 'clean' or defined as either the Marantz CD-80 or Radford WS2. Furthermore, spurious RF noise is unduly high and the 1.2kohms output impedance is way off spec. Long interconnects are not recommended.

## Sound Quality

The panel was certainly less relaxed and comfortable with the presentation of this player compared to its 16-bit cousins. Individual instruments were fairly well represented but there wasn't the sense of ambience or space to accompany them. Prompted by a mild coarseness on strong vocal and brass tracks, one listener identified the CD-06SE as 'distinctly multi-bit'.

The player does have a distinctive edge to its sound and superficially at least can also seem pretty dynamic. Yet over a period our listeners felt this was simply an overall 'loudness', lacking the freshness, vitality or low-level resolution we had come to expect. Simple recordings might have good body, but the overall performance lacks class.

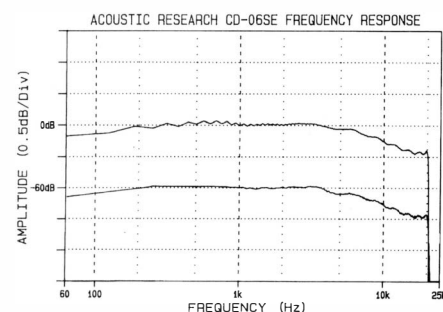
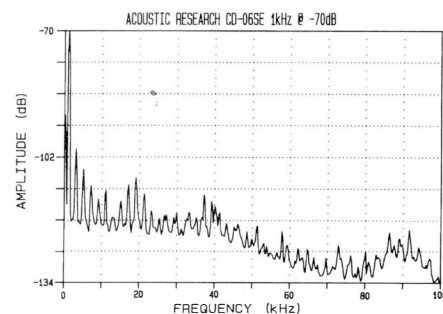
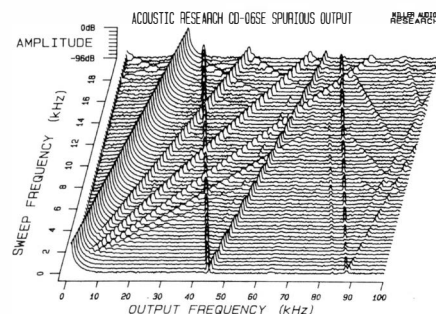
## Conclusion

In this case the *Special Edition* tag is both over-worked and under-justified. I am also concerned that AR is prepared to relinquish the modification of the CD-06 to an outside party, especially since no one I spoke to was aware of the nature of

this mysterious black box. As far as our measurement and listening tests were concerned, the extra £150 appears to be misplaced.

## TEST RESULTS

	20Hz	1kHz	20kHz
Channel Balance	0.04dB	0.03dB	0.09dB
Channel Separation	103.1dB	93.2dB	64.9dB
THD vs Level, 0dB	-67.4dB	-68.9dB	-57.9dB
-30dB	-68.7dB	-61.0dB	-50.7dB
-60dB	-55.2dB	-46.7dB	-26.5dB
-80dB	-32.8dB	-25.4dB	-33.0dB
Dithered -90dB	-12.6dB	-12.3dB	-28.8dB
Resolution @ -60dB		+0.03dB	+0.58dB
-80dB		-0.06dB	+0.18dB
-90dB		-1.75dB	+0.24dB
-95dB		-1.85dB	+0.65dB
-100dB		-1.65dB	
Peak Output Level, L			1.900V
R			1.895V
Output Impedance			1.195kohms
Radio Frequency Spurious			36mV @ 22.6MHz
CCIR IMD, 0dB			-68.1dB
Suppression of stop-band IMD			41.6dB
De-emphasis Accuracy, 1kHz			+0.10dB
5kHz			+0.98dB
16kHz			+1.89dB
S/N Ratio (A-wtd), w/o emp			104.9dB
w emp			108.1dB
Track Access Time (99)			5secs
Typical Retail Price			£450





# Aiwa XC-700

**Best Buy**

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



Never judge a book by its cover. Or for that matter, never judge a CD player by its fascia. The XC-700 puts a busy enough face on the world with its centralised drawer flanked by a myriad different buttons, but it looks rather anonymous. It's fiddly too, with a direct access keypad crowded together with various programming options.

There's even a 'cal tone' facility to help set tape deck record levels while a further row of keys cater for peak and index search, random and repeat play modes. Construction is pretty lightweight, the carcass containing 90 per cent air, but that's not all you'll find lurking within the XC-700.

Remarkably Aiwa has found the funds to accommodate a Philips Bit Stream DAC. Not the original SAA7320 used by Rotel and Kelvin. Nor even the common-organ garden SAA7321 that Philips and Marantz use in their £200+ players. Instead Aiwa has gone completely bananas and included Philips' so-called BS DAC, the SAA7350 that companies like Deltac and Meridian use in their state-of-the-art convertors!

For Aiwa to offer one of the first integrated CD players with Philips' top-of-the-line PDM DAC is remarkable enough, but to do so at £180 it seems almost impossible to believe.

## Lab Report

The performance of this player is not strictly comparable with other PDM players in this test because the SAA7350 DAC has its own, individual foibles. For instance the S/N ratio is up by a good 6dB but linearity, in this case at least, is only just acceptable. Also, this DAC uses 3rd-rather than 2nd-order noise-shaping, together with stylised analogue filtering, which is responsible for the flatter ultrasonic noise 'curve' seen on the -70dB plot.

The choice of analogue op-amps

influences the 3D plot because these are responsible for the strongish 2nd harmonic (typically 0.0045-0.02 per cent). Furthermore, all stop-band images (the V-shaped patterns) are caused by the eight times oversampling filter (NPC SM5840), showing closer resemblance to the Denon DCD-2560 and Kenwood DP-4030 CD players. The mild 0.25dB frequency response droop isn't likely to be audible.

## Sound Quality

There's no disguising the fact that this player was greeted with rapturous enthusiasm by all members of the listening panel. At the time I thought their reaction a little too eager, but I hadn't then discovered the secret of Aiwa's black box. Either way it goes to show the danger of having any preconceived notions about a product, however innocent they might seem at the time.

Freed from any such prejudice, the listeners thought the sound neither too forward nor dynamic, but fundamentally very natural, gently drawing them into the flow of the music. With no undue emphasis or bias towards any part of the musical spectrum, the sound of individual instruments was allowed to swell and die away in a fashion that seemed utterly natural and effortless. A sense of space, fluidity and ease permeated the width and depth of the soundstage, winking out subtle tonal details that might otherwise have been concealed.

Both the synthesised and acoustic bass underpinning our pop and jazz selections shared a fulsomeness and resonance that brought weight and substance into the music without spilling over and muddling more delicate details. In all it's an enviable performance for any player, let alone one costing £170.

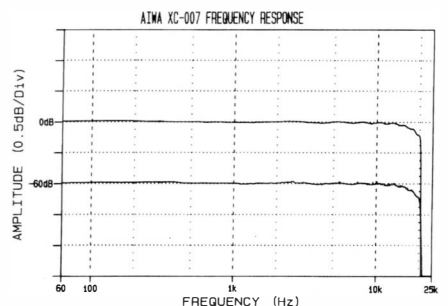
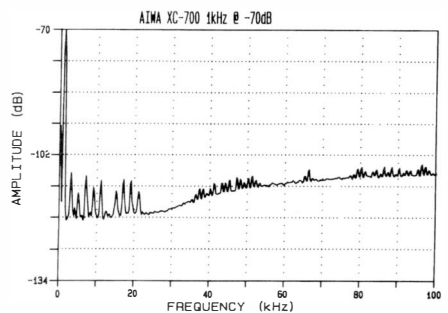
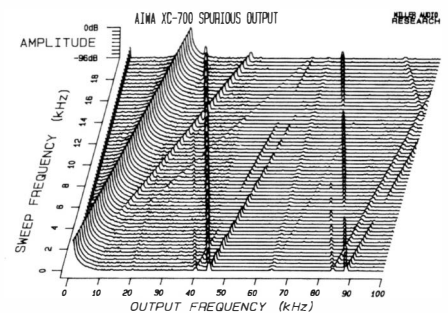
## Conclusion

The XC-700 was the biggest surprise of the entire test - not even Aiwa or its agents

in this country had any notion of its hidden technology! A £170 player equipped with Philips top Bit Stream DAC plus every feature under the sun seems almost too good to be true. The fact that it happens to sound bloody marvellous is merely incidental, ho ho. But seriously folks, this is the cream of Best Buys.

## TEST RESULTS

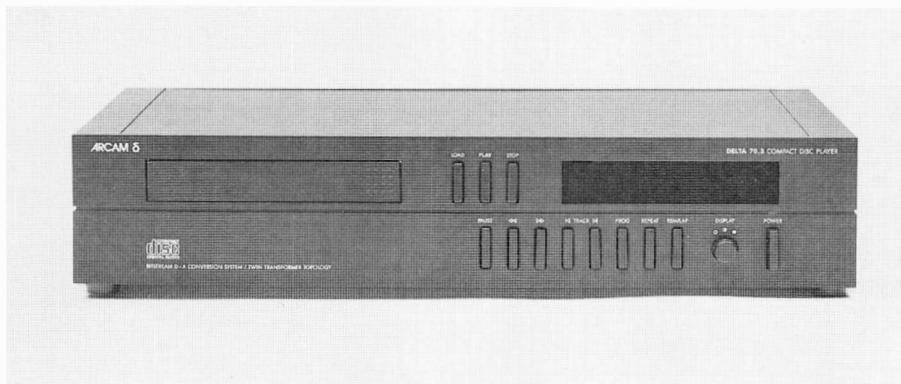
	20Hz	1kHz	20kHz
Channel Balance	0.04dB	0.04dB	0.11dB
Channel Separation	102.6dB	105.4dB	83.2dB
THD vs Level, 0dB	-89.6dB	-86.9dB	-73.6dB
-30dB	-73.4dB	-71.8dB	-65.4dB
-60dB	-44.7dB	-42.0dB	-38.5dB
-80dB	-23.9dB	-21.8dB	-18.0dB
Dithered	-90dB	-13.0dB	-11.0dB
Resolution @ -60dB	-80dB	+0.04dB	+0.03dB
-90dB	-80dB	+0.63dB	+0.46dB
-95dB	-80dB	+1.63dB	+1.20dB
-100dB	-80dB	+1.59dB	0.13dB
Peak Output Level, L			2.294V
R			2.283V
Output Impedance			981ohms
CCIR IMD, 0dB			-86.5dB
Suppression of stop-band IMD			61.0dB
De-emphasis Accuracy, 1kHz+			0.01dB
5kHz			+0.02dB
16kHz			-0.06dB
S/N Ratio (A-wtd), w/o emp			105.7dB
w emp			105.4dB
Track Access Time (99)			4.5secs
Typical Retail Price			£180





# Arcam Delta 70.3

A&R CAMBRIDGE LTD, DENNY END INDUSTRIAL CENTRE, WATERBEACH, CAMBRIDGE CB5 9PB. TEL: (0223) 861 550



It had to happen. After Arcam's PDM preamp and PDM *Black Box 3*, the time was ripe for the popular *70.2* CD player to be well and truly 'bitstreamed'. Enter the *Delta 70.3*, a fully integrated player that shares the same chunky alloy casework, rugged *CDM1 MkII* transport, adjustable display and modest array of features that occupied its predecessor.

It's expensive to be sure, but you are paying for robust engineering that exudes a feeling of purpose and confidence that's absent with so many cheaper, lightweight machines. Furthermore, with the convenience of remote control operation and a new variable output facility, the only obvious omission is a headphone socket, though Arcam has been ringing the changes on a grand scale inside.

Starting completely afresh, the *70.3* is not simply a *Black Box 3* version of the *70.2*. The *70.3* uses a Philips' *SAA7350* BSDAC, instead of the *SAA7321* employed in earlier PDM implementations, an *SAA7321* is actually included on the new decoder board though everything bar the integral four times oversampling filter is disabled. This then feeds the *7350* DAC proper, which operates at some 256 times oversampling rather than the potential 384 times employed by the likes of *Deltec*, for example. Arcam has stamped its mark on the analogue electronics too, employing a comprehensive four-pole filter with two gain stages, packed with quality capacitors and op-amps.

## Lab Report

This player shows a number of technical foibles, not least of which is the obvious frequency response ripple caused by the FIR filter in the *SAA7321* chip. Note also some departure from linearity through the bass in the lower level -60dB trace, while the ripple itself becomes less predictable. This four times filter is also responsible for the ripple of stop-band images seen on the 3D plot, though these

V-patterns, together with traces of odd-harmonic distortion, are nearly swamped by a wave of ultrasonic noise.

This huge bump of out-of-band white noise is also visible on the 1kHz/-70dB plot. It's caused by the 3rd-order noise-shaping employed in the *SAA7350* DAC taking hold more sharply than usual because of the lower 256 times oversampling rate, and therefore, the reduced bandwidth over which unwanted quantisation noise is redistributed. At very low levels this also implies distortion (at 20kHz) that exceeds 100 per cent! Together with the highish levels of RF noise and proprietary filtering devised by Arcam these are all likely to exert a powerful influence over its sound.

## Sound Quality

As if on cue, the *70.3* delivered a sensitive and bouncy sound, bubbling with starkly defined detail. Bass was not miraculously extended, but what there was certainly sounded full and weighty with plenty of 'oomph'. The panel recognised the effortless and delightfully fluid sound that seems to characterise the best PDM players, but there wasn't an appropriately expansive feel to heavyweight classical works.

Increasing the volume added extra power and conviction to individual instruments, more authority to drums and a greater zeal to strings, for instance, yet there was no broadening of the soundstage. In fact no matter how loud we pushed the speakers the sound from this player never became crass or jumbled. The *70.3* displays a remarkable soundstage solidity and precision, but instead of swelling in sympathy with musical dynamics, the instruments themselves seem unnaturally magnified.

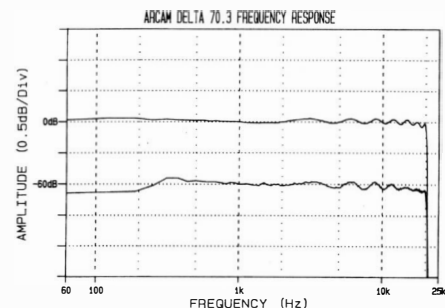
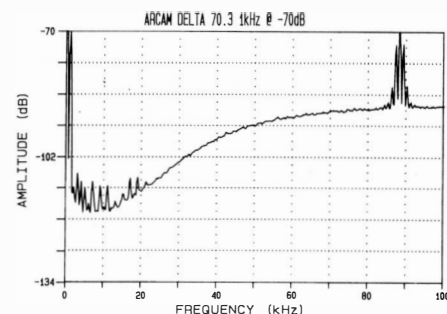
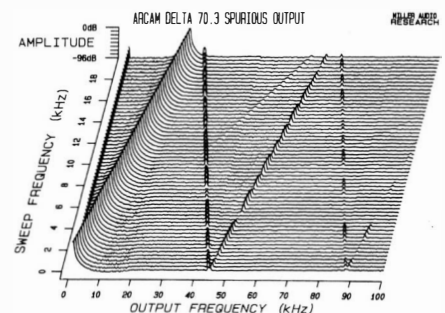
## Conclusion

The panel was quite struck by the sound of this new player which is markedly

different from the various PWM 'bitstream' models in this test. But different is not necessarily better. While the distinctive qualities of the *70.3* may well appeal to some listeners, it didn't entirely convince our panelists. One way or another this player looks set to polarise opinion.

## TEST RESULTS

	20Hz	1kHz	20kHz
Channel Balance	0.03dB	0.04dB	0.05dB
Channel Separation	114.5dB	108.0dB	104.7dB
THD vs Level, 0dB	-93.7dB	-100.5dB	-75.1dB
-30dB	-64.1dB	-71.0dB	-50.5dB
-60dB	-33.9dB	-41.0dB	-20.4dB
-80dB	-13.5dB	-22.0dB	-0.05dB
Dithered -90dB	-11.5dB	-13.4dB	+10.0dB
Resolution @-60dB		+0.08dB	-0.02dB
-80dB		+0.79dB	-0.38dB
-90dB		+1.56dB	-1.84dB
-95dB		+1.85dB	-5.24dB
-100dB		+2.00dB	
Peak Output Level, L			2.253V
R			2.262V
Output Impedance			49ohms
CCIR IMD, 0dB			-88.9dB
Suppression of stop-band IMD			54.3dB
De-emphasis Accuracy, 1kHz			+0.02dB
5kHz			+0.22dB
16kHz			-0.03dB
S/N Ratio (A-wtd), w/o emp			99.6dB
w emp			100.6dB
Track Access Time (99)			4.8secs
Typical Retail Price			£699



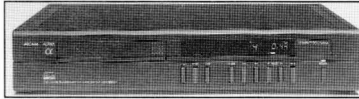


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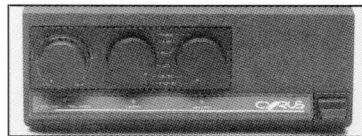
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# Ariston Maxim

ARISTON ACOUSTICS LTD, FREEPORT SCOTLAND, PRESTWICK AIRPORT,  
SCOTLAND KA9 2TA. TEL: (0292) 76933



Ariston takes 'a belt and braces' approach to CD design... to quote one of its engineers. Judged by this sturdy player, this is no joke. The extruded alloy fascia is mounted on a folded steel case, and even the front of the disc tray is reinforced by an alloy faceplate. On the other hand it has the cheaper Philips CDM4 transport mechanism instead of the alloy CDM1 used in costlier machines such as the Arcam, Radford and Marantz CD-80.

Like Arcam, Ariston has damped the plastic clamp which holds the CD in place. This prevents various rattles and vibrations and reduces digital jitter, itself a cause of distortion in the converted signal.

The bold fluorescent display (cf the CD582) is hard to miss, showing basic but essential track and time information. Alongside the play, pause and track skip keys is a further switch to defeat the display. A standard Philips-issue remote control provides features such as programming, repeat and direct track access - arguably the bare minimum at this price.

Inside Ariston's own analogue gain and filtering board is fed by entirely separate transformer, caps and regulators. There's even a dedicated regulator mounted above the digital filter which feeds the digital side of the 'Crown' 16-bit DAC. High speed LF351 op-amps perform current-to-voltage conversion, while a minimum-phase 3rd-order network supplements the action of Philips' four times oversampling filter. Belts and braces as the man said.

## Lab Report

Not every CD player has a predictably flat frequency response, as this unit demonstrates. Ariston's analogue filtering clearly introduces a degree of 'character' with its gently downtilted balance covering a full 0.5dB (substantial in CD terms) from 100Hz to 20kHz. The ripple

seen here and on the stop-band images (the V-patterns) from the 3D plot are caused by Philips' SAA7220P/B oversampling filter. Most modern filters produce less ripple and offer a stop-band rejection that is well in excess of the 41dB measured here.

Anyway Philips' TDA1541 DAC puts up a good showing in this instance with errors in linearity of just 0.55dB at -100dB, despite a -1.6dB 'hiccup' at -90dB. The general content and level of distortion is typical of a Philips 16-bit four times chipset (see 1kHz/-70dB plot), except at peak level where THD climbs to 0.013 per cent (20kHz). The DC offset of the direct-coupled output stage clocked up +7.5mV on both channels, which is far too high.

## Sound Quality

The panel reacted to the Maxim with a mixture of interest and disaffection. It's another bouncy-sounding deck that depends more upon its marvellously articulate midband and good vocal quality than a treble which is certainly less pure, refined and civilised. Still, despite the lack of a low-bit smoothness, the intonation is delightfully vibrant and dynamic. In essence, the player has a very 'live' sound but one that's imbued with a certain character, very much like the better Marantz players, with an articulate midband but cruder and harder treble quality.

Two listeners were decidedly irritated by the grainy treble, commenting that this was a 'typical 16-bit player' that lacks the sweet and fluid disposition of its PDM cousins. On the other hand, all listeners were very taken with the considerable momentum that lay behind its sound and, in particular, the thunderous bass.

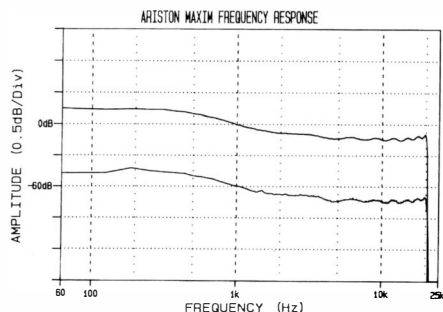
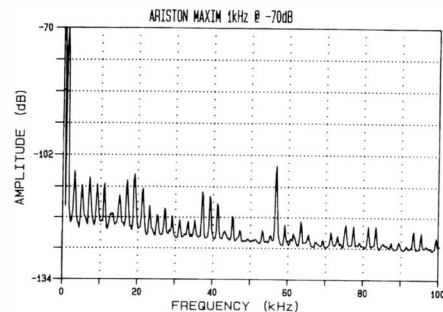
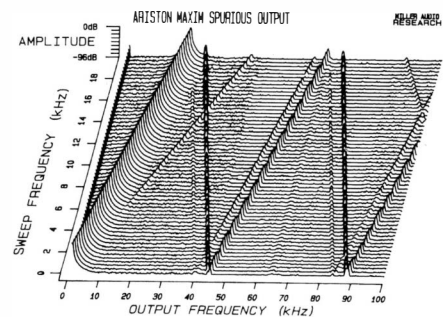
## Conclusion

This is a confident, earthy-sounding machine. The excellent build quality and vivid display are further points in its

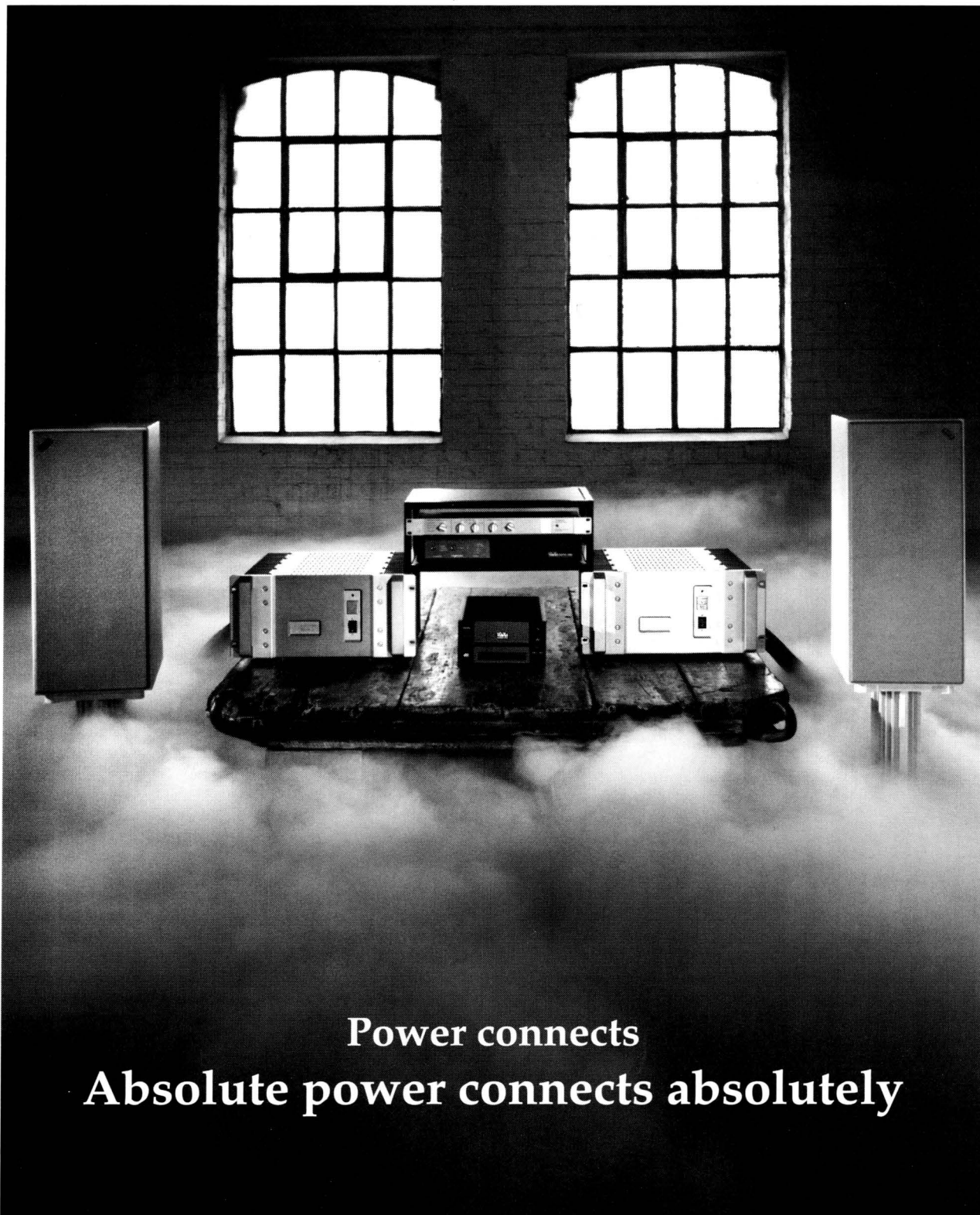
favour, though the loss of smoothness and sweetness through the treble reinforces the point that there are just as many good and highly specified performers available at around £200-250.

## TEST RESULTS

	20Hz	1kHz	20kHz
Channel Balance	0.13dB	0.13dB	0.14dB
Channel Separation	135.5dB	109.2dB	83.5dB
THD vs Level, 0dB	-102.7dB	-98.0dB	-77.8dB
-30dB	-76.4dB	-67.7dB	-59.1dB
-60dB	-49.3dB	-45.2dB	-33.4dB
-80dB	-23.1dB	-23.3dB	-31.2dB
Dithered -90dB	-7.85dB	-12.6dB	-22.3dB
Resolution @ -60dB		+0.03dB	+0.22dB
-80dB		-0.38dB	-0.05dB
-90dB		-1.58dB	+0.17dB
-95dB		-0.90dB	+1.13dB
-100dB		-0.55dB	
Peak Output Level, L			1.771V
R			1.797V
-Output Impedance			102ohms
CCIR IMD, 0dB			-99.1dB
Suppression of stop-band IMD			40.6dB
De-emphasis Accuracy, 1kHz			-0.10dB
5kHz			-0.43dB
16kHz			-0.18dB
S/N Ratio (A-wtd), w/o emp			106.5dB
w emp			110.1dB
Track Access Time (99)			5secs
Typical Retail Price			£499







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TARA LABS





# Carver TL-3220

HW INTERNATIONAL LTD, 3-5 EDEN GROVE, LONDON N7 8EQ.  
TEL: (071) 607 2717



Remember the Magnetic Field power amplifier, otherwise known as the Carver *Cube*? Not only did this eccentric design spawn a whole generation of lightweight, low power consumption professional amplifiers, but it also launched the Carver Corporation onto the domestic market. Eleven years on and Bob Carver's range may have expanded, but it's no less eccentric.

Take the TL-3220 CD player as an example: it's an unashamedly lightweight design, but graced with a 19-inch rack-mount fascia complete with decorative grab-handles. The moulded disc transport is no more substantial, while the back-lit LC display is positively prehistoric. The player does offer direct track access, a 32-track memory and a variable output, but there's little more than track and time info on the display. Random play and intro scan are provided on the matching handset, as are the up/down volume keys.

Inside the player lurk a couple of 18-bit Burr-Brown DACs with a fairly decent eight times oversampling filter from Yamaha, though pride of place must go to Carver's DTL feature. DTL stands for Digital Time Lens, an option that's claimed to 'restore the spectral and ambient balance intended by the musician', a feat that's achieved by manipulating the frequency response and L-R stereo component.

## Lab Report

The effect of DTL is graphically demonstrated on the (dotted) frequency response plot which, at -60dB, is treated to a boost of some +2dB at 200Hz. Without DTL the 0dB and -60dB responses return to their normal, very flat and even settings. DTL doesn't influence distortion but the factory-trimming of these 18-bit DACs most certainly does, hence the increase in midrange distortion from one to ten per cent between -60dB and -80dB.

This is marginally higher than that

measured with other players employing the same DACs, such as the Denon DCD-860, and goes hand in hand with linearity errors of +1.1dB at -80dB and +3dB at -90dB. Notice also the increase in THD (especially the 7th harmonic) plus ultrasonic IMD on the accompanying 1kHz/-70dB plot. Otherwise everything else seems quite in order.

## Sound Quality

According to the panel this player offers a sparse, small and dry sound that's potentially rather fatiguing. One listener suggested that it harked back to the bad old days of CD. Instruments that should have sounded full and rich were felt to lack substance to the point of sounding anaemic. Pop tracks sounded tiring while percussion, especially the synthesised stuff, lacked a sense of crispness and definition.

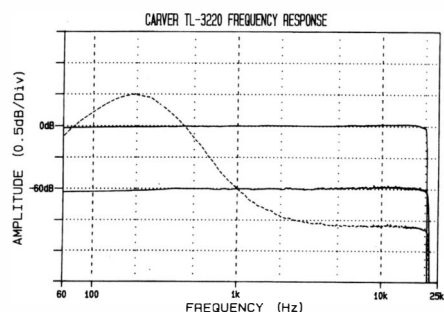
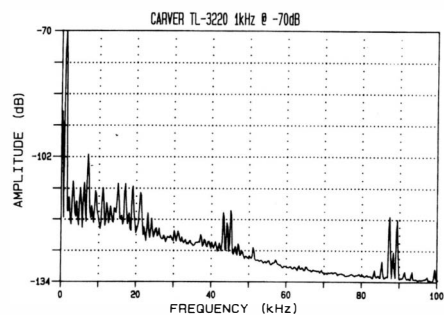
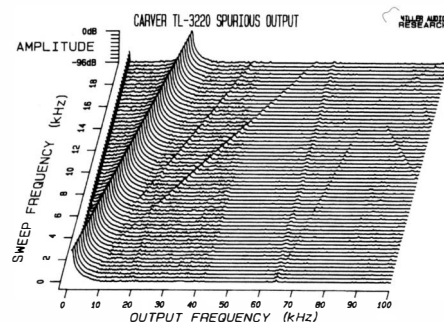
This might be tentatively linked to the player's weak tracking of dynamic contrasts, a feature that also strained its handling of larger scale orchestral works. Furthermore, and without informing the listeners of its purpose, I engaged Carver's DTL gizmo before replaying the very same discs. The panel agreed that the overall presentation was now softened, as if fattening the music to swell an otherwise restricted soundstage. The listeners also suggested that although the sense of stereo depth was improved, bass, and acoustic bass in particular, now sounded distinctly spongy.

## Conclusion

This is bit of an oddball player with an equally odd, amorphous sound. As for the DTL feature, so long as you don't treat it too seriously, there's no harm in massaging the sound once in a while! Unfortunately there's not much of any merit to massage in the first place. This player is simply too expensive for what it offers.

## TEST RESULTS

	20Hz	1kHz	20kHz
Channel Balance	0.10dB	0.09dB	0.07dB
Channel Separation	108.6dB	105.0dB	106.5dB
THD vs Level, 0dB	-105.2dB	-99.2dB	-93.7dB
-30dB	-79.9dB	-73.4dB	-84.7dB
-60dB	-49.5dB	-39.9dB	-59.2dB
-80dB	-23.7dB	-20.0dB	-31.3dB
Dithered -90dB	-14.0dB	-13.8dB	-21.3dB
Resolution @ -60dB		+0.06dB	+0.05dB
-80dB		+1.09dB	+0.89dB
-90dB		+3.03dB	+3.03dB
-95dB		+3.15dB	-1.66dB
-100dB		+3.20dB	
Peak Output Level, L			2.152V
R			2.128V
Output Impedance			449ohms
Radio Frequency Spurious		17.2mV @ 37.7MHz	
CCIR IMD, 0dB			98.9dB
Suppression of stop-band IMD			102.5dB
De-emphasis Accuracy, 1kHz			0.00dB
5kHz			+0.02dB
16kHz			+0.04dB
S/N Ratio (A-wtd), w/o emp			108.8dB
w emp			111.8dB
Track Access Time (99)			3.6secs
Typical Retail Price			£495





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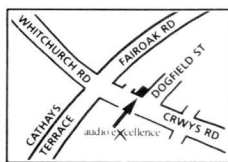


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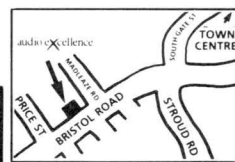
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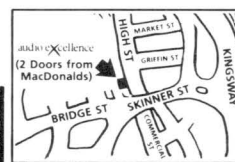
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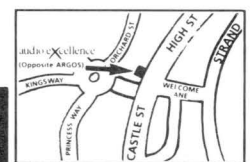
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# Denon DCD-2560

HAYDEN LABS LTD, HAYDEN HOUSE, CHILTERN HILL, CHALFONT ST PETER, BUCKS SL9 9EW. TEL: (0753) 888 447



If nothing else, you have to admire Denon's tenacity. At a time when the entire world seems to be opting for low-bit conversion, Denon is doggedly pursuing ever more convoluted multi-bit techniques. Ignoring the simplicity of a PWM or PDM DAC, the *DCD-2560* is equipped with nothing less than a 16 times oversampled 'Real 20-bit 4DAC Lambda Super Linear Converter'.

In reality the player is equipped with an eight times oversampling filter plus a pair of mono 20-bit DACs per channel these being new ICs from Analogue Devices. These DACs are operated in differential mode, handling L+/L- and R+/R- signals that have each been offset by equal and opposite amounts.

The idea is that sensitive, low-level information is moved away from the DAC's MSB (most significant bit) and so freed of any zero-cross distortion, meanwhile the differential operation cancels the positive and negative DC offset of each 'half'. Furthermore, both L- and R-signals are shifted by one-half of the eight times oversample frequency, implying the benefits of true 16 times operation!

The superb construction and finish of this player is beyond question. It even features the heavyweight ceramic transport assembly that was once the preserve of far costlier machines. Standard track access controls are visible alongside the attractive display, but all peripheral facilities are tucked away behind a flap. These include a direct access keypad, program, repeat and random play options plus a range of tape edit, time search and fader and pitch controls. In looks and operation at least, the *DCD-2560* is a beautifully constructed machine.

## Lab Report

Hi-tech it may be, but linearity errors of -1.2dB (-90dB at 20kHz) and -1dB (-100dB at 1kHz) are bettered by many cheaper

players. The A-wtd S/N ratio of 118dB is impressive if still some 4dB short of state-of-the-art, while distortion is held down to 0.04 per cent at -60dB and 0.7 per cent at -80dB for frequencies as high as 20kHz.

However, these excellent specs are as much a function of the post-DAC filtering (see -70dB plot) as the digital offset scheme, because THD through bass and middle frequencies is less impressive. The slight kink and ripple in the frequency response is a function of the NPC's eight times oversampling filter. Note also the similarity in stop-band noise to the Nakamichi player (3D plot).

## Sound Quality

In common with many of the costlier players in our test, regardless of technology, the *DCD-2560* provides a very polished and rounded sound, though one that never really lets its hair down. The panel commented that although bass notes were pretty firm and deep, they did not seem quite as full or resonant as desirable.

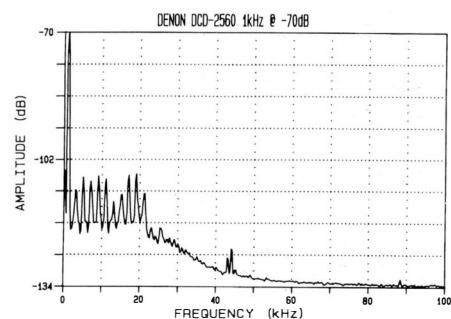
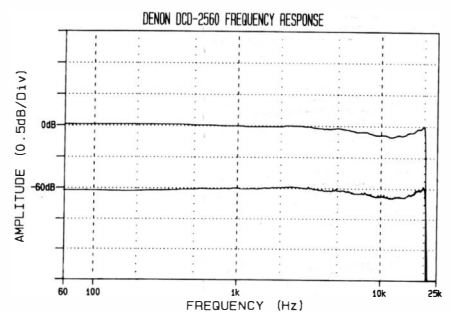
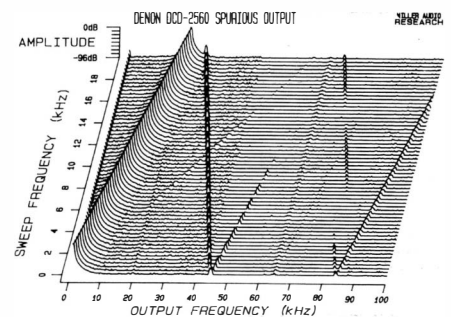
By contrast, an odd, glassy feel to vocals tends to accentuate sibilance and introduces a cold airiness to the soundstage. This was not a particularly harsh coloration but it certainly affected the resolution of brass instruments. In addition it serves to highlight the relative lack of pace and drive at lower frequencies, which plod along with sluggish determination. Either way the listeners found it very difficult to get to grips with the music itself, which simply failed to gel in a communicative fashion.

## Conclusion

Perhaps too complicated for its own good, the *DCD-2560's* kindly sound contrasts markedly with its purposeful, battleship construction. It's certainly not aggressive but neither is it particularly thrilling, unlike its cheaper '860 sibling which is by far the better buy.

## TEST RESULTS

	20Hz	1kHz	20kHz
Channel Balance	0.18dB	0.18dB	0.12dB
Channel Separation	131.4dB	126.1dB	100.8dB
THD vs Level, 0dB	-94.7dB	-101.5dB	-93.2dB
-30dB	-68.4dB	-71.0dB	-84.7dB
-60dB	-43.4dB	-44.4dB	-68.1dB
-80dB	-24.1dB	-23.7dB	-43.1dB
Dithered -90dB	-16.5dB	-15.0dB	-37.0dB
Resolution @ -60dB		-0.03dB	-0.03dB
-80dB		-0.24dB	-0.21dB
-90dB		-0.53dB	-1.22dB
-95dB		-0.76dB	-6.11dB
-100dB		0.99dB	
Peak Output Level, L			2.233V
R			2.188V
Output Impedance			154ohms
CCIR IMD, 0dB			-98.2dB
Suppression of stop-band IMD			60.5dB
De-emphasis Accuracy, 1kHz			+0.01dB
5kHz			-0.03dB
16kHz			-0.10dB
S/N Ratio (A-wtd), w/o emp			118.2dB
w emp			117.9dB
Track Access Time (99)			2secs
Typical Retail Price			£550

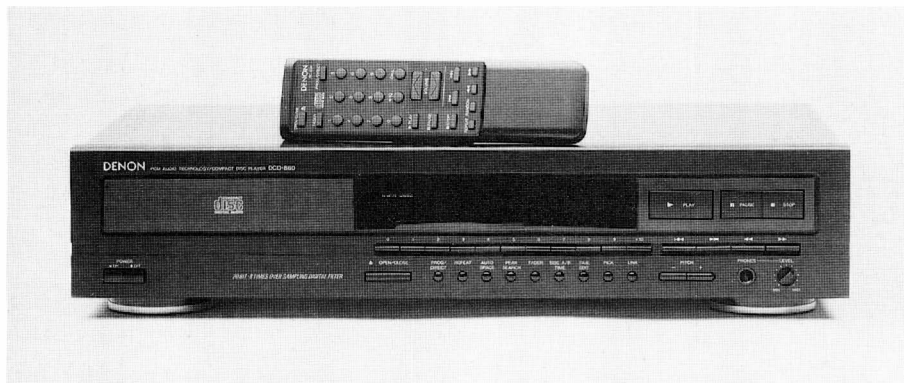




# Denon DCD-860

HAYDEN LABS LTD, HAYDEN HOUSE, CHILTERN HILL, CHALFONT ST PETER, BUCKS SL9 9EW. TEL: (0753) 888 447

**R**ecommended



Representing one of the last bastions of multi-bit technology, Denon's new *DCD-860* replaces the older *DCD-820* by offering various extra features. However, the internal strategy remains very similar, with two 18-bit DACs and eight times oversampling filter. Denon insists on referring to these as its own latest MSB-adjusted 'Super-Linear' DACs whereas they turn out to be Burr Brown *PCM61s*.

Once you strip away the hype this player seems to have a lot to offer. The slim black fascia is decorated with a fluorescent display covering track, index and time info, while a row of keys provide direct track access. The player also includes a Sony digital signal processor that enables the data rate to be manipulated in steps of 0.1 per cent, giving rise to the novel pitch control seen on the player's fascia; note that the digital output is defeated once this pitch control is brought into play.

Plenty of extra widgets are provided for the keen home-taper. Features such as auto space, peak search, programmable fade, time edit, pick and link will allow several CDs to be edited in succession. The remote handset offers random and repeat play options, together with full control over the variable output.

## Lab Report

This beastie is relatively straightforward compared to many of Denon's CD players, though the performance of the eight times oversampling filter gives some cause for concern. This is responsible for the 0.15dB ripple seen on both 0dB and -60dB frequency responses, in addition to the swathe of stop-band intermodulation on the 3D plot. In fact rejection of 28dB stop band is quite the poorest in this test and comparable to many budget players produced two or three years ago.

The linearity of the DACs is impressive enough, particularly at 20kHz where the -95dB error is just -1.5dB, a result far

better than that obtained with most low-bit convertors. Its multi-bit foundation is also revealed by the downward sloping noise pattern on the 1kHz/-70dB plot, where distortion harmonics are also gratifyingly low (typically 0.56 per cent at -60dB and 6.3 per cent at -80dB). Most impressive of all, however, is the almost complete absence of spurious RF noise, a feature that often bodes well for sound quality.

## Sound Quality

Sonically the *DCD-860* came over as a less substantial and slightly less polite version of the *DCD-2560*, factors that weigh very much in its favour. The presentation is still very relaxed and competent, but manages to pack in plenty of detail without sounding cramped, compressed or dirty. In fact the panel complimented the player on its very clean and spacious soundstaging. Although there's a hint of treble emphasis at times, it's not sufficient to aggravate vocal sibilance or highlight percussive sounds.

This is very much the sort of well-rounded and comfortable sound that prompts listeners to wind up the volume. The panel certainly felt the desire to step on the gas, bringing up the level without any fear of the sound becoming over loud or objectionable. It simply swells to accommodate the extra power and impetus, rather than directing energy towards individual, bright-sounding instruments.

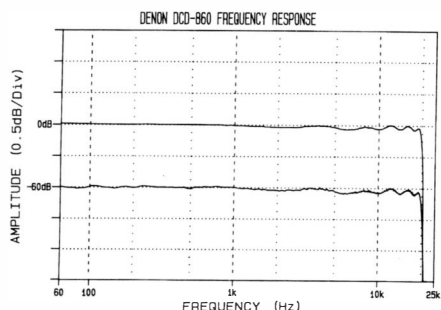
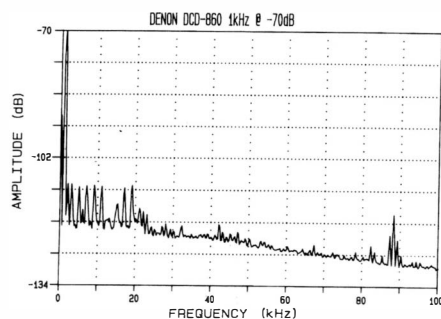
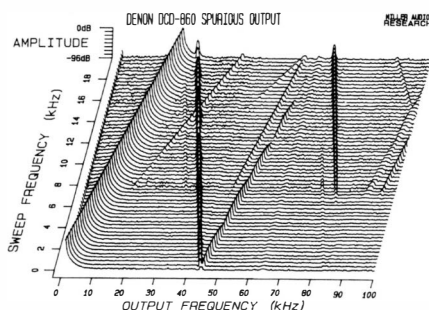
## Conclusion

Denon has found a winning formula in the *DCD-860*. It certainly struck a chord with our panelists, while clearly surpassing a *DCD-660* (based on similar circuitry) that I had been listening to earlier. Curiously enough, it bears comparison with Philips' *CD634* in terms of its evenhanded and agreeable balance, despite the gulf separating their

technologies. Yet with its ability to throw open the doors to a very roomy and communicative sound, Denon's *DCD-860* emerges as all the more successful.

## TEST RESULTS

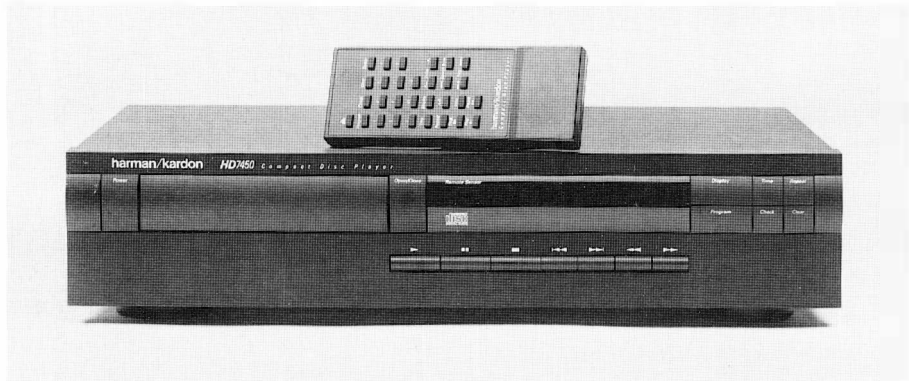
	20Hz	1kHz	20kHz
Channel Balance	0.13dB	0.13dB	0.12dB
Channel Separation	107.6dB	106.9dB	81.8dB
THD vs Level, 0dB	-98.6dB	-102.5dB	-75.9dB
-30dB	-76.9dB	-74.2dB	-69.9dB
-60dB	-43.1dB	-44.8dB	-52.0dB
-80dB	-19.0dB	-23.7dB	-31.2dB
Dithered -90dB	-15.8dB	-16.1dB	-27.6dB
Resolution @ -60dB		+0.93dB	+0.04dB
-80dB		+0.35dB	-0.17dB
-90dB		+0.54dB	+0.12dB
-95dB		-1.96dB	-1.53dB
-100dB			-2.26dB
Peak Output Level, L			1.833V
R			1.807V
Output Impedance			689ohms
Radio Frequency Spurious		1.5mV broadband	
CCIR IMD, 0dB			-93.5dB
Suppression of stop-band IMD			27.9dB
De-emphasis Accuracy, 1kHz			0.00dB
5kHz			-0.02dB
16kHz			+0.14dB
S/N Ratio (A-wtd), w/o emp			107.5dB
w emp			107.6dB
Track Access Time (99)			3.2secs
Typical Retail Price			£250





# Harman Kardon HD7450

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



Harman Kardon was an early passenger on the low-bit bandwagon, the *HD7450* being the cheapest of its second-generation low-bit players, effectively replacing the *7500*. Second-generation it may be, the *7450* is still based around the same Technics PWM DAC found in the earlier models, the only revisions confined to peripheral circuitry and complement of features.

This is a very attractive looking machine, with a matt black plastic fascia that curves to take in the front of the disc tray, the display window and a bank of peripheral controls. Set behind this convex window is a range of track, index and time information plus a 20-track calendar. Programming accommodates up to 30 tracks with extra facilities for repeat, track skip and music search.

This is supplemented by a new remote control that adds direct track access, index skipping and a 15-second intro scan to those features already included on the player itself. On the other hand, Harman Kardon's decision to omit any sort of headphone socket was not such a bright idea at this price point. Track access can be a little slow, but otherwise the *HD7450* is a doddle to operate.

## Lab Report

A *MN6471* MASH/PWM DAC lurks at the heart of this bitstream player, not the newest of Technics' devices but one that is still enjoying great success in other players like the *NAD 5425*. HK's application is fairly straightforward and there are no nasty technical surprises, the 3D plot revealing a characteristic run of 2nd- and 3rd-harmonics (typically 0.0018-0.025 per cent) while a trace of stop-band intermodulation (one half of the V-pattern) picks up to -83dB.

Resolution holds true to within 0.58dB down to -100dB but there's the customary deviation at 20kHz (-6dB at -95dB). There is also a slight kink in the frequency

response (and therefore the linearity) of the player at 10.5kHz (-60dB).

More importantly the analogue filtering could be improved because ultrasonic noise is far too prominent. Witness the abrupt noise curve on the 1kHz/-70dB plot, some 40-50dB in excess of that produced by 18-bit players and 20-25dB poorer even than 'average' low-bit player. As a result HF distortion increases beyond 100 per cent below -80dB.

## Sound Quality

Described a little unkindly by our panel as a 'can of worms', the *HD7450* has a perplexing mix of positive and negative qualities. Vocals have a body and substance which create a tangible, believable presence, but there isn't the articulation to match. Brash overtones, particularly with percussion and sax, mar its definition, one listener suggesting the treble is compromised by sonic 'parasites' - unwanted colorations that infest an instrument's natural timbre.

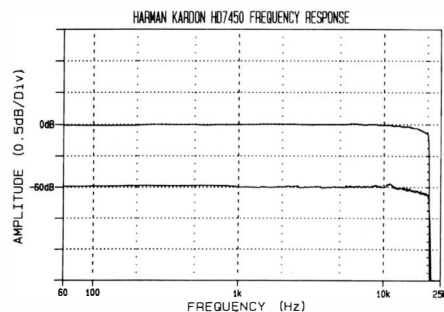
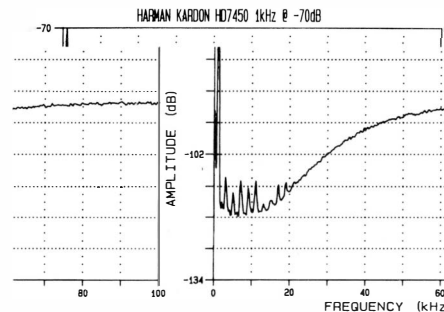
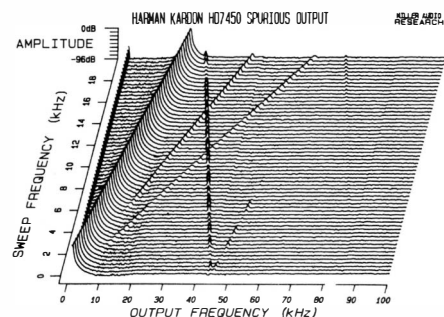
The soundstage was pleasingly broad with simple pop tracks, but was much less impressive once the going got tough. The sound simply lacks roots, which seriously undermines its ability to withstand an orchestral onslaught. Holst's *March* put the lid on things: drums shuddered, but with no depth and resonant weight to their impact, leaving the music thin, flat and uninvolving.

## Conclusion

There is surprising yet very real difference in sound quality between the *7450* and the *7500II* all for wont of an extra £50. No matter how good the reputation of any specific low-bit DAC, the *HD7450* proves that the application is just as important as the basic technology itself. In this instance at least, the sonic penalty is out of all proportion to the £50 price differential. At £300 the *HD7450* is simply outclassed by much of the competition.

## TEST RESULTS

	20HZ	1KHZ	20KHZ
Channel Balance	0.00dB	0.01dB	0.00dB
Channel Separation	91.4dB	96.8dB	89.0dB
THD vs Level, 0dB	-89.5dB	-94.7dB	-72.2dB
-30dB	-64.9dB	-75.3dB	-48.5dB
-60dB	-32.4dB	-47.9dB	-20.9dB
-80dB	-12.8dB	-25.8dB	-0.25dB
Dithered-90dB	-12.3dB	-16.0dB	+7.75dB
Resolution@-60dB		+0.02dB	0.00dB
-80dB		+0.09dB	+0.03dB
-90dB		+0.53dB	-0.05dB
-95dB		+0.56dB	-5.95dB
-100dB		+0.58dB	
Peak Output Level, L			1.993V
R			1.992V
Output Impedance			151ohms
Radio Frequency Spuriae	5.5mV @ 4.3MHz/67.8MHz		
CCIR IMD, 0dB			-96.2dB
Suppression of stop-band IMD			82.5dB
De-emphasis Accuracy, 1kHz			0.00dB
5kHz			-0.02dB
16kHz			0.00dB
S/N Ratio (A-wtd), w/o emp			101.9dB
w emp			102.8dB
Track Access Time (99)			4.9secs
Typical Retail Price			£300





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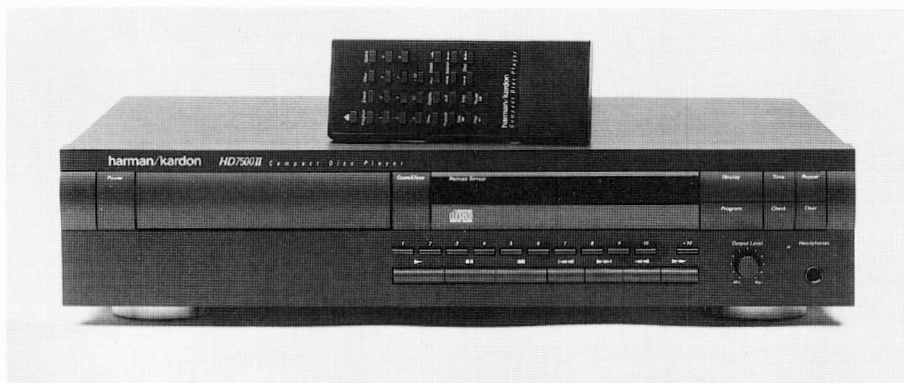
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# Harman Kardon HD7500II

**R**ecommended

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



Now in *MkII* guise but with little external evidence of any change, the *HD7500II* has the same curvaceous black plastic fascia as the cheaper *HD7450* but has extra on-board features such as direct track access to improve operating flexibility. More important, perhaps, the *HD7500* is graced with a volume control that feeds both the headphone and variable-output sockets.

Inside, however, it's all change. HK has used the same control, processing and low-bit DAC ICs, but with four separately regulated power supplies, judicious RF filtering, and a complex all-discrete analogue output stage. In fact the only visible integrated op-amp forms part of the headphone circuit.

HK has sandwiched the DAC between two sticky felt layers, though, in my experience, these PWM DACs are less susceptible to vibration than 16-bit devices such as the *TDA1541*. On the other hand, they are very sensitive to stray RF noise, not least because of the very high processing speed. For example, in order to synthesise accurately up to 11 different analogue pulse 'widths' after 32 times oversampling, truncation from 16-bit to 3.5-bit data and 3rd-order noise-shaping, this *MN6471* DAC requires a trigger accuracy of 33.9MHz. That's 33.9 million times a second!

## Lab Report

There is a slight glitch in the linearity of the -60dB response plot, while the -95dB resolution matches HK's *7450*. The 3D plot looks similar too, but this disguises a significant improvement in bass distortion (now 0.008 per cent at -30dB instead of 0.06 per cent). Furthermore both the audio and RF spectra are much cleaner on this player, since the *HD7450* suffers from spurious HF tones that compromise its S/N ratio. Free of such interference, the

*HD7500II* clocks-up a 113dB S/N ratio (some 9-10dB better than the *HD7450*) which implies an 18-bit resolution.

The de-emphasis accuracy of the player is spot-on, while the 1kHz/-70dB spectrum reveals further improvements over its stablemate. HK has managed to 'lose' about 8dB of ultrasonic quantisation noise while reducing the low-level 20kHz THD below 100 per cent

## Sound Quality

Judging by the row of appreciative nods, our panel was quite moved by the rousing conclusion to Holst's *March*. Indeed the listeners were particularly impressed by the way this player got to grips with the weight and definition of bass notes leading to a tangible sense of scale and power. Still, our first and lasting impression was of an expansive, clean and dynamic sound.

If we were eager to hear more, then the unit itself seemed happy to oblige by playing in double time. It was certainly very quick on its feet, yet in the view of one listener, still slightly aggressive. There was also the suggestion of sibilance exaggeration with female vocals, which could sound a shade thin at times. But it was certainly as detailed as Kenwood's *DP-7030* for instance, though not as tightly controlled or damped.

Instead this is a player that magnifies the emotive strengths of a recording, bubbling with enthusiasm for the music itself rather than maintaining strict control over its technical presentation.

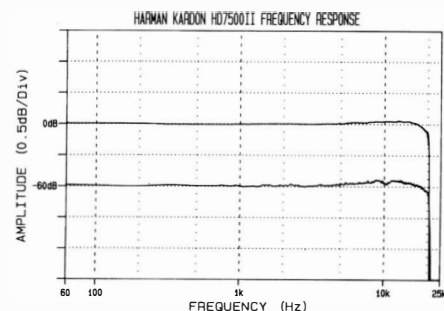
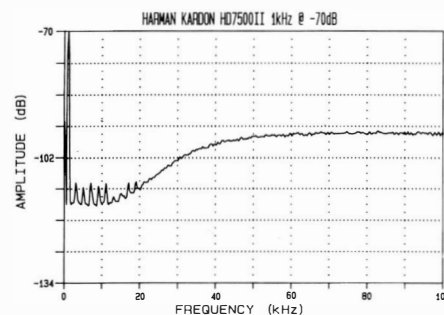
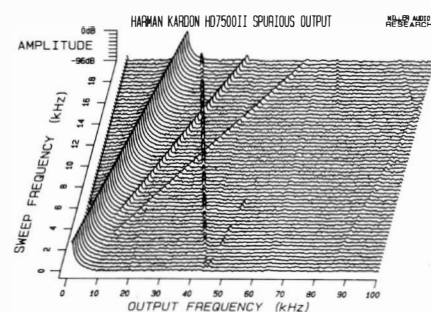
## Conclusion

The *HD7500II* successfully addresses those basic problems that undermine the performance of the cheaper *HD7450*, allowing the potential of the Technics MASH/PWM DAC to emerge. It doesn't pull the music apart in a ruthless or

analytical fashion, but it does cut through to its heart. The end result is a racey but appealing and communicative sound that deserves the warmest Recommendation.

## TEST RESULTS

	20Hz	1kHz	20kHz
Channel Balance	0.03dB	0.02dB	0.04dB
Channel Separation	122.0dB	110.3dB	86.7dB
THD vs Level, 0dB	-99.6dB	-93.7dB	-73.0dB
-30dB	-81.5dB	-73.8dB	-56.4dB
-60dB	-52.5dB	-48.5dB	-29.1dB
-80dB	-26.4dB	-25.8dB	-10.4dB
Dithered -90dB	-17.4dB	-16.8dB	-0.77dB
Resolution @ -60dB		+0.01dB	0.00dB
-80dB		+0.02dB	+0.02dB
-90dB		+0.22dB	+0.20dB
-95dB		+0.58dB	-3.70dB
-100dB		+0.75dB	
Peak Output Level, L			2.222V
R			2.217V
Output Impedance			105ohms
Radio Frequency Spurious		4.5mV @ 33.9MHz	
CCIR IMD, 0dB			-96.1dB
Suppression of stop-band IMD			82.4dB
De-emphasis Accuracy, 1kHz			0.00dB
5kHz			-0.01dB
16kHz			+0.01dB
S/N Ratio (A-wtd), w/o emp			109.4dB
w emp			113.3dB
Track Access Time (99)			4.1secs
Typical Retail Price			£399





# JVC XL-Z431

JVC (UK) LTD, ELDONWALL TRADING ESTATE, 12 PRIESTLY WAY, STAPLES CORNER, LONDON NW2. TEL: (081) 450 3282



In keeping with current trends, JVC has introduced a range of players using its own interpretation of low-bit D/A conversion. Called PEM or Pulse Edge Modulation, the system uses two opposing DACs to generate a composite PWM bitstream. It's certainly very ingenious, using a lower clock frequency than comparable MASH/PWM type DACs, together with noise-shaping that varies from second to fourth order.

Of course, this in itself has no influence on the everyday operation of the machine which has the conventional direct track access, search, program and repeat play modes. JVC has also attempted to make CD-to-tape copying as flexible as possible, with various edit and fade facilities in addition to its proprietary DDRP feature.

DDRP, or Dynamic Detection Recording Processor, scans the disc looking for peak-level signals and then adjusts the player's variable output accordingly. Used in conjunction with a reciprocal JVC tape deck it's possible to synchronise fully the level and time of any recording at the touch of a single button. For the rest of us the variable output itself can be pretty useful, especially as its motorised pot can be adjusted by remote control. Thankfully it is also possible to turn down JVC's rather garish orange display from a distance!

## Lab Report

Fortunately the disarmingly lightweight transport has little influence over a technical performance which is, on the whole, excellent. Linearity is true to within 0.5dB all the way down to -100dB while channel balance, S/N ratio, stop-band rejection (see 3D plot) and distortion (typically 0.56 per cent at -60dB) are benchmark figures for a modern, budget player.

On the 1kHz/-70dB plot the predominance of odd-order distortions and moderate incline of ultrasonic noise

are characteristic of the PEM DAC. RF noise is low but contaminated with sporadic glitches around 150MHz or so - this is also peculiar to the XL-Z431.

## Sound Quality

The listening panel unhesitatingly agreed that the 'Z431 possessed a strong and highly defined character. Above all it went about making music in an almost mechanical, matter-of-fact fashion. Yet this does not imply a colourless or neutral sound; dynamics are mildly dampened and a thin, jangly quality infiltrates the treble octaves.

The bass is not especially deep or powerful but at least it remains rhythmically secure. Still, the panel suggested that regardless of the type or style of music being played the XL-Z431 was given the impression of it simply 'going through the motions' and glossing over many subtle but important underlying clues.

In essence it seems just as easy to ignore as it is wearisome to get to grips with the music. Unfortunately the player has a habit of damning itself by dint of a lack of purpose or compulsion. So much so that everything seems to happen at the same level and, ostensibly, at the same time thereby bleaching any sense of perspective that might have otherwise been present.

## Conclusion

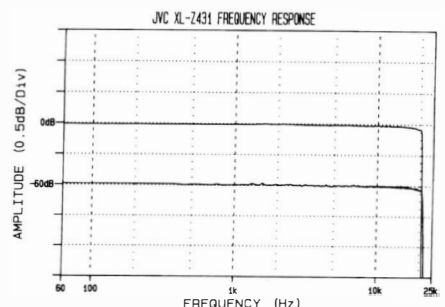
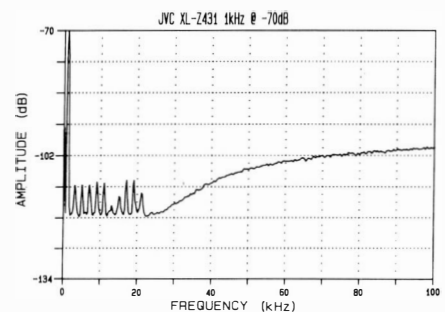
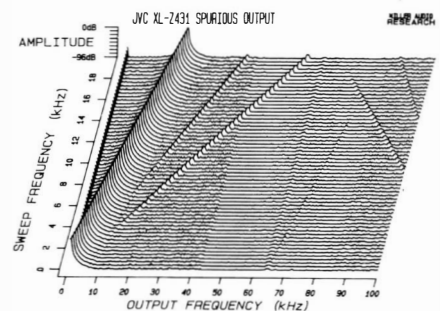
The competitiveness of the XL-Z431 has been steadily eroded as better built, better equipped and superior sounding players have emerged. I can offer no explanation, but just as I have noted an improvement in the sound quality of JVC's cheaper XL-V231, so I am equally convinced that the sound of this recent '431 sample has actually deteriorated.

This is further reinforced by the opinion of the blind panel which found little if anything about the sound to capture its interest. Technically this is a good piece of

kit, but somewhere along the line the potential magic of PEM low-bit conversion has been smothered.

## TEST RESULTS

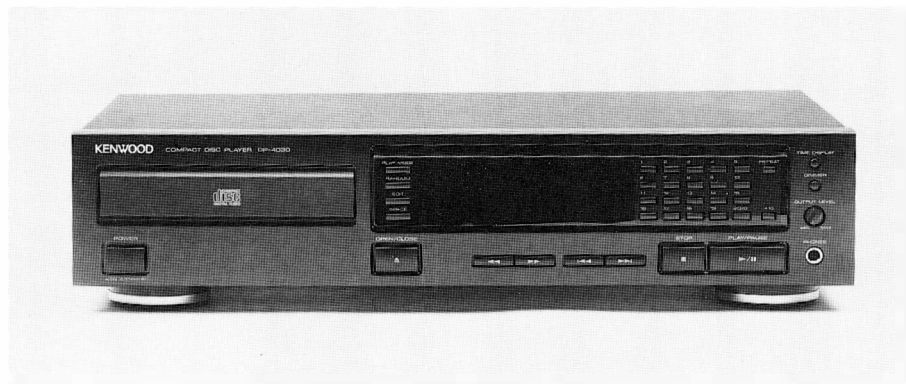
	20Hz	1kHz	20kHz
Channel Balance	0.00dB	0.00dB	0.00dB
Channel Separation	96.9dB	99.7dB	77.4dB
THD vs Level, 0dB	-105.6dB	-99.2dB	-77.5dB
-30dB	-87.8dB	-74.4dB	-63.1dB
-60dB	-54.4dB	-45.4dB	-32.2dB
-80dB	-26.3dB	-23.4dB	-12.2dB
Dithered -90dB	-17.4dB	-13.1dB	-3.20dB
Resolution @ -60dB		+0.01dB	0.00dB
-80dB		-0.08dB	-0.04dB
-90dB		+0.04dB	-0.34dB
-95dB		+0.27dB	-4.77dB
-100dB		+0.51dB	
Peak Output Level, L			2.190V
R			2.189V
Output Impedance			421ohms
Radio Frequency Spuria			1.5mV broadband
CCIR IMD, 0dB			-99.1dB
Suppression of stop-band IMD			103.2dB
De-emphasis Accuracy, 1kHz			+0.02dB
5kHz			-0.01dB
16kHz			+0.10dB
S/N Ratio (A-wtd), w/o emp			108.9dB
w emp			109.0dB
Track Access Time (99)			4secs
Typical Retail Price			£200



# Kenwood DP-4030

TRIO-KENWOOD UK LTD, KENWOOD HOUSE, DWIGHT ROAD, WATFORD, HERTS, WD1 8EB. TEL: (0923) 816 444

**R**ecommended



Kenwood has finally taken the plunge into the bitstream, leaving Denon as the only major Far Eastern company yet to have a paddle. The *DP-4030* replaces the older 18-bit *4020* and features a change of styling as well as technology. The satin black fascia is free of any spurious marketing clap-trap, while the features that are provided seem very generous for the price.

Full remote control operation gives direct track access, 20-track programming, random, repeat and time play options all from the comfort of your armchair. There's also tape edit, peak search, repeat and space functions that'll make recording from CD a doddle. The player even has a motorised volume control (operable from the remote) that feeds the headphone and variable output phono sockets.

Technically this player is rather novel because it's the first to use a new low-bit PWM DAC from NPC (Nippon Precision Circuits). This flexible LSI may be used at a variety of different oversample rates and with varying degrees of truncation. In this instance Kenwood is running the DAC at a maximum of 32 times oversampling (eight times followed by four times) while 3rd-order noise shaping covers a range from 16-bit to 3.5-bit. Used in this way it's very similar to the original version of the Technics/NTT MASH/PWM DAC used in some of the first low-bit CD players.

## Lab Report

Performance-wise this NPC DAC has its own fingerprint, so while distortion is extremely low through bass and midrange frequencies (typically 0.0008 per cent) it climbs to around 0.02 per cent at 20kHz. This is visible on the 3D plot as a mild 2nd- and 3rd-harmonic while the stop-band intermodulation V-patterns (-61dB) are caused by the initial eight times oversampling filter. There's the merest hint of passband ripple on both frequency

response plots but neither this nor the slight 0.4dB droop at 20kHz are likely to have any subjective impact.

What's more interesting is the very pronounced shelf of ultrasonic noise on the -70dB/1kHz plot, which is about 40dB higher than most multi-bit designs and about 25dB higher than some other low-bit systems. Digital tracking enables the player to achieve a state of the art S/N ratio of 122.5dB, though ultimate resolution and dynamic range is restricted by drifts of about 1.9dB in linearity at -100dB.

## Sound Quality

Kenwood may have taken a risk by opting for what amounts to an unknown chipset, but it's a risk that has paid off in this instance. The panel was quite taken by the engagingly fluid style which was easy-going and nicely composed. To be sure, the soundstaging lacks extreme depth but foreground images are tactile enough. Bass lacks extreme depth and power but the general 'feel' of bass notes still blends in well with the mid and treble.

In many respects this sums up the overall character of the player, for it seems very evenhanded and polite despite obvious limits to its resolution of intricate detail. The panel thought that instrumental separation was quite good even if the instruments themselves could have sounded warmer, fuller and more vivid. Though not subtle, this mild veiling is at least consistent from bass to treble, and helps produce a cautious but engaging sound.

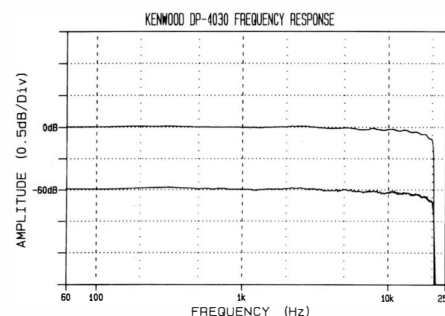
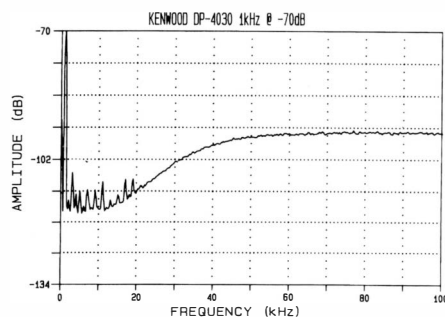
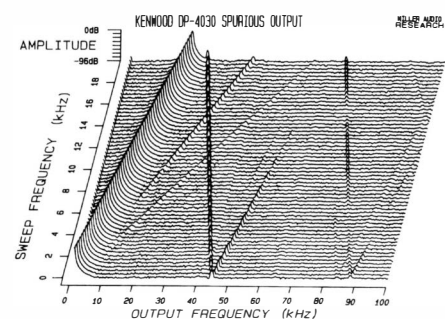
## Conclusion

This is a classic example of a well-balanced CD player, designed to offer a very refined and deceptively classy sound yet without over-stretching its modest capabilities. You simply don't hear the *DP-4030* getting into trouble and, to a degree, what you cannot hear doesn't end up bothering

you! Furthermore it is pleasant to operate, well built and lavishly equipped for a sub-£200 player, qualities that only serve to reinforce a hearty Recommendation.

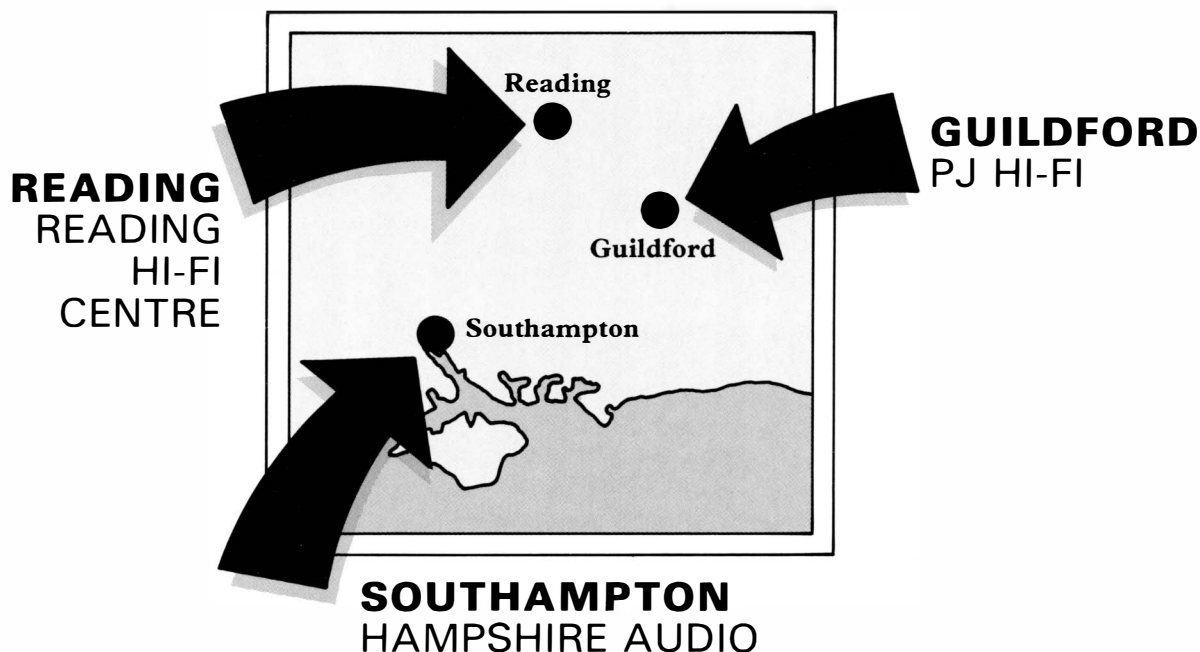
## TEST RESULTS

	20Hz	1kHz	20kHz
Channel Balance	0.13dB	0.15dB	0.07dB
Channel Separation	93.1dB	100.5dB	82.4dB
THD vs Level, 0dB	-104.6dB	-101.2dB	-73.5dB
-30dB	-78.6dB	-74.9dB	-55.7dB
-60dB	-44.6dB	-44.3dB	-25.7dB
-80dB	20.4dB	-20.5dB	-5.50dB
Dithered -90dB	-9.25dB	-13.7dB	-1.15dB
Resolution @ -60dB	0.00dB	0.00dB	-0.02dB
-80dB		-0.11dB	-0.10dB
-90dB		+1.22dB	-1.02dB
-95dB		+1.48dB	-5.30dB
-100dB		+1.85dB	
Peak Output Level, L		2.223V	
R		2.189V	
Output Impedance		753ohms	
Radio Frequency Spurious		10.2mV @ 128MHz	
CCIR IMD, 0dB		-95.1dB	
Suppression of stop-band IMD		60.8dB	
De-emphasis Accuracy, 1kHz		0.00dB	
5kHz		0.00dB	
16kHz		-0.09dB	
S/N Ratio (A-wtd), w/o emp		122.1dB	
w emp		122.5dB	
Track Access Time (99)		4.1secs	
Typical Retail Price		£180	





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# Kenwood DP-7030

TRIO-KENWOOD UK LTD, KENWOOD HOUSE, DWIGHT ROAD, WATFORD, HERTS, WD1 8EB. TEL: (0923) 816 444

**Recommended**



Although Trio-Kenwood makes few of its own basic electronic components, the company has carved a very successful niche by adapting and developing existing systems to suit its own requirements. So it is with the *DP-7030*, the third and costliest player of the new range.

Sony's PLM bitstream DAC takes pride of place, though Kenwood has tweaked the normal master clock circuit with a discrete FET oscillator. Given the rather unfortunate codename 'CLAPP', this clock reduces noise that might otherwise contribute to jitter and so cause distortion within the DAC.

There's no mistaking the purposeful and sturdy appearance of this unit. Its centralised drawer underlines a high quality fluorescent display and a matrix of illuminated keys, which give direct track access, helping you fill the 20-position memory without having to squint at tiny buttons.

The remote echoes that of the *DP-4030* but with the addition of index selection. More important perhaps, the *DP-7030* is fitted with a non-volatile disc file, enabling storage of favourite tracks or even parts of tracks (time play) from up to 80 different discs.

## Lab Report

Comparisons with other players which use the *CXD2552* DAC, such as the Sony *CDP-990*, are very interesting. The 3D plot is not so 'clean' because Kenwood uses NPC's *SM5840* oversampling filter which has a poorer stop-band rejection (61dB) than Sony's *CXD1244* filter (105dB). Consequently the V-shaped intermodulation patterns match up with those of the *DP-4030* in addition to players from Denon, Aiwa and Nakamichi. The absolute resolution or in-band S/N ratio of the DAC is not too hot either, and Sony's own players easily better both figures.

The consequence of Kenwood's master

clock technology is revealed by the low level -70dB plot instead. There is less high frequency distortion (0.28 per cent at -60dB and 3.4 per cent at -80dB) plus a level of ultrasonic noise that as far as I am aware is lower than any other low-bit player currently available.

## Sound Quality

Compared to Kenwood's budget player, the *DP-7030* provided a busier sound, bustling with musical detail yet exuding a confidence and refinement that is reminiscent of far costlier machines. There was improved separation of individual strands within the music and crisper imaging throughout the breadth and depth of the soundstage.

It was more responsive to dynamic inflections but still seemed mildly restrained when compared to technical relatives such as the Sony *CDP-990*. For example, the *Holst March* teetered on the edge of a crescendo but just failed to explode into life; one listener suggested its sense of excitement was urbane rather than passionate.

Technically speaking, the presentation was infallibly neutral, only in the resolution of subtle emotional clues was it less inspired. Too civilised and polite for its own good perhaps, it's unlikely to cause fatigue in the long term, equally unlikely to stir the soul. This is not to suggest the player's bland or boring; it does have character, but one of control and of understatement.

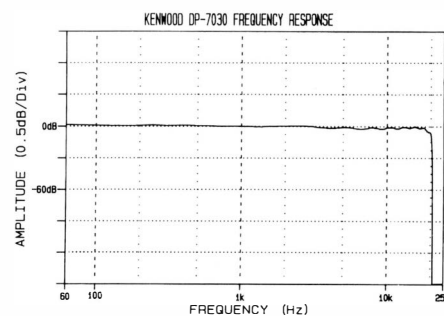
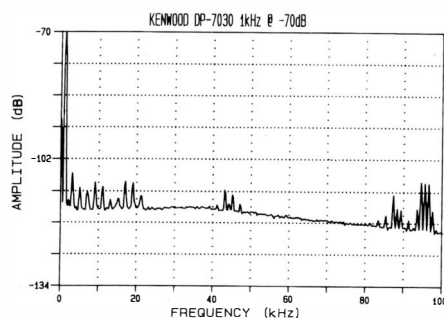
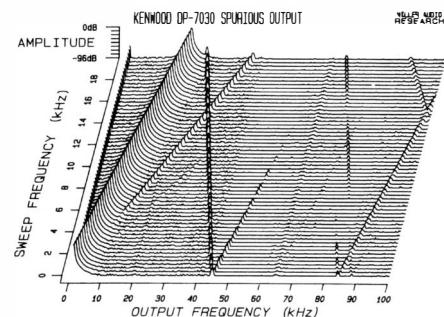
## Conclusion

Kenwood's mods to the Sony DAC together with its own analogue circuitry have resulted in a player that's not instantly comparable with the *CDP-990* - the immediate competition. Perhaps this is no bad thing, for the sober appearance and sound of the *DP-7030* will appeal to a different audience. Taking into account the superb construction, slick operation

and gracious sound quality, the *DP-7030* also achieves Recommendation by the skin of its teeth.

## TEST RESULTS

	20Hz	kHz	20kHz
Channel Balance	0.05dB	0.06dB	0.04dB
Channel Separation	113.0dB	104.7dB	83.1dB
THD vs Level, 0dB	-95.9dB	-94.7dB	-73.7dB
-30dB	-76.0dB	-74.5dB	-75.1dB
-60dB	-44.5dB	-45.5dB	-51.0dB
-80dB	-22.4dB	-25.4dB	-29.3dB
Dithered -90dB	-7.85dB	-12.6dB	-22.3
Resolution @ -60dB		+0.04dB	0.00dB
-80dB		+0.79dB	+0.09dB
-90dB		+1.78dB	+0.13dB
-95dB		+1.75dB	-3.07dB
-100dB		+1.70dB	
Peak Output Level, L			2.045V
R			2.032V
Output Impedance			206ohms
Radio Frequency Spurious			12mV@124MHz
CCIR IMD, 0dB			-95.5dB
Suppression of stop-band IMD			61.0dB
De-emphasis Accuracy, 1kHz			+0.02dB
5kHz			+0.02dB
16kHz			-0.33dB
S/N Ratio (A-wtd), w/oemp			111.5dB
w emp			111.8dB
Track Access Time (99)			2.8secs
Typical Retail Price			£300





# Marantz CD-41

MARANTZ AUDIO (UK) LTD, 15-16 SAXON WAY IND EST, MOOR LANE, HARMONDSWORTH, MIDDX, UB7 0LW. TEL: (081) 897 6633



Unlike the *CD-11*, the *CD-41* is neither expensive nor over-complex, in fact Marantz likens it to a bitstream-ised version of its older 16-bit *CD-40*.

In reality it shares the same basic circuit board, powersupply, transport and plastic chassis as the Philips *CD624*. It even uses the same fluorescent display, though a turquoise filter window is used to match other Marantz separates.

All this is concealed by a fascia that was originally conceived for the *CD-40*, except it's now labelled *CD-41*. Naturally, the microprocessor is slightly different but then there are fewer features on this model.

The controls are split into two sections on the plastic fascia; track skip and music search facilities alongside random, repeat and program play options. But, unlike the Philips models, there are not the Favourite Track Selection, intro-scan, tape edit or digital output selections available on the *CD-41*. Even Philips' variable output headphone facility has been replaced by a standard fixed output socket.

## Lab Report

In the past Marantz has 'tweaked' various of Philips' players in order to improve performance. This is not the case with this model, as, in technical terms at least, there's no advantage offered by the *CD-41*. The A-wtd S/N ratio is up by a fraction of a decibel, but distortion and linearity results sit comfortably between those of the *CD624* and *CD634*, although it must be pointed out that the entire spectrum of results are easily accounted for by the tolerances of manufacture.

In fact it would be tricky to distinguish between any one of the three players by looking at either its frequency response or 3D plot because they all share a common 'fingerprint'. Only the pattern of RF noise is genuinely different because of the unique electrical environment of each player. I should warn of quick A/B

comparisons though, particularly as the player's output is some 0.8dB down on the nominal standard of 2V.

## Sound Quality

I asked the panel to compare the *CD-41* with both the Philips players they had heard earlier, though they were kept unaware of the exact nature and price of the various machines.

After some debate they announced that the *CD-41* (product X as far as they were concerned) sounded distinctly 'faker' than either of the Philips models. They pointed in particular to its boomy bass quality that certainly warmed the soundstage but also blossomed uncontrollably with every impact of the bass drum from Holst's *March*.

The player also seemed to lack the refinement shown by the *CD624* even though it did share a little of the *CD634*'s spark and bite. In general terms it appeared more detailed, but in a way that actually irritated the listeners. For example, although the music enjoyed much of the spacious, fluid quality of a half-decent PDM player the sound was still impure.

The panel returned to this facet of its performance time after time. They were unduly bothered by its packaged presentation and though at times the player could seem very spacious, there was an overlying film, a haze that followed structural changes in the music itself.

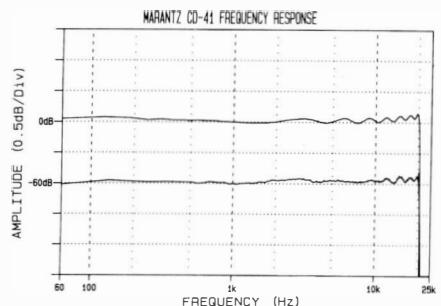
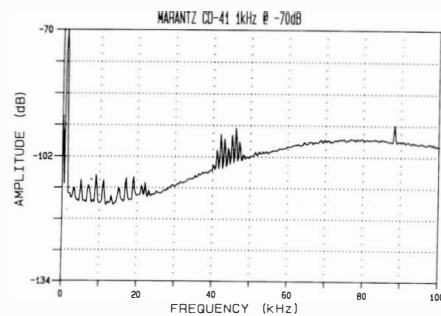
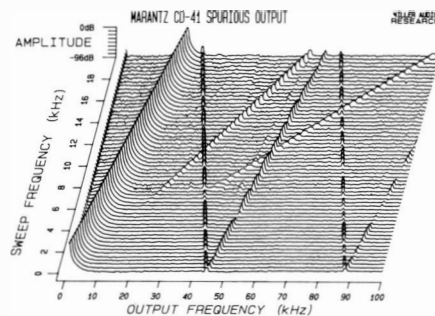
## Conclusion

Marantz has done little or nothing to improve upon the basic performance offered by Philips' *CD624* while actually trimming away some of the facilities. The evidence may be hidden in an old *CD-40* case, but there is also an extra £30 on the retail price.

My advice? Listen to the original *CD-40* instead, which, by the way, is now reduced and is something of a bargain at a mere £180!

## TEST RESULTS

	20Hz	1kHz	20kHz
Channel Balance	0.06dB	0.07dB	0.07dB
Channel Separation	87.1dB	88.1dB	87.4dB
THD vs Level, 0dB	-89.9dB	-93.3dB	-67.1dB
-30dB	-74.1dB	-74.6dB	-63.8dB
-60dB	-43.6dB	-45.7dB	-32.9dB
-80dB	-20.8dB	-23.0dB	-13.8dB
Dithered -90dB	-12.7dB	-10.7dB	-3.90dB
Resolution @ -60dB	-0.04dB	-0.04dB	-0.05dB
-80dB	-1.03dB	-1.03dB	-0.40dB
-90dB	-3.98dB	-3.98dB	-1.03dB
-95dB	-3.72dB	-3.72dB	-5.11dB
-100dB	-3.77dB	-3.77dB	
Peak Output Level, L			1.818V
R			1.833V
Output Impedance			204ohms
Radio Frequency Spurious		7.8mV @ 11.3MHz	
CCIR IMD, 0dB			-98.6dB
Suppression of stop-band IMD			54.2dB
De-emphasis Accuracy, 1kHz			-0.18dB
5kHz			-0.08dB
16kHz			+0.13dB
S/N Ratio (A-wtd), w/o emp			98.7dB
wemp			100.1dB
Track Access Time(99)			3.8secs
Typical Retail Price			£250



# Marantz CD-80

MARANTZ HI-FI (UK) LTD, KINGSBRIDGE HOUSE, PADBURY OAKS, 575-583 BATH ROAD, LONGFORD, MIDDLESEX UB7 0EH. TEL:(0753) 680 868



If Marantz' initial flirtation with BitStream convertors has been tentative, it's as well to acknowledge the brand's success with Philip's older 16-bit technology.

Marantz has also built players from the ground up: heavyweight beasts such as this CD-80 with its rugged CDM1 MkII transport, four independent power supplies and sturdy die-cast construction.

The rugged appearance of this player contrasts with the delicate pushbuttons and keys for direct track access, programming and music search which underline an equally fine fluorescent display.

This scrolling alphanumeric display allows storage of personalised titles, up to 25 characters long, for up to 127 CDs, though the exact number depends on the number of favourite tracks that are also memorised.

In fact, with its remote control in tow, the CD-80 is a veritable tour-de-force of facilities, which even includes luxury items such as a motorised plastic-film volume control.

## Lab Report

Classic stuff this, taken faultlessly from the 16-bit textbook. First there's the 3D plot with the familiar rippling of stop-band images (41dB suppression) in addition to consistently low distortion. Few players offer THD as low as 0.00065-0.0019 per cent across the entire audio range, even if this is at peak level. However, the performance of the TDA1541A DAC is less impressive around -30dB (where much of the music is) where distortion is to 0.043 per cent (1kHz, -30dB) - about double that suffered by most low-bit players.

On the other hand, high frequency THD is very good indeed, because the ultrasonic 'signature' is quite different to those shown by low-bit players. The 1kHz/-70dB plot highlights this, the declining noise floor and spray of harmonics

matching up with similar products like the Radford WS2.

I must say I was very impressed with the 20kHz linearity of this DAC which actually improved upon the performance at 1kHz - a rare feat indeed.

## Sound Quality

With its solid, meaty bass line and secure handling of powerful dynamics, the CD-80 typifies all that's good about the '16-bit sound'.

Nevertheless, it's success was far from unconditional, and it still left the panel with the impression of a somewhat engineered sound and was criticised for a slight metallic character in the treble octaves. Remarkably, one acute listener actually identified the DAC as a 1541 Crown by this very coloration.

In common with other players based on this technology, the CD-80 was saluted for its impressive spread of sound, that is from left to right, but lightly rebuked for a relative lack of stereo depth. Still, this did very little to compromise the player's deft handling of the contrasts between large and small dynamics. It enjoys 'good roadholding' one listener commented after casting about for a suitable analogy.

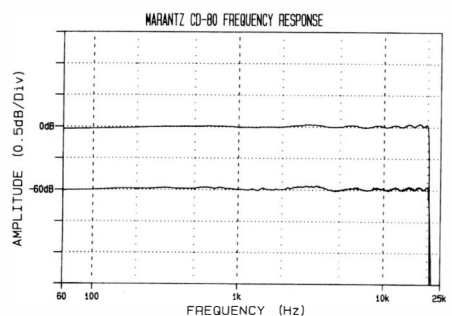
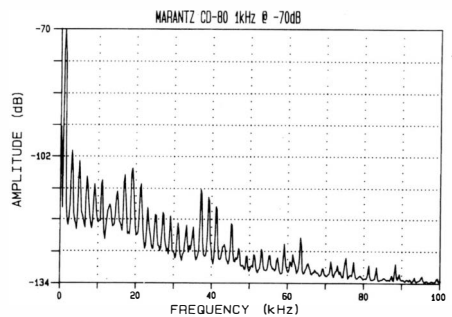
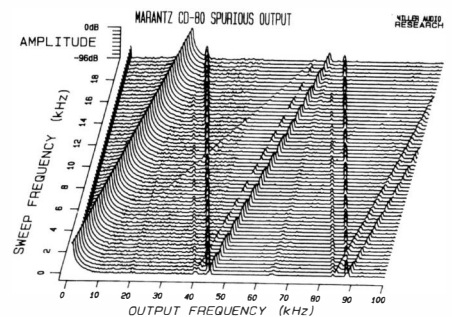
The player was as kind to subtle tonal details as it was bold in its delivery of thunderous crescendos, though this was less true of brass instruments. More importantly perhaps, the rock and pop tracks which were played could sound a little crude.

## Conclusion

The CD-80 is very much as a symbol of the old order, an undeniably beefy and confident sounding machine but one that's not always terribly civilised. As a result it failed to achieve a unanimous recommendation in our listening tests, the grainy treble quality being very much the deciding factor.

## TEST RESULTS

	20Hz	1kHz	20kHz
Channel Balance	0.06dB	0.07dB	0.08dB
Channel Separation	128.2dB	115.4dB	100.9dB
THD vs Level, 0dB	-103.8dB	-100.6dB	-94.6dB
-30dB	-71.7dB	-67.4dB	-61.3dB
-60dB	-44.1dB	-44.4dB	-36.3dB
-80dB	-19.6dB	-22.6dB	-35.7dB
Dithered -90dB	-7.70dB	-11.6dB	-29.0dB
Resolution@ -60dB		+0.03dB	+0.23dB
-80dB		-0.45dB	-0.03dB
-90dB		-2.54dB	-0.55dB
-95dB		-1.95dB	0.00dB
-100dB		-1.55dB	
Peak Output Level, L			1.963V
R			1.949V
Output Impedance			208ohm
CCIR IMD, 0dB			-98.2dB
Suppression of stop-band IMD			40.7dB
De-emphasis Accuracy, 1kHz			-0.01dB
5kHz			-0.06dB
16kHz			-0.06dB
S/N Ratio (A-wtd), w/o emp			113.2dB
w emp			114.9dB
Track Access Time (99)			2.1secs
Typical Retail Price			£549

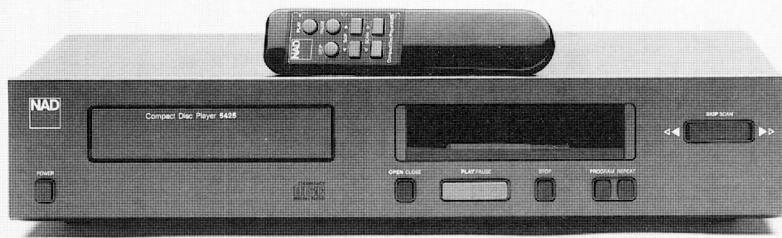




# NAD 5425

NAD MARKETING LTD, ADASTRA HOUSE, 401-405 NETHER STREET,  
LONDON N3 1QG. TEL: (081) 349 4034

**Best Buy**



Flushed with the success of the 5440 and 5000, its first fully-fledged low-bit players, NAD has channelled its knowhow into a pair of cheaper players. The £200 5425 is distinguished from the £170 5420 by its slim, 7-key remote control, though neither player exactly bristles with features. They offer only basic programming, repeat, track skip and scan.

The 5425 really scores in terms of sound quality. It uses the same MN6471 MASH/PWM DAC that NAD first employed in the 5440 player but assembly has moved from Singapore to Taiwan to cut down on overheads. Costs have also been reduced by trimming off 'luxury' features like CDR, variable and digital outputs while employing a simpler back-lit LC display instead of the fluorescent panel used on the 5440.

What savings have been made have been used to maximise the quality of the player's power supply, digital and analogue electronics. Separate series-shunt regulators are employed for L and R channels, while RF decoupling and circuit layout have been further optimised. High quality Signetics NE5532N op-amps are retained in the buffer and analogue filter stages, which, as in the 5440, curtail all RF noise emanating from the DAC.

## Lab Report

The effect of this five-pole filter is most noticeable on the 1kHz/-70dB plot where the usual increase in ultrasonic quantisation noise is abruptly curtailed above 40kHz.

This filter action continues well into the RF region (nominally above 1MHz) where the 5425 is singularly free of such interference. Evidence of early filtering is also seen in the 0.4dB droop at 20kHz, though, more importantly, the -60dB response curve reveals a break in linearity around 10.5kHz.

Other players using this same MN6471 PWM DAC show a similar disruption

here, along with a near-identical 3D 'fingerprint'. Still, the final low-level resolution displayed by the 5425 remains spot-on target.

## Sound Quality

Along with just one or two other players in this review group, the 5425 went down a storm. The panel was unanimous in its applause for the very sonorous, purposeful and involving sound. It possesses such a marvellous sense of depth, a spaciousness that holds true even when faced with the resonant impact of the drums from Holst's *March*. It even resolved the interplay between woodwind and brass while preserving the massive dynamic contrasts that occur simultaneously.

These counterpoints were further highlighted by an ability to present the subtlest tonal features of each instrument - a combination of finesse and absolute control. Few players tread the line between excitement and brashness with equal fortune, for the 5425 even makes the 5440 sound a little too reserved and cautious.

Simpler tracks also benefit from this open and lively attitude, percussive brushwork of the pop tracks being resolved as capably as the brassy rasp of sax from our jazz CD. This player is always richly detailed and has a real grip on individual instruments. It's a delightful and convincing sound that draws the listener into the realm of the music rather than providing what amounts to a merely superficial veneer.

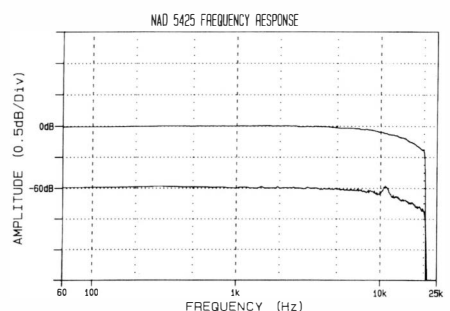
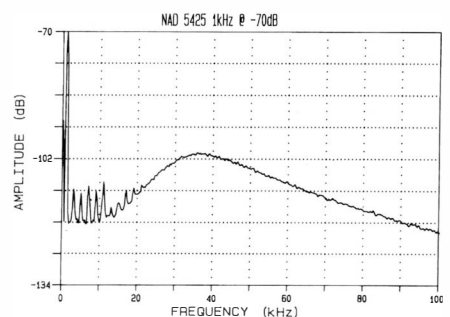
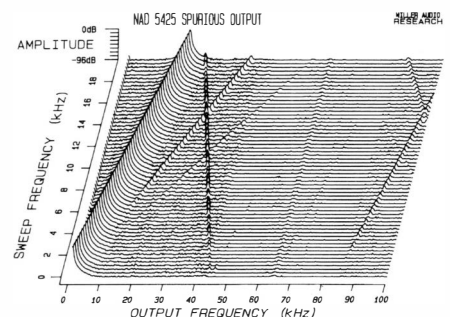
## Conclusion

NAD's new cheapie is a real cracker. It may have all the stylistic flair of a Lego brick but this has no effect on its enthusiasm for playing music. Genuinely convincing music that lives and breathes! If features have a low priority then NAD's remote-less 5420 could turn out to be something of a mega-bargain at just £170;

even at £200, the 5425 is still a sure-fire Best Buy.

## TEST RESULTS

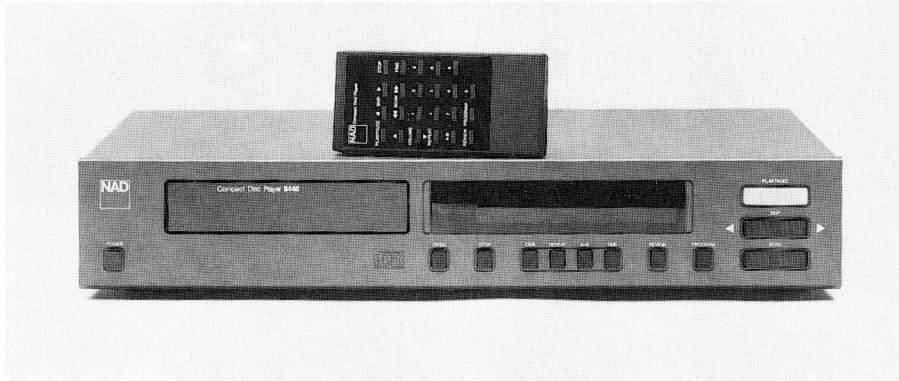
	<b>20Hz</b>	<b>1kHz</b>	<b>20kHz</b>
Channel Balance	0.03dB	0.04dB	0.04dB
Channel Separation	117.3dB	108.0dB	86.3dB
THD vs Level, 0dB	-108.5dB	-105.3dB	-80.2dB
-30dB	-82.5dB	-77.0dB	-64.8dB
-60dB	-53.4dB	-50.5dB	-39.2dB
-80dB	-25.3dB	-28.2dB	-18.8dB
Dithered -90dB	-17.9dB	-18.4dB	-11.5dB
Resolution@ -60dB		+0.01dB	0.00dB
-80dB		-0.08dB	-0.01dB
-90dB		+0.14dB	+0.58dB
-95dB		+0.05dB	-4.38dB
-100dB		+0.01dB	
Peak Output Level, L			2.205V
R			2.194V
Output Impedance			115ohm
Radio Frequency Spuria			<1mV broadband
CCIR IMD, 0dB			-95.8dB
Suppression of stop-band IMD			81.3dB
De-emphasis Accuracy, 1kHz			0.00dB
5kHz			-0.03dB
16kHz			-0.20dB
S/N Ratio (A-wtd), w/o emp			105.7dB
w emp			110.5dB
Track Access Time (99)			3.2secs
Typical Retail Price			£200



# NAD 5440

NAD MARKETING LTD, ADASTRA HOUSE, 401-405 NETHER STREET, LONDON N3 1QG. TEL: (081) 349 4034

**R**ecommended



Surrounded by ranks of anonymous black fascias seething with buttons and glaring displays, the sober appearance of the NAD 5440 is highly distinctive. Beside the soft orange fluorescent display is a trio of rocker switches for play/pause, track skip and scan, while a series of plastic pushbuttons offer various programming and repeat facilities.

A small remote handset is equipped with a direct access keypad plus up/down volume buttons that control the player's variable output: the 5.5V available here is more than enough to satiate the most insensitive power amplifier. NAD has also included its CDR (Controlled Dynamic Range) feature, using a Yamaha processor to squash the dynamic range of the digital data into a smaller 'window' that's claimed to be ideally suited for taping for home or in-car use.

Inside lies a MASH/PWM DAC, complete with multiple regulated power supplies that isolate the transport, display, digital and analogue circuits. High quality Signetics op-amps are used as part of a five-pole filter which removes almost all spurious RF noise, while low-inductance ceramic capacitors, close-up against the DAC itself, minimise local interference. Many passive components in the analogue section are superior in quality to those in the 5425.

## Lab Report

Comparisons with the cheaper NAD 5245 are interesting, to say the least. On the one hand improvements in board layout have increased stereo separation from 108dB to 121dB midband, while the -60dB response plot is both 'cleaner' and less disturbed by the DAC's customary glitch at 10.5kHz. Intermodulation distortion is also down by 7.8dB and de-emphasis accuracy much improved.

By contrast, harmonic distortion is slight worse at peak level (0.0012 instead of 0.00054 per cent), linearity is out by -

1.1dB at -100dB and the ultimate S/N ratio actually down by 1dB or so. Sample variation can be blamed for much of this, as the basic 'character' of the MASH/PWM chipset is revealed on the 3D plot by the light spray of 2nd and 3rd harmonics plus some partial stop-band intermodulation.

## Sound Quality

The panel took some time to digest and savour the full, rolling and exceptionally fluid sound of this player. The panel agreed that its strength lay in an "inky black" silence (mindless of the fact that Ed has slapped an embargo on such phrases). Decaying notes were heard to disappear into the fathomless depths of its soundstage, lingering just a fraction longer before being absorbed by the velvety blackness.

There's a marvellous sense of vocal articulation, the presence of the performer vivid but not too forward or unnaturally enthusiastic.

However, the 5440 did not quite grasp the finest details of percussion or brass in the fashion of the cheaper 5425. The interplay between various instruments was suggested rather than obvious, the smoother ride of the 5440 giving a more refined but also milder overview of the music.

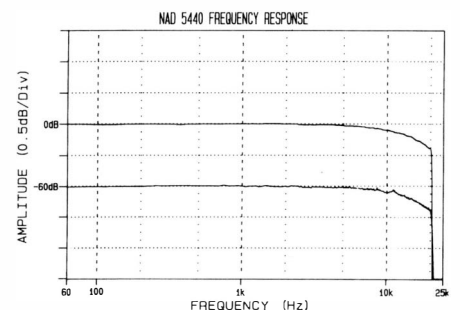
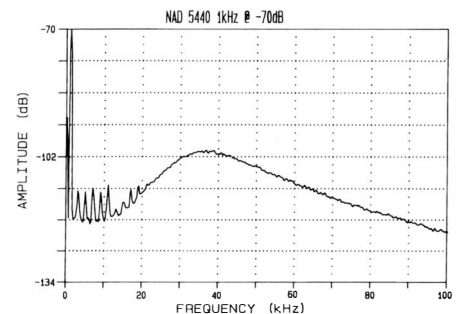
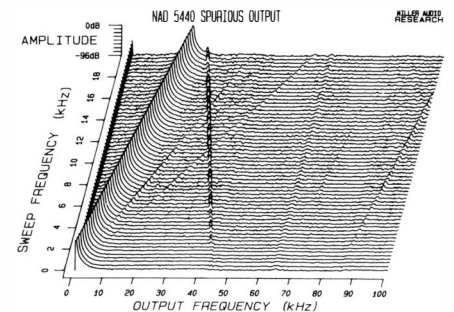
## Conclusion

NAD's first foray into low-bit technology is a remarkably successful one for NAD. The aesthetic design and range of facilities may be a little weak compared to much of the competition, but the unquestionably smooth and luxuriously detailed sound of the 5440 are the just reward for painstaking design.

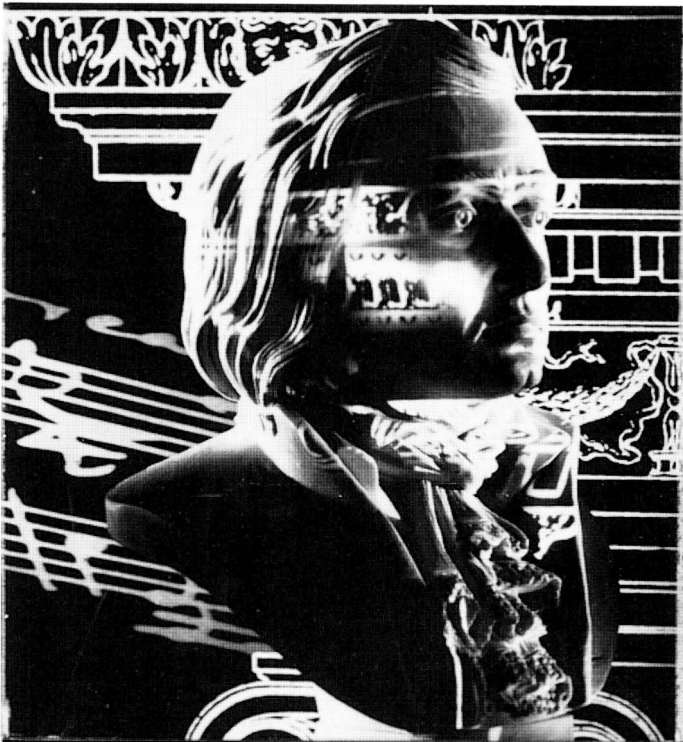
This is no text-book implementation of the popular MASH/PWM chip but rather a reappraisal and fuller realisation of its true potential, which deserves Recommendation.

## TEST RESULTS

	20Hz	1kHz	20kHz
Channel Balance	0.07dB	0.07dB	0.03dB
Channel Separation	117.5dB	121.5dB	110.5dB
THD vs Level, 0dB	-104.7dB	-98.4dB	-76.7dB
-30dB	-81.7dB	-76.9dB	-63.4dB
-60dB	-52.6dB	-50.5dB	-35.1dB
-80dB	-25.3dB	-27.0dB	-17.7dB
Dithered -90dB	-17.8dB	-17.6dB	-11.4dB
Resolution @ -60dB		0.00dB	+0.01dB
-80dB		+0.02dB	-0.08dB
-90dB		-0.09dB	+0.03dB
-95dB		-0.85dB	-5.25dB
-100dB		-1.06dB	
Peak Output Level, L		2.188V (5.455V)	
R		2.207V (5.510V)	
Output Impedance			116ohm
Radio Frequency Spurious		1-2mV broadband	
CCIR IMD, 0dB			-103.6dB
Suppression of stop-band IMD			82.8dB
De-emphasis Accuracy, 1kHz			-0.01dB
5kHz			-0.05dB
16kHz			0.00dB
S/N Ratio (A-wtd), w/o emp			105.8dB
w emp			109.6dB
Track Access Time (99)			4.6secs
Typical Retail Price			£290







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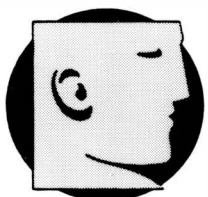
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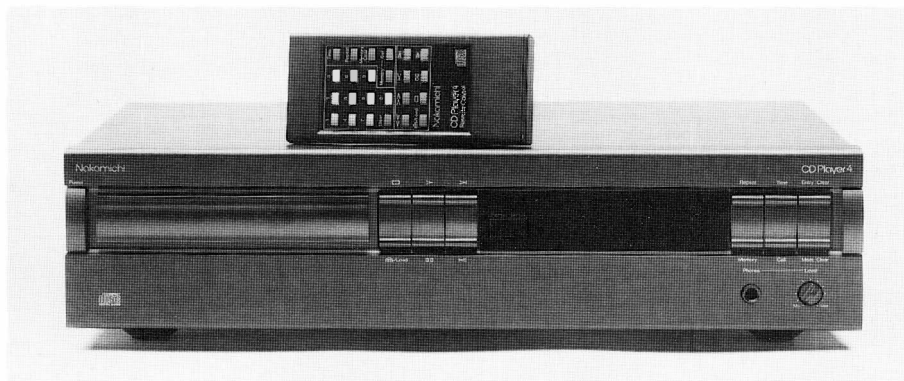


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# Nakamichi CD Player 4

B&W LOUDSPEAKERS LTD, MARLBOROUGH ROAD, CHURCHILL INDUSTRIAL ESTATE, LANCING, WEST SUSSEX. TEL: (0903) 750 750



From the purveyors of the highest quality cassette decks comes an entirely new range of separates under the Music Bank banner. Among them is the *CD Player 4*, cheapest in a series of three such models but one that shares Nakamichi's flair for clean and attractive styling.

It's certainly a most distinctive and elegant design with a light green fluorescent display flanked by dual-purpose rocker switches.

However, if features are a priority, the *CD Player 4* will be something of a disappointment. The player itself has basic track skip, repeat and memory options while additional extras like direct track access and fast music search are found on the accompanying remote. A coaxial digital output is included though, and is switchable to prevent interference when not in use.

Nakamichi has opted for separate (regulated) power supplies and earth tracks to help isolate each of the transport, digital and analogue sections within the player. There's an interesting choice of DAC too, a dual-channel 18-bit IC selected from Analogue Devices, run at eight times oversampling. Other than this there's little really special about the design of the player.

## Lab Report

Like most other 18-bit devices, this AD1864 DAC, requires external adjustment of the MSB to optimise linearity and distortion. In this case the player's resolution holds up to within -1dB across a 100dB range, but this has been achieved at the expense of both THD and IMD. The 3D plot at peak level reveals a dominance of mainly odd harmonics while the CCIR spectrum was littered with a spray of IM products. Compare also the 'fingerprint' V-pattern of 44.1kHz and 88.2kHz sampling IMD (3D plot) with the Denon DCD-2560; they're identical because both players use the same eight times oversampling filter

from NPC.

More serious in this case is the substantial increase in distortion that occurs from -10dB to -60dB, the region that's most important from a subjective angle. Here THD climbs to 0.7 per cent (0.03 per cent is more typical at -30dB) while the -60dB frequency response (lower trace) shows both an error in linearity below 200-300Hz plus a marked increase in ripple.

At -70dB the 1kHz plot shows the extent of distortion products, including intermodulation about the 44.1kHz and 88.2kHz sampling frequencies.

## Sound Quality

The panel rated this rather average performer with a smattering of good and bad points. On the positive side it seemed reasonably clean and dynamic, particularly well suited to punchy pop recordings where it bopped along without sounding grainy or hard. Solo vocal and solo sax were nicely resolved - a little edgy perhaps, but subtle changes in level, if not tonal colour, were revealed with great care.

On the other hand there was some loss of depth and, more importantly, composure with works of increasing complexity.

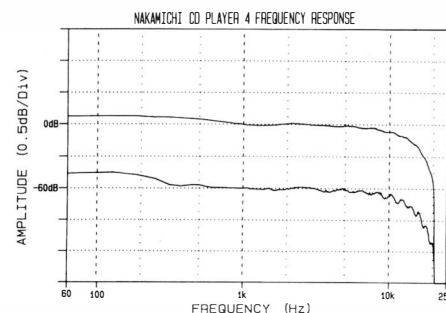
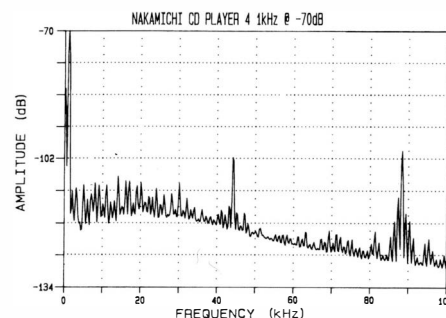
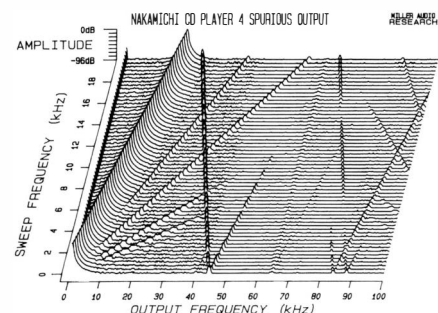
Stereo imagery becomes less distinct, strands within the music become confused and the soundstage less coherent. It's only fair to point out that this smearing and vagueness of the sound was not in any way aggressive or fatiguing, simply soft in focus.

## Conclusion

Judging by the test results, this player may have been incorrectly adjusted at the factory, while the distortion seems to correlate well with the player's inoffensive but rather vague and imprecise sound. Nice enough but it might have been so much better . . .

## TEST RESULTS

	20Hz	1kHz	20kHz
Channel Balance	0.01dB	0.01dB	0.03dB
Channel Separation	120.3dB	97.7dB	74.5dB
THD vs Level, 0dB	-75.0dB	-72.7dB	-81.0dB
-30dB	-43.1dB	-43.6dB	-60.9dB
-60dB	-44.5dB	-43.5dB	-45.7dB
-80dB	-25.1dB	-23.1dB	-16.8dB
Dithered -90dB	-10.9dB	-13.5dB	-9.30dB
Resolution @ -60dB		+0.01dB	-0.08dB
-80dB		+0.10dB	-0.29dB
-90dB		-0.49dB	-1.79dB
-95dB		-0.66dB	-4.89dB
-100dB		-0.95dB	
Peak Output Level, L			2.027V
R			2.029V
Output Impedance			1.135kohms
CCIR IMD, 0dB			-83.1dB
Suppression of stop-band IMD			57.9dB
De-emphasis Accuracy, 1kHz			+0.01dB
5kHz			-0.09dB
16kHz			+0.09dB
S/N Ratio (A-wtd), w/o emp			103.5dB
w emp			104.2dB
Track Access Time (99)			3.9secs
Typical Retail Price			£315





# Philips CD624

PHILIPS ELECTRICAL LTD, CITY HOUSE, 420-430 LONDON ROAD, CROYDON, SURREY CR9 3QR. TEL: (081)689 2166



Philips was responsible for developing the PDM (Pulse Density Modulation) Bit Stream DAC, a scheme which is closest to the ideals of genuine 1-bit operation and harbours the greatest potential of all the generic low-bit DACs. There are three PDM players currently in the Philips range, cheapest of which is this CD624, a near budget machine that costs £40 more than the popular 16-bit CD610.

Nevertheless, £200 buys plenty of features. The CD624 combines conventional 30-track random access programming with two non-volatile FTS memories. A bright display offers full track, time and status information, all underlined by a 20-track music calendar. A thicket of rather fiddly buttons is reserved for direct track access, tape edit and review functions, and another series of buttons presets the play mode or fires up intro scan, repeat, random play and fast music search facilities.

Elsewhere there's a switchable digital output which is driven by Philips' new PCF3523 ADOC (Audio Digital Output Circuit), plus index selection on the remote handset.

## Lab Report

Philips has opted for a single SAA7321 bitstream DAC in this player, so the A-wtd S/N ratio is rather below par at just 98-100dB. Linearity has suffered too, witness the 2.5dB error at -90dB, while distortion is primarily odd-order (3rd and 5th) at peak level.

This is clear enough on the 3D plot which also reveals a similar rippling of the stopband images ('V' patterns) to that seen with Philips' older 16-bit players. This is because the SAA7321 DAC uses an integral version of the old four times oversampling filter, yet it also implements additional 32 times and two times oversampling stages (giving a total of 256 times) which are responsible for the more pronounced ripples seen on both

frequency response plots. Probably of greater subjective significance is the messy RF spectrum contains multiples of the 11.2896MHz clock frequency.

## Sound Quality

In my experience all players currently using the SAA7321 DAC in single-ended mode share a very distinct family sound. On the whole the listening panel confirmed this impression, complimenting the CD624 on its refinement, lack of vocal sibilance and general tidiness but criticising it for sounding over-polite, simply too civilised for its own good was the suggestion.

Resolution of tonal detail and stereo space was admired as well, but at least two listeners found it difficult to get truly excited about the sound. The interpretation of our classical selection was very strict but also a little flat and uninvolved, almost as if the player was tip-toeing through the score.

Above all the music lacks passion and commitment. Reproduction is consistent and predictable, certainly, but is neither sufficiently dynamic nor youthful in expression.

One listener was much more taken by its reproduction than the others. He at least appreciated the player's finesse and delicacy of touch, features of the sound that prove both enjoyable and stimulating. However, the remainder of the panel felt left behind and uninvolved in the music at hand.

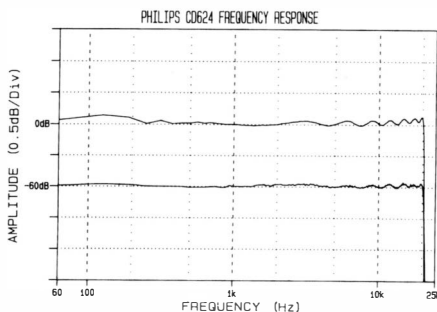
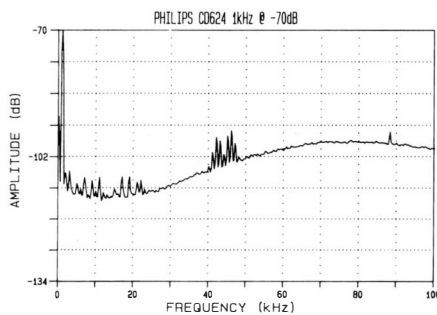
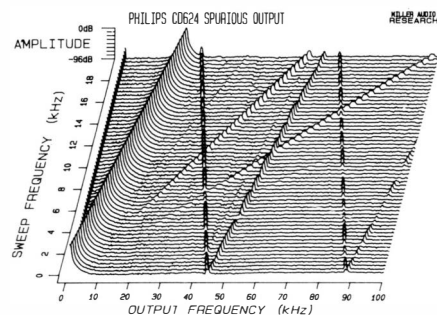
## Conclusion

There's plenty of refinement on offer here for £200, and plenty of twiddly-bits too, if only the player showed more enthusiasm for the music it reproduces. Clearly implementation plays an important role in the success of PDM technology, but I've yet to hear a single-ended 7321 design that gets close to those using two 7321s in differential mode. The older 7320 DAC

worked like a charm in single-ended mode but the 7321, and therefore the CD624 itself, is uninspiring by comparison.

## TEST RESULTS

	20Hz	1kHz	20kHz
Channel Balance	0.02dB	0.03dB	0.02dB
Channel Separation	86.9dB	88.5dB	91.7dB
THD vs Level, 0dB	-99.7dB	-95.0dB	-67.4dB
-30dB	-75.3dB	-71.6dB	-60.2dB
-60dB	-49.5dB	-42.1dB	-29.5dB
-80dB	-21.7dB	-19.5dB	-8.55dB
Dithered -90dB	-7.75dB	-5.85dB	-0.15dB
Resolution @ -60dB		+0.07dB	-0.02dB
-80dB		+0.20dB	+0.13dB
-90dB		-2.50dB	+0.44dB
-95dB		-2.11dB	-4.65dB
-100dB		-1.85dB	
Peak Output Level, L			1.969V
R			1.976V
Output Impedance			208ohms
CCIR IMD, 0dB			-98.3dB
Suppression of stop-band IMD			54.2dB
De-emphasis Accuracy, 1kHz			-0.17dB
5kHz			-0.08dB
16kHz			+0.12dB
S/N Ratio (A-wtd), w/o emp			97.8dB
w emp			99.9dB
Track Access Time (99)			3.8secs
Typical Retail Price			£200



# Philips CD634

PHILIPS ELECTRICAL LTD, CITY HOUSE, 420-430 LONDON ROAD, CROYDON, SURREY CR9 3QR. TEL: (081) 689 2166



At first glance there appears to be little difference between Philips' CD624 and the costlier CD634, at least not sufficient to justify an extra £50. Broadly speaking they are one and the same machine, using the same basic circuit board complete with SAA7310 decoder and SAA7321 BitStream DAC. However, the 634 does use an alternative microprocessor and also piggy-back boards containing the full-blown FTS (favourite track selection) and variable output facilities.

The CDM4 transport is the same too, though a different front section has been stuck on by way of identification. Otherwise the layout of controls is very similar, though some now double for both direct track location and accessing the alphanumeric memory. It's possible to allocate 12-character titles to favourite discs and tracks, which are then recalled by either of the two FTS programs. Personalised presets permit preselection of the brightness of the display, the play mode (auto-play, random or scan), output level (eight-steps) together with a fade-in or fade-out time.

To prevent the operator getting bogged down, the display regularly flashes up messages like 'Go Into Stop' or 'Go Into Play' by way of encouragement. Nevertheless, the uninitiated might still need a route map for the first week or so!

## Lab Report

Extra features aside, the CD634 uses the same 1-bit DAC with 256 times oversampling and 2nd-order noise-shaping as the CD624, so both machines produce virtually identical 3D plots. The 3rd-order analogue filtering is consistent too, hence the identical noise 'curve' seen on the plot of 1kHz at -70dB. Sample variations represent the biggest differences and the 634 suffers typically 4-5dB more distortion through the midband.

Of greater concern is the 634's

deteriorating linearity, the DAC betraying errors of -3.3dB at -90dB and -5.6dB at -100dB. The A-wtd S/N ratio is also a dB or two poorer, as is the channel separation. The oversampling 'ripple' visible on the -60dB frequency response is also more pronounced on the CD634, though the sonic consequences are tenuous. However, the RF spectrum is cleaner although still kicking out around 13mV, consists of a single frequency.

## Sound Quality

Although the two Philips players are very similar, just altering the electrical environment of the basic circuit with additional features can have unforeseen repercussions on its sound quality. This was reflected in our listening test findings where the panel thought the 634 was less refined than the 624, yet perhaps more capable of getting to grips with the music: "more convincing but less polite" was one observation.

All felt it gave a fair account of the music's natural vitality, but the majority still found it tough to suspend disbelief and escape into the pool of sound. Dynamics are good and the bass is honestly full and weighty, a characterless and slightly insipid streak nevertheless ran through the performance.

This sort of dryness and neutrality might be viewed as a positive feature, but when combined with the player's listless soundscape it only served to douse what spark of enthusiasm remained. In the words of one listener, "it'll never knock your socks off".

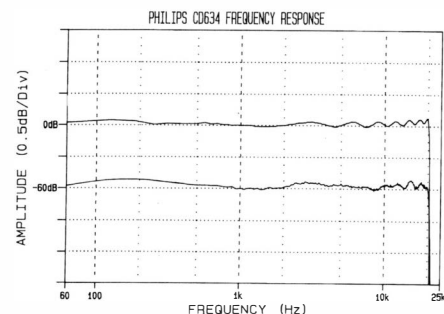
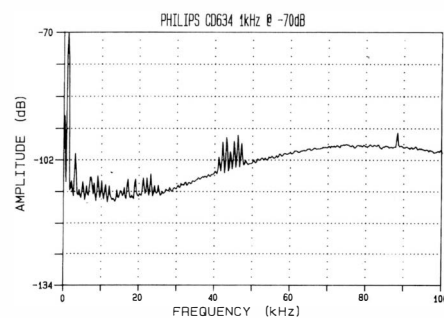
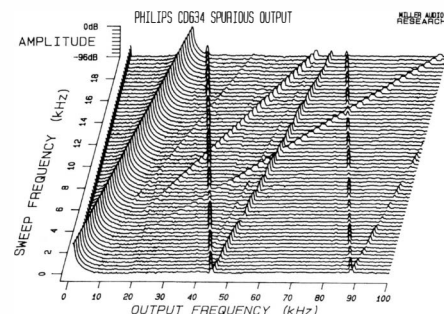
## Conclusion

A common basic character links the CD634, CD624 and Marantz' CD-41. In this case the £50 premium buys a little extra body and involvement in the music, as well as a smattering of extra facilities. Nevertheless our panel considered that, on balance, all the players should be

tagged with the same verdict. So, I'll not recommend any of them. PDM Bit Stream might be the best thing since sliced bread, but these two players show that even its originators can screw-up occasionally.

## TEST RESULTS

	20Hz	1kHz	20kHz
Channel Balance	0.10dB	0.08dB	0.08dB
Channel Separation	85.8dB	86.5dB	89.7dB
THD vs Level, 0dB	-93.8dB	-90.1dB	-67.6dB
-30dB	-73.6dB	-68.7dB	-59.0dB
-60dB	-39.5dB	-36.5dB	-29.6dB
-80dB	-16.4dB	-16.3dB	-10.1dB
Dithered -90dB	-10.2dB	-2.75dB	-0.58dB
Resolution @ -60dB		+0.12dB	-0.03dB
-80dB		+0.76dB	+0.53dB
-90dB		-3.27dB	-0.14dB
-95dB		-4.85dB	-3.72dB
-100dB			-5.56dB
Peak Output Level, L			1.915V
R			1.898V
Output Impedance			205ohms
CCIR IMD, 0dB			-90.6dB
Suppression of stop-band IMD			54.2dB
De-emphasis Accuracy, 1kHz			-0.18dB
5kHz			-0.10dB
16kHz			+0.10dB
S/N Ratio (A-wtd), w/o emp			96.9dB
w emp			97.2dB
Track Access Time (99)			4secs
Typical Retail Price			£250



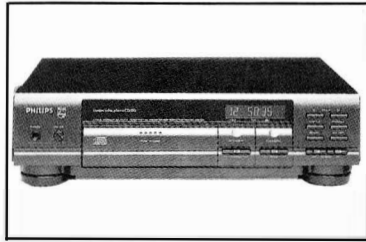


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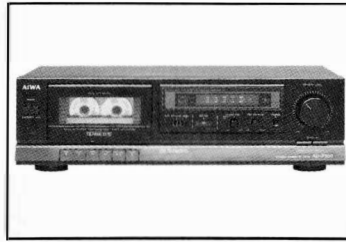
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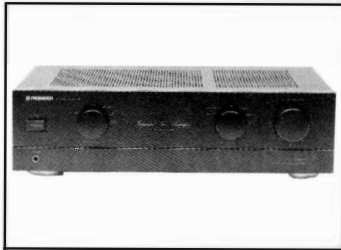
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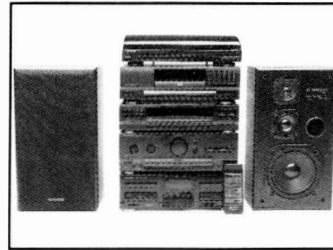
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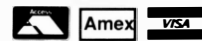
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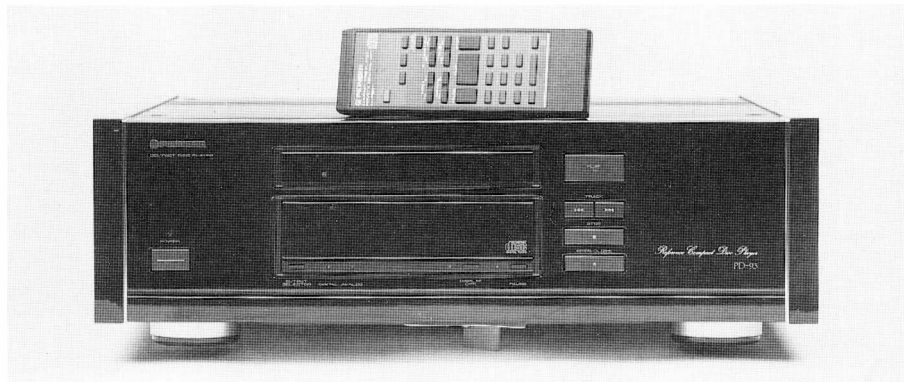
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# Pioneer PD-93

PIONEER HIGH FIDELITY (GB) LTD, FIELD WAY, GREENFORD, MIDDLESEX UB6 8UZ. TEL: (081) 575 5757



If the famous Sugar Puff's Honey Monster ever decided to buy a CD player then, likely as not, he would choose something similar to Pioneer's PD-93. This vast crate of a CD player houses much the same digital electronics as the PD-8500 but with more power supplies, multi-stage analogue filtering and a bulkier transport assembly.

The glorious piano-black fascia is disturbed only by the most essential controls, and features such as track access, index search, program and repeat play are provided on the remote control.

Pioneer has copper-plated just about everything in this machine, including the interior, from the transport to the casework and honeycomb chassis - even the motors and electrolytic capacitors are surrounded by copper foil.

The two mains transformers are around the back of the player, decoupled from the main chassis as a way of combating vibration.

The 20-bit resolution eight times oversampling filter and 20-bit DACs are the same as in the PD-8500 though in this instance the latter are covered by a (you guessed it) copper-plated can. Pioneer has stuck its own 'Dual Balanced 20 Bit' logo on these screens while their literature refers to them as 'our D/A converter'; Burr Brown might well have cause to feel slighted.

## Lab Report

Technically the extra £1,000 worth of electronics inside Pioneer's PD-93 offers very little advantage over the PD-8500. Ok, so the '93 squeezes another 2-3dB of S/N ratio and the output impedance is lowered to a decent 100ohms.

Low-level high frequency distortion is further reduced (now 0.6 per cent at -80dB), but resolution is impaired to +0.7dB at -100dB.

Dual-mono construction has kept stereo separation to better than 130dB

across the audible spectrum (an amazing result), but the essential characteristics of the 20-bit DAC and eight times oversampling filter are betrayed on the 3D and 1kHz/-70dB plots.

A comparison of the latter plots of both players shows up the very great similarities between them.

## Sound Quality

Comparisons with Pioneer's cheaper 20-bit player were the order of the day, for one reason or another this flagship model proved the less convincing. First impressions were of an exceedingly civil, inoffensive sound with attractive detail, but one which ultimately fails to fulfil its promise.

Tonally very even with a broad spread and depth of sound, individual instruments sound clear, but the full dynamic contrast is not so well represented. There's a distinctly understated feel about the music - it 'didn't really rock along' in the words of one listener.

Neither was there sufficient weight or conviction behind the impact of the supposedly solid bass notes lack weight and conviction, a feature that in turn compromises the player's sense of rhythm. The panel stressed the open and fatigue-free style however, which permitted an insight into the structure of the music, if not its underlying passion.

But whatever caveats were offered, PD-93 simply failed to set the panel's feet tapping.

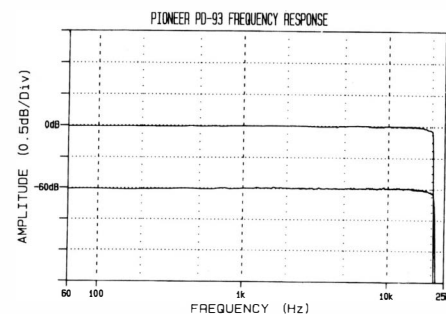
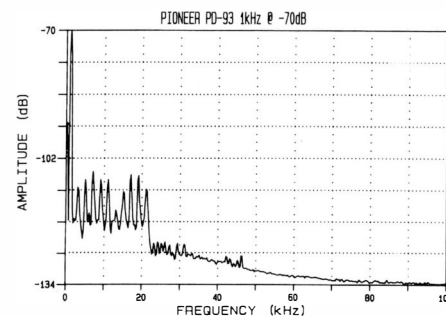
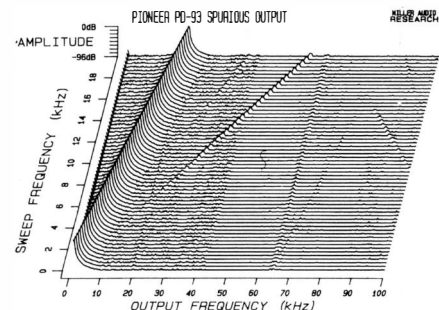
## Conclusion

This gargantuan machine oozes class and confidence, but the sound, like many other over-sophisticated designs, is simply too polite for its own good.

It was suggested that the player would appeal more to the intellect than the soul, but then some of our listeners are a trifle eccentric...

## TEST RESULTS

	20Hz	1kHz	20kHz
Channel Balance	0.01dB	0.01dB	0.04dB
Channel Separation	145.5dB	135.5dB	132.5dB
THD vs Level, 0dB	-104.7dB	-102.6dB	-82.7dB
-30dB	-81.2dB	-74.6dB	-81.7dB
-60dB	-49.3dB	-45.1dB	-63.6dB
-80dB	-26.3dB	-24.1dB	-44.1dB
Dithered -90dB	-17.6dB	-14.9dB	-33.6dB
Resolution @ -60dB		+0.01dB	+0.01dB
-80dB		+0.05dB	+0.13dB
-90dB		+0.25dB	-0.03dB
-95dB		+0.55dB	-4.64dB
-100dB		+0.74dB	
Peak Output Level, L			2.239V
R			2.234V
Output Impedance			102ohms
Radio Frequency Spuria		12mV @ 42-45MHz	
CCIR IMD, 0dB			-88.6dB
Suppression of stop-band IMD			104.2dB
De-emphasis Accuracy, 1kHz			-0.01dB
5kHz			-0.03dB
16kHz			-0.01dB
S/N Ratio (A-wtd), w/o emp			116.4dB
w emp			118.7dB
Track Access Time (99)			2.5secs
Typical Retail Price			£1,400





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# Pioneer PD-8500

PIONEER HIGH FIDELITY (GB) LTD, FIELD WAY, GREENFORD, MIDDLESEX, UB6 8UZ. TEL: (081) 575 5757

**R**ecommended



No great fanfare, not even a discrete logo on the broad alloy fascia: nevertheless, the Pioneer PD-8500 is the first CD player to employ a genuine single-chip 20-bit DAC. The Denon DCD-2560 also uses 20-bit DACs, but only the 8500 employs the latest device from Burr Brown - the PCM63P.

This little chip combines two 19-bit DACs which handle positive and negative-going portions of the signal independently. Their complementary operation makes available double the number of quantisation levels provided by a single 19-bit DAC, implying the performance of a single 20-bit system!

But the player's appearance conceals all this. The PD-8500 greets the world with a centralised drawer mechanism underpinned by a detailed fluorescent display. Although the transport is not particularly chunky, the player itself is a weighty affair due to its multi-layer honeycomb chassis, a recurring theme with other Pioneer separates.

The remainder of the fascia is far from cluttered because most of the facilities are operable only from a remote handset - guard this with your life! Direct track and index selection is possible, along with a variety of time fade and tape edit options.

Aside from conventional programming, Pioneer has also added something which it calls Music Window. This feature permits the memory of up to ten different portions within separate tracks on a single disc, rather like A-B repeat on a grand scale. A nought to nine second digital fade plus volume control are provided too, the latter offering adjustment over a 25dB range.

## Lab Report

One potential advantage of using a 20-bit DAC comes in reducing distortion with low-level high frequency signals. Certainly the 1.7 per cent distortion measured at -80dB (20kHz) is far lower

than the ten per cent or so that's usually encountered, though distortion elsewhere is not similarly improved. Linearity should witness a change for the better and the results obtained in this instance are quite superb. The only fly in an otherwise textbook ointment is a slight -0.2dB glitch at -80dB.

The very clean 3D plot is testament to the quality of the DACs, Pioneer's analogue electronics and the NPC eight times oversampling filter that provides some 105dB of stop-band rejection.

## Sound Quality

The listeners made a variety of enthusiastic gestures while listening to this player. They were certainly impressed by its very dynamic and full-blooded sound which enjoyed a powerful sense of momentum without appearing aggressive. We were never given the impression that this player was trying too hard, for its sound was typically effortless and its style uniformly graceful.

It does seem to prefer the civilised balance of jazz and classical selections, though this could be a reflection of their naturally dynamic quality as opposed to the mildly processed sound of the pop tracks. Still, many competing players will sound superficially detailed but are dirty with it, while others are overtly smooth but distinctly lacking in detail. Pioneer's players successfully juggles these opposing qualities - it's smooth yet unmuddled and comfortably detailed.

Strings, in particular, possess a refreshing airiness and life, crisp but not rasping. And all this is linked to its unrestrained, effortless quality which maintains a gratifying sense of proportion.

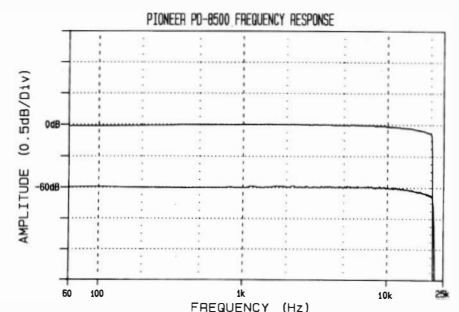
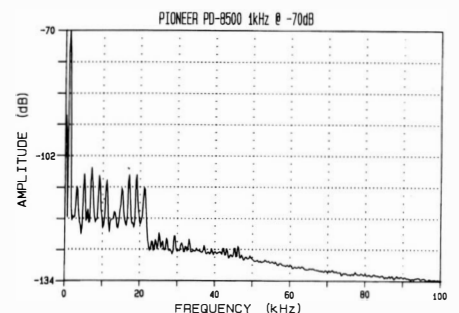
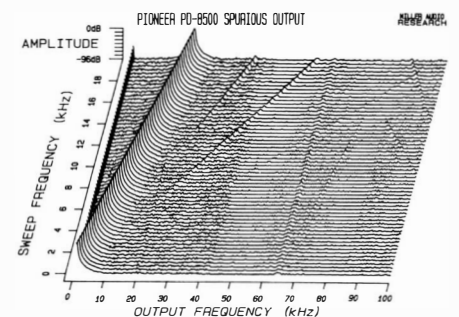
## Conclusion

Here's a player that communicates plenty of musical detail while remaining thoroughly undemanding. Combine this with an attractively finished, uncluttered

and easy-to-use layout and Pioneer has all the ingredients of a Recommendation.

## TEST RESULTS

	<b>20Hz</b>	<b>1kHz</b>	<b>20kHz</b>
Channel Balance	0.08dB	0.08dB	0.01dB
Channel Separation	119.2dB	22.7dB	103.7dB
THD vs Level, 0dB	-95.8dB	-95.9dB	-82.9dB
-30dB	-69.0dB	-68.9dB	-77.2dB
-60dB	-47.4dB	-46.8dB	-55.5dB
-80dB	-25.6dB	-28.2dB	-35.4dB
Dithered -90dB	-17.4dB	-18.7dB	-27.0dB
Resolution @ -60dB		-0.05dB	-0.04dB
-80dB		-0.20dB	-0.20dB
-90dB		0.00dB	-0.61dB
-95dB		-0.02dB	5.27dB
-100dB		-0.03dB	
Peak Output Level, L			2.145V
R			2.165V
Output Impedance			482ohms
Radio Frequency Spurious		12mV @ 42-45MHz	
CCIR IMD, 0dB			-98.8dB
Suppression of stop-band IMD			104.8dB
De-emphasis Accuracy, 1kHz			+0.02dB
5kHz			-0.13dB
16kHz			0.00dB
S/N Ratio (A-wtd), w/o emp			113.9dB
w emp			115.5dB
Track Access Time (99)			2secs
Typical Retail Price			£400





# Radford WS2

WOODSIDE ELECTRONICS, KIMBERLEY ROAD, CLEVEDON, AVON  
BS21 6QJ. TEL: (0272) 877 611



The Philips tried and tested 16-bit chipset has proved an ideal foundation for many specialist CD players, including this elegant WS2 model from Radford. In keeping with the £1,000 pricetag, a rugged CDM1 MkII transport is specified, plus a new purpose built chassis and fascia.

The tasteful matt black finish is set off by a standard Philips display, while the vast majority of facilities are left to the accompanying remote control handset. Nevertheless the unit is equipped with a high quality variable output, which will be useful for those wishing to avoid using an active preamp stage.

Each of the two main boards is powered by separate supplies. One board is simply the remnant of an original Philips board, the other a very sophisticated combination of Philips' top four times oversampling filter and TDA1541 DAC. The filter, DAC and analogue circuits are all isolated by independent regulators, while a mass of polycarbonate caps are visible evidence of decoupling.

Decent polystyrene caps and Holco resistors are employed in the final 3rd-order passive filter. No additional gain is provided here, so the output level is markedly lower than normal. This shortfall of 5-6dB must be compensated for during any A/B comparison, to avoid the 'louder' player gaining an unfair advantage!

## Lab Report

As might be expected, the overall specification is pretty typical of a Philips 16-bit four times oversampling chipset, with one or two exceptions. Both 0dB and -60dB responses show the customary oversampling ripple, but there's a slight loss of extreme treble (-0.22dB @ 20kHz) due to Radford's own filtering. The 3D plot highlights the low distortion (typically 0.001-0.004 per cent from 1kHz-20kHz), but also the relatively poor stop-band rejection (just 41dB) of this chipset.

The linearity of this 'Crown' TDA1541 is relatively poor at 1kHz, but holds up well at 20kHz, with a smooth decrease in linearity of around -1.5dB in marked contrast to many low-bit DACs. Of greater concern is the comparatively very high level (typically 95mV) of spurious RF noise. Visible from 11.3MHz to 90.4MHz, this unwanted hash may make the sound of the WS2 vary unpredictably with different amplifiers.

## Sound Quality

The listeners had a very mixed reaction to the sound of this player, particularly in the way it responded to different types of music. Rock and pop selections boasted plenty of drive and pace, but female vocals were compromised by noticeable sibilance, for example. There's certainly a hardness and splashiness in the treble, which is aggravated by strong percussion or the rasp of a metal-stringed guitar - a case of one man's 'detail' sounding like another man's 'grain'.

Yet a jazz disc was received more warmly than usual, the player revealing complex interactions between the various instruments within a pleasantly open, spacious acoustic. It was simply more involving than usual, according to the panel. Similarly, although the soundstaging was not as deep as possible, the scale and grandeur of classical events seemed very consistent.

Although the WS2 sounds like a 'cheap' CD player on boppy pop tracks, it responds much more favourably to the more civilised jazz and classical pieces; any edginess or roughness was now little more than a memory.

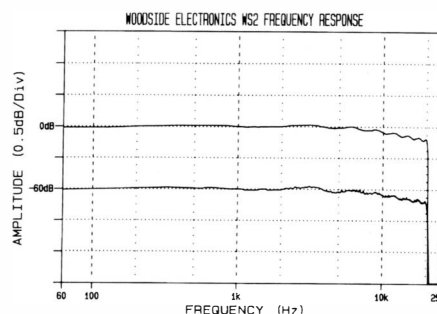
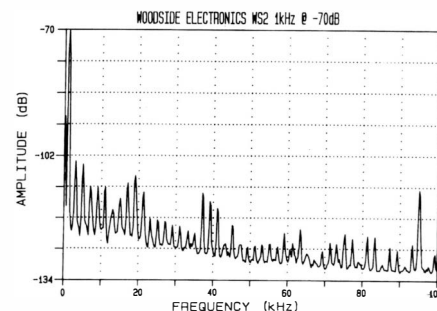
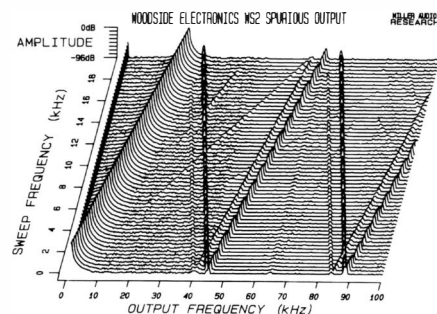
## Conclusion

Just as the blind listening sessions are no respecter of price or reputation, neither am I in the business of defending a product just because it is deemed specialist or 'tweaky'. So it is with Radford's WS2, a

machine that's undeniably well-built and graced with more than a few expensive components. It can sound engaging enough, but is not, in the view of our panel, significantly better than many players costing significantly less.

## TEST RESULTS

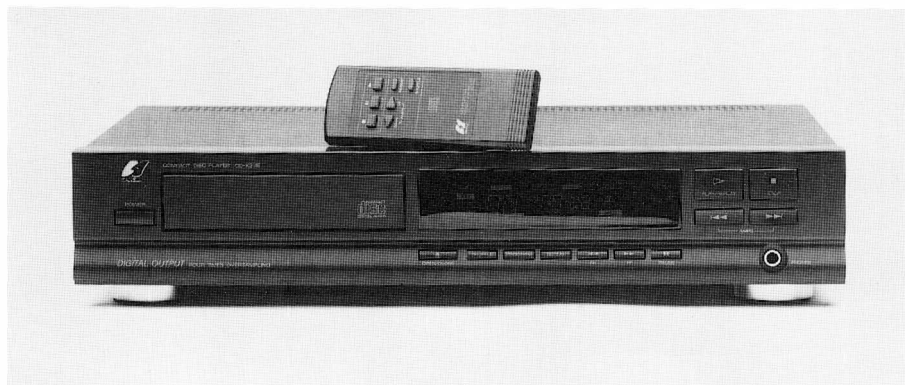
	20Hz	1kHz	20kHz
Channel Balance	0.14dB	0.14dB	0.09dB
Channel Separation	98.9dB	97.3dB	77.8dB
THD vs Level, 0dB	-102.5dB	-99.7dB	-87.5dB
-30dB	-73.0dB	-68.0dB	-59.7dB
-60dB	-43.7dB	-44.1dB	-34.8dB
-80dB	-18.9dB	-21.5dB	-33.3dB
Dithered -90dB	-7.45dB	-11.2dB	-23.1dB
Resolution @ -60dB		+0.02dB	+0.19dB
-80dB		-0.80dB	-0.26dB
-90dB		-3.87dB	-1.51dB
-95dB		-3.43dB	-1.47dB
-100dB			
Peak Output Level, L			1.086V
R			1.068V
Output Impedance			619ohms
CCIR IMD, 0dB			-98.8dB
Suppression of stop-band IMD			40.7dB
De-emphasis Accuracy, 1kHz			-0.02dB
5kHz			-0.16dB
16kHz			-0.21dB
S/N Ratio (A-wtd), w/o emp			111.2dB
w emp			112.3dB
Track Access Time (99)			3.2secs
Typical Retail Price			£1095



# Sansui CD-X211E

**Best Buy**

MISSION ELECTRONICS, STONEHILL, HUNTINGDON, CAMBS PE18 6ED. TEL: (0480) 52777



Is this another mass market cheapie from the production lines of the Far East? Not so; Sansui's new £200 CD-X211 is actually a repackaged Philips multi-bit machine (a CD582 by all accounts), complete with a composite CDM4 transport equipped to handle both 12cm and 8cm discs.

This is not obvious from the front of the player, however, because Sansui has camouflaged the plastic chassis with a stylish alloy fascia of its own. It's a simple enough trick, and one that ensures the smoothly contoured front panel matches Sansui's other budget separates.

The bold fluorescent display has also been used on Philips machines too, though here an orange filter window acts as the disguise. This fiery display is rather too bold in fact, with huge track and time digits visible from across the street.

Features are restricted to basic track skip, a three-speed music search, random, repeat and program play while a diddy remote control adds nothing extra. Still, the CD-X211 has another string to its bow as a high quality, low cost CD transport, courtesy of the coaxial digital output fitted at the rear - future upgrades couldn't be simpler

## Lab Report

Budget it may be, but on the technical front the CD-X211 can give costlier Philips-based players pause for thought. Distortion varies from 0.006 to 0.00073 per cent at peak level, settling out at around 0.5 per cent at -60dB (1kHz). The only peculiar feature is an apparent decrease in 20kHz distortion from 1.8 per cent at -60dB to 0.6 per cent at -80dB - the reverse of what's expected.

The 3D plot ripple of stop-band images (the V-patterns) that is characteristic of Philips SAA7220 four times oversampling filter. Related players, like the Ariston, Woodside and Marantz CD-80, all show this fingerprint.

The oversampling filter is also

responsible for the milder rippling of what is an otherwise very flat overall frequency response.

The CD-X211 suffers from rather less RF garbage than its costlier bedfellows while enjoying a larger S/N ratio (113dB) than all save the Marantz. Linearity is acceptable too, bearing in mind that earlier versions of the TDA1541A 16-bit DAC habitually survived errors of 10-15dB at -90dB.

## Sound Quality

Quite unaware of the origins of this unassuming little player, the panel reacted with unanimous enthusiasm. Listeners thought it evenhanded in its approach to all types of music, but particularly praised the resolution of subtle structural details.

An almost haunting transparency with expressive and natural vocals smooth and free from sibilance is brought to simple pop tracks. Nor does graininess detract from fine treble detail, though, there's a slightly heavy or muted feel to the brightest treble notes, compared to the very best players.

Stereo depth is slightly curtailed, but this didn't prevent us from enjoying the selections from our jazz CD. The xylophone, for instance, had a natural resonance or roundness about it, rather than the faint metallic colour that infiltrated with other 16-bit players.

## Conclusion

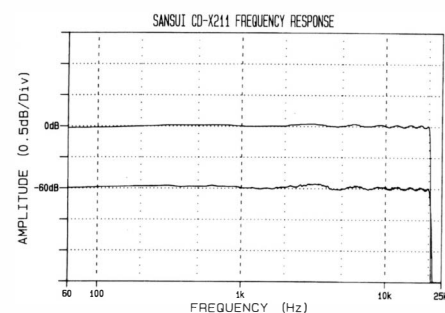
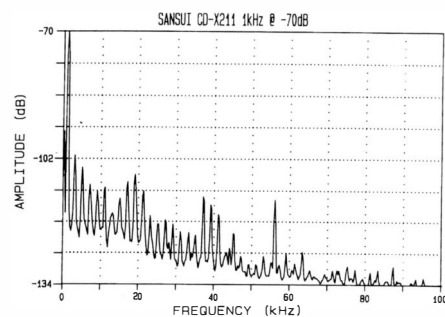
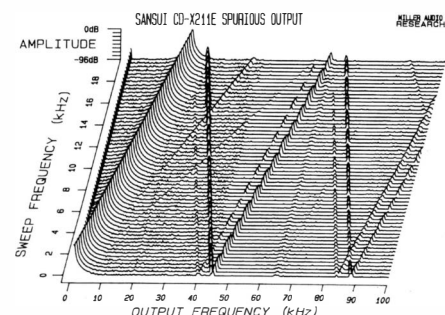
Sansui has enjoyed success using the Technics MASH/PWM DAC in previous players but, has opted for an older and more established technology in this new budget machine.

This would appear to have been a wise choice; although the player is not overburdened with features and facilities, its attractive, tangible sound is ample recompense.

More than sufficient, it would seem, to merit a Best Buy rating.

## TEST RESULTS

	20Hz	1kHz	20kHz
Channel Balance	0.09dB	0.10dB	0.08dB
Channel Separation	129.5dB	121.0dB	101.4dB
THD vs Level, 0dB	-102.7dB	-100.3dB	-84.4dB
-30dB	-69.3dB	-66.0dB	-60.4dB
-60dB	-43.5dB	-46.5dB	-35.1dB
-80dB	-19.1dB	-22.2dB	-44.5dB
Dithered -90dB	-7.65dB	-12.4dB	-34.8dB
Resolution @ -60dB		-0.01dB	+0.24dB
-80dB		-0.55dB	-0.06dB
-90dB		-2.47dB	-0.43dB
-95dB		-2.25dB	+0.18dB
-100dB		-2.03dB	
Peak Output Level, L			1.909V
R			1.889V
Output Impedance			206ohm
Radio Frequency Spurious			1mV broadband
CCIR IMD, 0dB			-98.9dB
Suppression of stop-band IMD			41.5dB
De-emphasis Accuracy, 1kHz			-0.01dB
5kHz			-0.11dB
16kHz			-0.10dB
S/N Ratio (A-wtd), w/o emp			112.8dB
w emp			113.4dB
Track Access Time (99)			4secs
Typical Retail Price			£199





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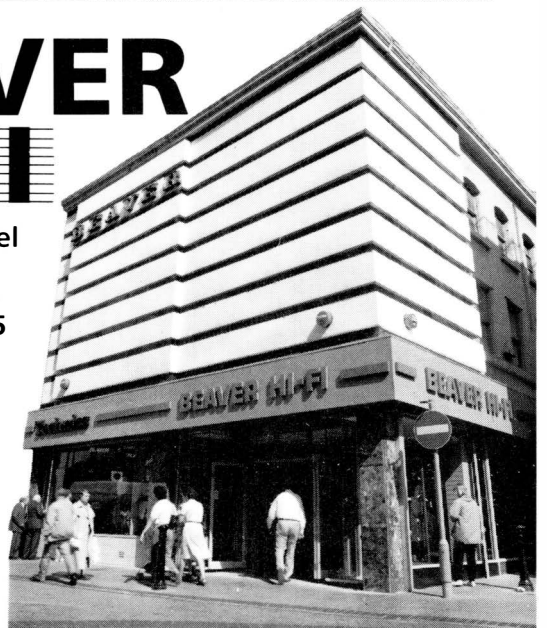
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# Sony CDP-990

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**Recommended**



Guaranteed to strike fear into the heart of even the most ardent button-pusher, Sony's £300 CDP-990 is comprehensive to the point of confusion. The player is based around the latest PLM (Pulse Length Modulation) low-bit DAC and because it represents the costliest non-ES model, much attention is focused on features and facilities. Pay a little more and you're in ES territory, where greater emphasis is placed on specification, build and sound quality.

In this case, no stone has been left unturned in the quest for ultimate flexibility. The 990 has exceedingly fast direct track access, plus peak search, fader, program edit and time edit functions to accommodate any length of blank tape, and up to 24 tracks from six different discs. But this is child's play compared to the Custom File memory.

Custom File is like a souped-up version of Philips' FTS facility. It'll cope with up to 185 discs, each of which can be labelled with a unique 10-digit alphanumeric title. Custom indexing allows you to specify favourite positions on any memorised disc, whether this happens to be at the beginning, end or middle of a track. It's even possible to preset the variable output level for different discs, an option swiftly executed by the motorised volume control.

All this plus extras like A-B repeat, slow search and index skipping are available on the matching remote. On the player itself, an attractive dot-matrix display keeps the user updated on the state of play.

## Lab Report

This is state-of-the-art stuff, courtesy Sony's CXD1244 oversampling filter and CXD2552 PLM DAC, which delivers a ruler-flat response, an A-wtd S/N of 117dB, and a mere 0.35dB drift in linearity at -100dB. For what it's worth, this points to a potential resolution of some 18 to 19 bits but regrettably some 16mV worth of

clock noise (45.158MHz) has been allowed through.

Distortion is low too, typically 0.001 per cent midband but increasing to 0.009 per cent at 20kHz, where simple second and third harmonics dominate the spectrum (see 3D plot). Once again, the ultrasonic spectrum at lower levels is masked by increasing noise levels, though the analogue filtering prevents an obvious 'hump' in the noise floor, as the -70dB plot shows.

## Sound Quality

On the whole the panel warmed to the sound of this player, feeling that there was some obvious restriction in drive and impact, yet admitting this had little influence over an otherwise fresh and invigorating presentation. It's a pacey, vital sound, but one that's crisper through the treble than in the bass which is even-tempered enough but lacks structural solidity. Nevertheless, stereo depth is better than some as is separation and individual instrument positioning.

Careful listening to specific instruments like the sax, strings and woodwind reveals some lack of explicit definition, yet there's a lively, bouncy quality that always seems to maintain the music's natural momentum. This very composed manner is maintained almost regardless of the type or difficulty of the music being reproduced; consistency is pivotal to the sound of this player.

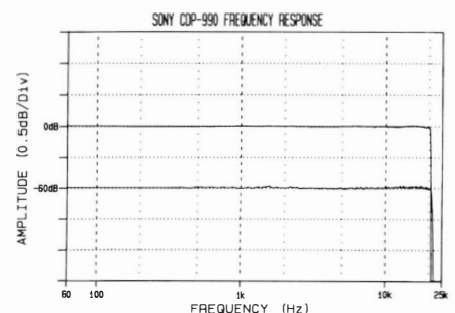
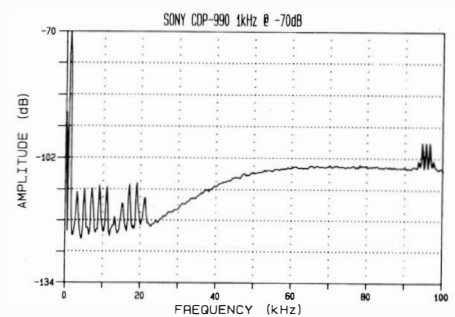
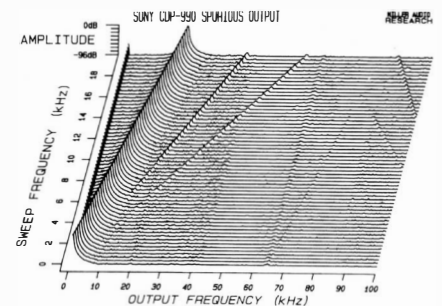
## Conclusion

Technically beyond reproach and almost beyond compare in terms of features, the subjective prowess of this machine is a little less cut-and-dried.

It certainly enjoys the fluid top-end of a good low-bit player, but would also benefit from a richer and raunchier bass. Weigh these pros and cons up and the 990 ends up with a Recommendation - but only just.

## TEST RESULTS

	20Hz	1kHz	20kHz
Channel Balance	0.04dB	0.04dB	0.05dB
Channel Separation	135.7dB	129.5dB	05.8dB
THD vs Level, 0dB	-104.7dB	-99.7dB	-80.6dB
-30dB	-81.9dB	-74.8dB	-68.6dB
-60dB	-57.7dB	-46.7dB	-38.7dB
-80dB	-29.7dB	-24.3dB	-19.1dB
Dithered -90dB	-17.5dB	-15.2dB	-9.05dB
Resolution @ -60dB		0.00dB	+0.01dB
-80dB		-0.08dB	-0.05dB
-90dB		-0.22dB	-0.39dB
-95dB		-0.31dB	-3.82dB
-100dB		+0.35dB	
Peak Output Level, L			1.928V
R			1.936V
Output Impedance			199ohms
CCIR IMD, 0dB			-97.7dB
Suppression of stop-band IMD			105.0dB
De-emphasis Accuracy, 1kHz			-0.10dB
5kHz			-0.10dB
16kHz			-0.11dB
S/N Ratio (A-wtd), w/o emp			116.5dB
w emp			116.6dB
Track Access Time (99)			1.8secs
Typical Retail Price			£300





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Alvin Gold, *Audiophile* Dec 1990

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# Sony CDP-X77ES

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The undisputed single-box heavyweight in Sony's latest range, the *CDP-X77ES* looks little different to the 18-bit *CDP-X7ESD* it replaces. It has the same beam-strengthened chassis, die-cast linear-tracking transport and acoustically-sealed drawer mechanism. The facilities are identical too, including program, shuffle, continuous and Custom Index play modes. However, much of the really useful stuff is relegated to the IR control - lose this at your peril!

Stark contrasts are evident inside, however, for this player utilises not one but two of Sony's differential PLM (Pulse Length Modulation) DACs in a true complementary mode. Two stages of oversampling precede the DAC, raising the data rate 64 times before it's reduced from a 16 bit level to 'packets' of 2.81 bits. These high speed chunks of data then determine which of the seven available pulse widths (or lengths in this case) are output by the DAC. Simple filtering then reveals the original analogue music signal (in theory at least).

There's also the option of fixed, variable and digital outputs (which may be disabled) plus two XLR sockets that provide a balanced feed for professional applications. Although expensive, the £1,300 *CDP-X77ES* is certainly one of the most slick and purposeful players currently available.

## Lab Report

Any difference in technical performance between the *CDP-990* and '77ES is largely due to the use of complementary PLM DACs. Consequently the differences are most obvious at peak level and are therefore largely academic, like a 3-4dB improvement in distortion plus a gain of 6dB or so in S/N - a remarkable 122.5dB (A-wtd) range is clocked-up here. Add to this the minimal +0.04dB error in linearity at -100dB and the potential resolution is nudging towards the 20-bit level!

The spurious RF output of the player is low at 2.8MHz and possibly linked to the main audio data rate of 1.4Mbits per second. Third-order noise-shaping within the PLM DAC remains unchanged but complementary operation also sees a reduction of 6dB in ultrasonic noise (see -70dB plot).

## Sound Quality

The listening tests uncovered a rather odd, and potentially worrying development in the sound of this complex machine. First impressions were of a reasonably lively, warm and approachable balance. It seemed exceptionally polite and free of 'nasties', even if individual instruments did tend to collect around the speakers rather than fleshing-out the soundstage. One listener thought it was too polished and restrained, holding back to the point of timidity.

It is tonally neutral but a loss of crispness and airiness makes the sound tame and unexciting. These sentiments do, however, conflict with my impressions of the very same player when it was brand spanking new, some nine or ten months earlier.

The measured results show that although nothing is fundamentally wrong with this '77ES (low-level linearity has actually improved), there has been an obvious change in its sonic character. I would expect some slight drift in the performance of such sophisticated electronics but such a pronounced change on a month to month basis as opposed to a conventional 'warming-up' is another thing altogether.

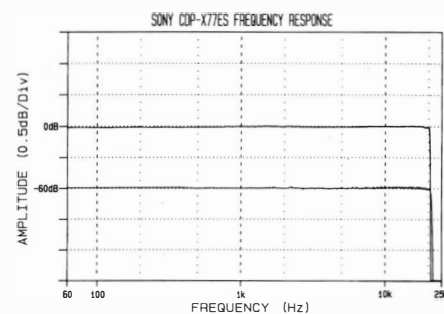
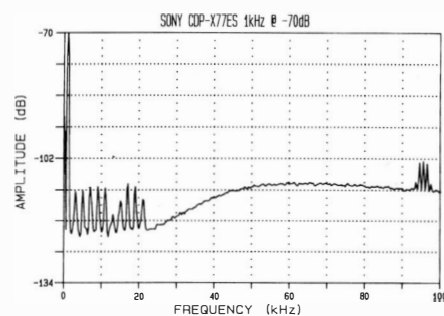
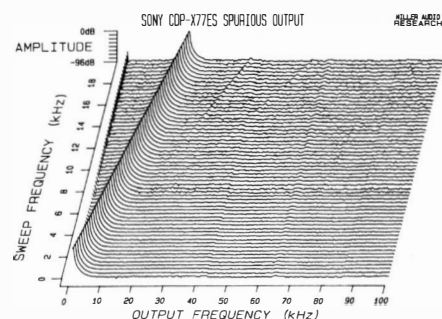
## Conclusion

The worrying conclusion of this review is that the performance of this player seems to have altered during its life as demonstration stock, though there was insufficient time to compare it to a new and perhaps more representative current

production sample. As far as this unit is concerned, and on the basis of the panel's experience, the *CDP-X77ES* may be supremely confident, but remains, quite simply, too expensive.

## TEST RESULTS

	20Hz	1kHz	20kHz
Channel Balance	0.01dB	0.01dB	0.02dB
Channel Separation	125.8dB	122.3dB	109.3dB
THD vs Level, 0dB	-106.4dB	-102.9dB	-84.7dB
-30dB	-82.3dB	-74.2dB	-69.9dB
-60dB	-54.2dB	-46.6dB	-39.2dB
-80dB	-26.6dB	-23.6dB	-20.3dB
Dithered -90dB	-17.6dB	-15.3dB	-9.35dB
Resolution @ -60dB		+0.01dB	+0.01dB
-80dB		+0.03dB	-0.02dB
-90dB		-0.01dB	-0.35dB
-95dB		+0.02dB	-5.00dB
-100dB		+0.04dB	
Peak Output Level, L			2.564V
R			2.560V
Output Impedance			205ohms
CCIR IMD, 0dB			-98.6dB
Suppression of stop-band IMD			101.5dB
De-emphasis Accuracy, 1kHz			-0.10dB
5kHz			-0.09dB
16kHz			-0.08dB
S/N Ratio (A-wtd), w/o emp			122.4dB
w emp			122.5dB
Track Access Time (99)			1.5secs
Price			£1,000





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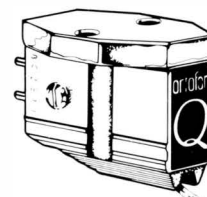
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# Teac CD-P3000

TEAC (UK) LTD, 5 MARLIN HOUSE, THE CROXLEY CENTRE, WATFORD, HERTS WD1 8YA. TEL: (0923) 225 235



This is now TEAC's second term in the low-bit class though the *CD-P3000* is not a direct replacement for any existing model.

Instead this is an unpretentious design, based on Technics' budget *MN6474* MASH/PWM DAC but featuring all the cosmetic trappings of TEAC's costlier machines. The black alloy fascia with its centralised drawer mechanism and attractive orange display certainly belies the modest retail price, the player selling for a penny less than £170.

Most of the facilities are perable from a small remote handset which is positively cluttered compared to the paucity of controls on the player itself.

On the remote there is a direct access keypad, index search, scan (with cue lock), program and repeat play options together with a digital volume control that operates through the main outputs of the player. TEAC has also included a coaxial digital output on the player itself.

The overall construction of the *CD-P3000* is still fairly lightweight, however, and no special attention has been paid to the components used in the analogue filter and gain stages that follow the PWM DAC. RF filtering at the output is rather crude and insufficient to prevent a reasonable level of spurious noise from escaping.

## Lab Report

Cheap and cheerful it may be, but TEAC's *CD-P3000* is still very linear, betraying errors of just 0.24dB at -90dB and 0.1dB at -100dB. If only the A-wtd S/N ratio were better than the 101dB recorded, the overall resolution might have touched 18bits, Interference from a spurious 7.4kHz tone prevented this, however.

The 1kHz/-70dB plot shows the effectiveness of TEAC's post-DAC filtering which starts to decrease ultrasonic quantisation noise above 40kHz. In this respect it's similar to the NAD players though, in this case, the filtering has too

pronounced an effect in the audio band.

The 1dB drop in output at 20kHz is clear from the frequency response plots, as is the characteristic 10.5kHz 'bump' in the -60dB trace. Still, one positive effect of this filtering is to reduce high frequency distortion - the figures of 0.05 per cent (-30dB) and 1 per cent (-60dB) are good for a cheap low-bit model.

Low frequency distortion, by contrast, was dominated by high odd-order harmonics.

## Sound Quality

Auditioned directly after the *CD-P4000* had been unceremoniously laid to rest, the listening panel judged this particular model to be modestly superior.

It was certainly better able to project stable, focussed stereo images, while recreating a pleasing sense of depth and space. However, this transparency was a trifle superficial, and linked to a general dilution or thinning of the music's weight and substance. In the words of one member of the panel it was 'nicely see-through but still insipid'.

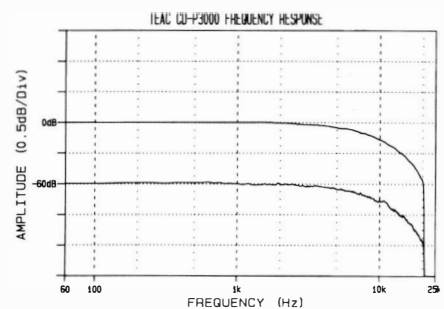
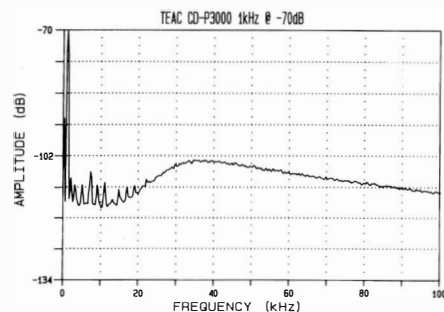
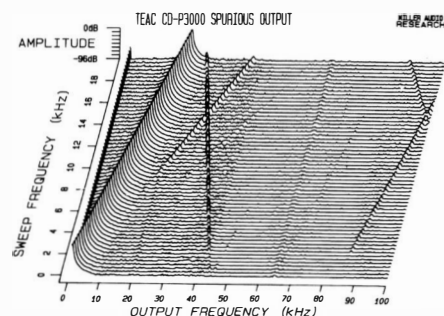
Bass, too, was quite full and lush but it lacked tight power and added unnecessary colour to the sound of strings and woodwind for example. The top-end was also rather splashy, which intruded on the most powerful tracks, but was otherwise quite inoffensive with simple, civilised recordings.

## Conclusion

Preferable to the *CD-P4000* in many ways, and certainly far better value, the *CD-P3000* is still insufficiently gripping to warrant any sort of recommendation. I'm sure I've heard both the '3000 and '4000 sounding rather better than this on other occasions, but I did find myself in complete agreement with the panel's sentiments during the course of this sitting and I've absolutely no desire to override their impressions.

## TEST RESULTS

	20Hz	1kHz	20kHz
Channel Balance	0.33dB	0.00dB	0.22dB
Channel Separation	105.6dB	100.1dB	77.8dB
THD vs Level, 0dB	-90.8dB	-89.7dB	-79.6dB
-30dB	-81.2dB	-74.9dB	66.3dB
-60dB	-56.6dB	-39.6dB	-40.1dB
-80dB	-26.6dB	-26.7dB	-18.6dB
Dithered -90dB	-16.6dB	-18.5dB	-10.7dB
Resolution @ -60dB		+0.02dB	0.00dB
-80dB		+0.06dB	+0.04dB
-90dB		+0.24dB	+0.04dB
-95dB		+0.19dB	-5.45dB
-100dB		+0.10dB	
Peak Output Level, L			2.027V
R			2.106V
Output Impedance			1.107kohms
CCIR IMD, 0dB			-90.7dB
Suppression of stop-band IMD			80.4dB
De-emphasis Accuracy, 1kHz			-0.01dB
5kHz			0.00dB
16kHz			-0.42dB
S/N Ratio (A-wtd), w/o emp			01.2dB
w emp			105.9dB
Track Access Time (99)			3.8secs
Typical Retail Price			£169





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# Teac CD-P4000

TEAC (UK) LTD, 4 MARLIN HOUSE, THE CROXLEY CENTRE, WATFORD, HERTS WD1 8YA. TEL: (0923) 225 235



The logical replacement for TEAC's first low-bit player, (the *CD-P400*), this *4000-series* model features a similar external, if not internal, structure. The general construction of the player is more substantial than the *CD-P3000* but there are few additional facilities.

The centralised drawer mechanism does now have a chamfered frontispiece and there is a 20-track music calendar on the fluorescent display. Yet the on-board and remote facilities remain virtually identical.

Time Edit is the principal addition, a feature that enables you to specify tape length (in minutes and seconds) so that the player can then juggle the track complement accordingly. The cue lock is also useful, permitting fast scanning without requiring a key to be permanently depressed.

Inside the player TEAC has separated the transport and digital processing electronics from the MASH/PWM DAC and analogue filter stages on two isolated PCB's.

The parts list is pretty similar to the *400* but the IC's are better arranged in this model! The coaxial digital output has been replaced by an optical output for some reason, and not one but two parallel analogue outputs now grace the rear panel.

Both of these run off the remote volume control, and so the player does lend itself to use in a bi-amped system. However if you should be unfortunate enough to lose the remote control you are well and truly stuffed.

## Lab Report

Improvements to the layout of TEAC's analogue board have brought rewards in the *'4000'* with better stereo separation though, in absolute terms, the difference between 100dB and 109dB is largely academic.

Distortion is much improved at low

frequencies too, though the 3rd harmonic tends to pick up at high frequencies thereby increasing the 20kHz THD. On the other hand CCIR IMD actually decreases from 0.0015 to 0.0006 per cent because this is a measure of 2nd rather than 3rd-order distortion.

Either way, the differences are clear enough on the 3D plot which shows similar stop-band residues to the *'3000'* but a different audioband 'character'. The 1kHz/-70dB plot also implies an increase in dynamic range of 4dB or so (linked to the S/N ratio which is up by a good 6dB compared to the *'3000'*) while the filtering of quantisation noise adopts a very similar slope.

The frequency response of this player is also a little better controlled - just 0.55dB down at 20kHz - but the output of spurious RF noise is less well defined.

The messier RF spectrum simply lends itself to greater mischief, regardless of the fact that the peak-to-peak level has fallen to 12mV.

## Sound Quality

'Insubstantial, thin, reedy, aggressive...' are adjectives plucked at random from a very disenchanted panel of listeners. After throwing their arms up in collective surrender the panel struggled to find something genuinely pleasant to say about this machine.

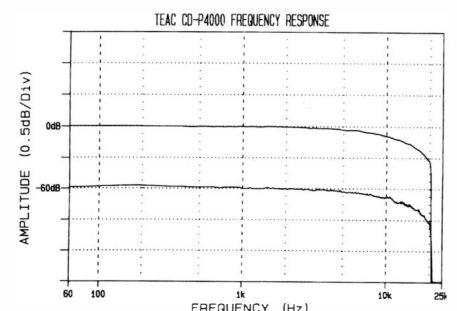
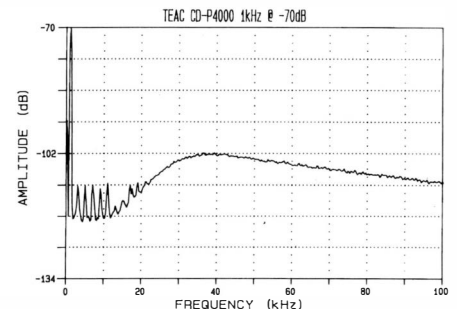
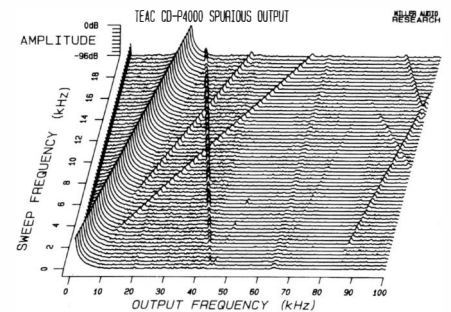
On the one hand it did possess a hint of fluidity but by stripping substance and body from the music we were left with a wishy washy canvas. In the words of one listener this was, quite simply, 'a tragedy of a CD player'.

## Conclusion

I won't labour the point but it should be fairly obvious by now that the *CD-P4000* pretty much bombed-out in the listening tests. Although it does possess a hint of fluidity, this was by no means enough to convince the panel.

## TEST RESULTS

	20Hz	1kHz	20kHz
Channel Balance	0.13dB	0.14dB	0.23dB
Channel Separation	118.1dB	108.7dB	85.1dB
THD vs Level, 0dB	-103.6dB	-101.9dB	-78.8dB
-30dB	-80.8dB	-77.4dB	-65.4dB
-60dB	-53.7dB	-50.1dB	-37.8dB
-80dB	-25.5dB	-28.2dB	-18.4dB
Dithered -90dB	17.9dB	-18.8dB	-5.65dB
Resolution @ -60dB		+0.02dB	+0.01dB
-80dB		-0.01dB	-0.06dB
-90dB		+0.04dB	+0.03dB
-95dB		+0.11dB	-5.87dB
-100dB		+0.21dB	
Peak Output Level, L			2.170V
R			2.205V
Output Impedance			1.102kohms
CCIR IMD, 0dB			-98.5dB
Suppression of stop-band IMD			83.1dB
De-emphasis Accuracy, 1kHz			-0.01dB
5kHz			+0.01dB
16kHz			-0.18dB
S/N Ratio (A-wtd), w/o emp			107.6dB
w emp			111.9dB
Track Access Time (99)			4secs
Typical Retail Price			£299





# Conclusions Best Buys and Recommendations

*Paul Miller sorts out the magnificent from the mediocre in this month's batch of 27 CD players.*

**A** clearly defined but quite unexpected consensus underscored this entire test. No, the panel did not find all low-bit players emerging triumphant, but then neither did the listeners come down wholeheartedly in favour of our traditional multi-bit contenders. In fact, the reaction was quite mixed and this is reflected in the smattering of technologies harboured within the list of Recommendeds and Best Buys.

This said, the latest crop of Bit Stream wonders from Philips and Marantz have proved disappointing. The single-ended SAA7321 DAC consistently fails to live up to the promise of costlier differential PDM players - you may save pounds but it's a false economy. At the other end of the scale, Arcam's latest *Delta 70* employs Philips' top SAA7350 PDM Bit Stream DAC in what, to the best of my knowledge, is a unique configuration.

This, plus the specialised analogue circuitry, combine to produce a startlingly positive sound, hugely superior to the cheaper Philips/Marantz players but still rather, well, unconventional. I really think this is one that will polarise opinion - if you're going to like the *70.3* then you will know the instant you clap ears on it.

But I digress. In truth what emerged was the thought that

you needn't spend a fortune on a CD player to enjoy a decent, foot-tapping sound. Quite the reverse in fact for not one player above £400 was judged sufficiently outstanding to warrant Recommendation! Remember, all our listening was done under blind conditions with an utterly random selection of different players on different days. So, listening to a £1,000 player immediately after a £200 unit should, you would have thought, given it every opportunity to shine.

Instead I found that nearly every time the panel was faced with a costly unit, the listeners struggled to ascribe it some character - phrases like 'very polite, civilised and refined' were the norm. Our cheaper contenders were, on the whole, a little less conservative in their music-making but for all their raggedness, they at least aroused the enthusiasm of our panel. It just seems that in a well-meaning attempt to rid their flagship CD players of all 'digital nasties', they've also snuffed out any spark of emotion.

No-one could criticise players like the Pioneer *PD-93*, Denon *DCD-2560* or Sony *CDP-X77ES* for their luxurious build or complement of facilities. But it seems crazy that cheaper players from all three companies were judged more faithful to the heart and

soul of the music. Players like the Pioneer *PD-8500* and particularly the Denon *DCD-860* formed the vanguard of our multi-bit contingent because, quite simply, they were not hampered by unnecessary over-engineering.

Denon's '860 is based on tried-and-tested 18-bit DACs with an eight times oversampling filter that's also used in Sony's budget *CDP-790* for example. But it's a successful combination giving rise to a spacious, detailed sound that holds together through the most arduous of tracks. Pioneer's machine is more full-bloodied and perhaps a little smoother too so, in this instance at least, extra pennies do buy you worthwhile improvements.

Ariston's latest *Maxim* player takes the 16-bit philosophy on a step or two and, despite its high cost, only narrowly escaped a formal recommendation. It's an honest attempt to produce a quality machine and certainly worth tracking down if you've preferred the flavour of Marantz's *SE* players in the past. Nevertheless, it was the PWM low-bit players that dominated the £300 mark with excellent units from Sony, Harman Kardon, NAD and Kenwood all jostling for position.

Both the *CDP-990* and Kenwood's *DP-7030* share the

same Sony low-bit DAC but each company has chosen to implement it in its own way. This is reflected in the sound, the Kenwood offering a warmer but more sober and refined outlook while the Sony bounds across with a lighter, breezier if no less detailed a perspective. Both machines are beautifully built though the Sony has the edge when it comes to advanced features like Custom File programming.

There's a similar contrast between the NAD *5440* and the *HD7500II* from Harman. Once again, both players employ the same low-bit DAC (in this case a MASH/PWM chip from Technics) but their application of the technology has resulted in two distinct tonal 'flavours'. Here it's the NAD that prefers to take things easy with a silky-smooth and thoroughly undemanding sound that's quite distinct from the youthful, up-beat enthusiasm of the *HD7500II*.

HK's player offers an exciting, expansive sound that's packed with dynamic detail without sounding relentless or demanding. It certainly hangs together with more confidence than the thinner, weaker and generally unsatisfying sound of their cheaper *HD7450* - a player that's based on identical technology by the way.

Cheaper still is the new budget player from Kenwood

*In truth what emerged was the thought that you needn't spend a fortune on a CD player to enjoy a decent foot-tapping sound. Not one player above £400 was judged sufficiently outstanding to warrant Recommendation.*



*CD or not CD: that is the question. Which ones survived the slings and arrows?*

which has been craftily engineered to provide what seems, at first sight, to be a very elegant sound. It's certainly even-handed but the DP-4030 still skips over fine musical detail. Yet because this veiling occurs in the most surreptitious fashion, its performance remains thoroughly engaging.

This leaves us with just three players that rose to even greater prominence in our listening tests. It would be facile to suggest that all the £1,000 players were the best thing since sliced-bread, following the predictable thesis that 'it's expensive therefore it's good'. But who has that sort of money to blow on a CD player these days?

No, these are three thoroughly accessible players.

Players that shone through in the listening tests without our panel having any knowledge of their price or manufacture. I am bound to ask, would the same conclusion have been reached if we had performed traditional 'sighted' listening tests?

Either way, Sansui's CD-X211 romped home with a very agreeable sound that benefitted from all the dynamic prowess of a good 16-bit player while avoiding the tendency towards grittiness. In fact our panel thought the treble slightly heavy, trading a honey-sweet colour for crystal clarity. This is certainly not the sort of player to aggravate a lean or bright sounding system and so seems ideally suited to many budget amps.

Its freedom from RF

garbage also guarantees a certain consistency from system to system while its bold orange display prevents any sort of confusion if you're firing-up at a distance by remote control! Add to this a coaxial digital output and you've an ideal budget CD transport, primed for future upgrades.

Two very new low-bit players, the NAD 5425 and Aiwa XC-700, complete our contingent of Best Buys. NAD's latest budget offering is apparently a less sophisticated version of the 5440. Ok, so the NAD-grey fascia is virtually empty of facilities but by plucking various components from within the player they've actually succeeded in freeing more of the music's natural life and vitality. It provides an

eternally optimistic view of the music without ever becoming brash or crude, an open and welcoming sound that captures rather than demands your attention.

Still, if the 5425 has a firm grip over the pace and excitement of its music, it is difficult to get quite so enthusiastic about the very limited convenience of the player. If all you really need is track skip, play and pause, then I'd opt for the remoteless 5420 and save another £30 - bringing it firmly in line with our final Best Buy of the month, Aiwa's XC-700.

Incredible as it might seem, the UK arm of Aiwa - including its marketing consultants - had no idea of the technological heart beating away inside this box. Perhaps it's best this way, for if they had known that their £180 player was equipped with Philips' prestigious 7350 PDM DAC then we would never have heard the end of it...

Blissfully unaware of this revelation, our panel of listeners heard through the camouflage and were clearly delighted with what they found. This player has a subtle, silky-smooth and effortless quality. It doesn't bellow detail from the speakers, but simply allows it to flow unhindered and collect in an irresistible pool of sound. Only if you prefer something markedly more aggressive will the delicate, fluid demeanour of the XC-700 be wasted.

Otherwise I can only report that it connected with our listeners in the most persuasive fashion, all of whom were willingly seduced by its refined but potent charm. All of this from a package that's generously equipped with facilities and available at a price that seems too good to be true. And this, lest we forget, this is what Best Buys are all about!



# Tech Talk

*Paul Miller explains how the CD player reviews were done and goes into some depth on the laboratory work behind them.*

If you've got this far then the change in presentation from previous CD Player issues is unlikely to have escaped your notice. But this is not change for change sake, instead we have striven to achieve a degree of consistency with the test and listening procedures successfully adopted in our amplifier issues.

Most importantly this means continuing to employ a variety of independent listeners to audition each and every CD player under blind conditions, the very heart of the Hi-Fi Choice evaluation procedures. Having tried a number of alternatives I have found this to be the fairest and most objective way to proceed, always ensuring that the atmosphere is relaxed and that the panellists are never suspicious of being 'tested' in some obscure way.

Each player was thoroughly warmed-up before being auditioned in isolation. It is simply not good enough to stack players one atop another and review them in succession because most - and especially the bitstream generation - are sensitive to radiated interference. I'll cover this in greater depth later. Anyway, each player is auditioned using a fixed series of CDs until every member of the panel has come to appreciate its relative strengths and weaknesses.

We've abandoned the notion of having the panellists write notes while they listen, instead they simply discuss what they have heard amongst themselves before attempting to relay something of the player's unique character. Their impressions are typed directly into the computer, the notes are read back and adjusted until the panellists are satisfied that they best reflect their collective opinion. Then, and only then, the panellists are informed of the player's price

so that they can make a value judgement that, though later tempered by build quality and facilities, forms the basis of our Recommendations and Best Buys.

Our ancillary equipment included 100S-series pre and power amplifiers from Deltec together with Snell *Type III* speakers, the preferred choice of our panel. The listening programme included excerpts from:

Marty Paich Big Band *Moanin'* (Discovery DSCD-962), Sadao Watanabe *Dedicated to Charlie Parker* (DenonDC-8558), Pet Shop Boys *Behaviour* (EMICDP794310), Tanita Tikaram *Everybody's Angel* (WEA 9031-73341), Prokofiev's Classical Symphony (Conifer CDCF 173) and *Holst Suite No 1* (Telarc CD80038).

## Measurement Programme:

CD-R (CD-Recordable) discs were used along with conventional test CDs from Sony, Technics, Philips and CBS to provide a wealth of information about each machine. Furthermore, dedicated computer programs were implemented to control a range of digital test equipment via an IEEE interface BUS, resulting in the various plots that accompany each review.

### Channel balance, separation, output level and Signal-to-Noise ratio:

Most CD players adhere to a nominal standard of 2V as far as their peak output is concerned, though many manufacturers will hike this up to 2.2V or more to give them a dB's edge in A/B listening tests. Remember, the loudest CD player is not necessarily the best CD player. If you intend using long interconnect leads or a passive volume control then do check the player has a

suitably low output impedance, less than 1kohm say.

The S/N is determined both with and without de-emphasis as a ratio of this maximum output (all DAC current sources on equals 0dB) against full digital zero (all DAC current sources off), measured in 3rd-octave mode over a 20Hz-20kHz bandwidth and with A-weighting to reduce the contribution of hum. The balance and separation between L and R channels are both assessed relative to this 0dB level at 20Hz, 1kHz and 20kHz.

### Distortion and resolution versus signal level:

In direct contrast with analogue systems like tape decks, phono cartridges and audio amplifiers, distortion in a digital system will increase as the level is decreased. In other words the quieter the sound the more distorted it becomes. This is because the CD format uses a linear quantisation to describe the amplitude of each audio sample and there are some 216 or 65536 equally-spaced quantisation levels spanning the full 16 bit range. Each of these levels is equal to one Least Significant Bit (LSB).

Consequently there are proportionally more levels available to describe the amplitude of a high-level than a lower-level signal. Fewer levels means a relative decrease in the accuracy of the coding (a quantisation error) and that, upon D/A conversion, means both added distortion and a shift away from absolute linearity. Most CD players will give of their best at 0dB (peak level) because here all the quantisation levels are engaged - figures as low as -100dB or 0.001 per cent distortion are not uncommon.

However even at peak level, distortion is likely to increase with frequency because of the added strain this places on the DAC's op-

amps and later analogue stages. Slew-limiting is the principal culprit here, increasing THD from -100dB to -80dB (0.01 per cent) or more. Other effects such as zero-cross distortion and glitches also make their presence felt at higher frequencies though, in the main, these problems are overcome by single-bit DACs such as the PDM, PWM or PEM devices found in many current CD players.

## A little noise

Figures for harmonic and intermodulation distortion are provided in each table, the former taken at 20Hz, 1kHz and 20kHz and at decreasing levels from 0dB to -90dB (dithered). Accordingly the linearity of the DAC is also revealed, both at 1kHz and 20kHz and down to a level of -100dB (dithered).

Theoretically the DAC should reproduce a -90dB tone at -90dB and a -100dB tone at -100dB for instance. In practice they rarely do, so the error in resolution of the DAC is written as the difference between the level that is expected and the level that is obtained.

Ideally they should be as close to 0dB as possible or, at least, any error that crops up at 1kHz should be matched at 20kHz. If not then you'll witness a change in the player's frequency response at progressively lower levels - changes that can be revealed on the two responses published for each machine. In a perfect world the peak-level response (upper trace) should be maintained at -60dB (lower trace), give or take a little noise.

### The 3D Spurious output and 2D 1kHz @ -70dB plots:

Having already discussed how distortion can arise, the result is portrayed most graphically on the accompanying 3D plots which show a complete audio band sweep

over its full dynamic range. Cast an eye over the example plot and we'll examine the different products more closely. Firstly there are the simple harmonic products (2)-(5) which are multiples of the main 20kHz-20kHz sweep (1). So, just as the main sweep (1) ends at 20kHz so the 2nd harmonic (2) ends at 40kHz, the 3rd harmonic (3) ends at 60kHz and so on.

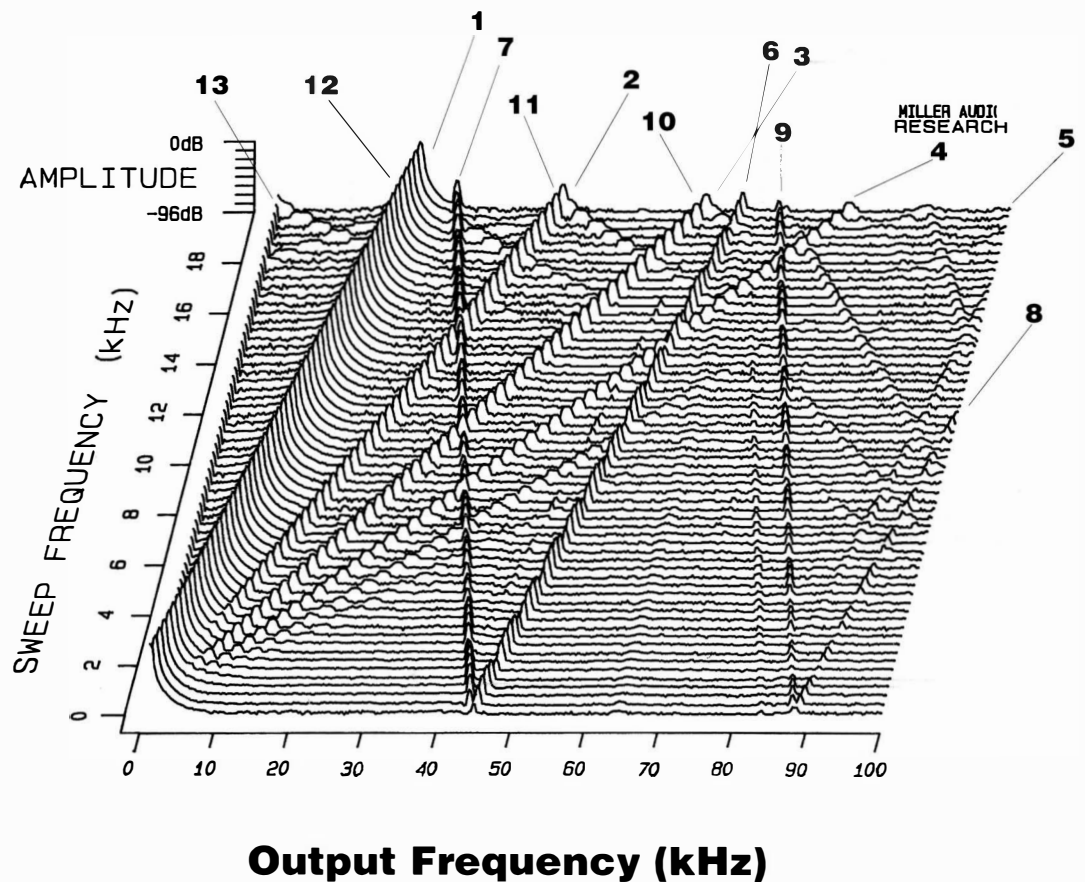
Additionally many plots will also reveal two V-shape tracks either in full or part. These are sampling images or aliasing distortion, reflections of the main sweep (1) either side of the 44.1kHz sampling and over sampling frequencies of 88.2kHz, 132.3kHz, 176.4kHz and so on. Of course, because my horizontal frequency scale only extends to 100kHz you only get to see the first two of these images in full. Sum and difference intermodulation products go to make up each 'V': either 44.1kHz plus (1) or 44.1kHz minus (1). The first option gives (6), the second gives (7) and both of these are called 2nd-order effects.

The same thing occurs either side of 88.2kHz which is the first oversample frequency, producing (8) and (9) respectively. Higher-order images caused by multiples of (1) at higher oversampling frequencies can also occur. The tracks (10)-(13) are the tail-end of just such images which begin at 176.4kHz, the 4x oversample frequency.

Only the very latest oversampling filters are able to suppress these images below the level of noise (look for the stop-band figure in the tests), the type of filter used in Sony's CDP-X77ES for instance!

## Manageable one bit chunks

At lower levels other problems come to the surface - hence the plot of 1kHz taken



at -70dB. For instance, this plot can tell you at a glance whether the player is using a conventional multi-bit or bitstream DAC simply by looking at the pattern of noise above 20kHz.

A bitstream DAC generates an awful lot of quantisation noise as it reduces the 16bit data into manageable one-bit chunks, so it uses a technique called noise-shaping to shovel as much of this noise as possible out of the audio band.

Hence the great hump of noise that curves upwards of 20kHz, the terminus of the audio band. With an ordinary 16 or 18-bit DAC you'll find the noise actually decreases above 20kHz revealing 'spikes' of distortion and sampling images.

At higher frequencies still we find contamination from various clumps of Radio Frequency (RF) noise that 'leak' from the crystal clock and various digital processors that go to make up each and every CD player.

Just how an amplifier responds to the huge differences in the level and type of ultrasonic noise produced by

these players could give us some clue to their characteristic differences in sound quality.

You might like to re-read the section on RF IMD which was last published in issue 92 and tie-up the unwanted RF produced by these CD players with the sensitivity to such RF demonstrated by many amplifiers.

Still, I feel I must reiterate my warning voiced in the Tech Talk for amplifiers. That is, do not use these plots as some sort of guide to the absolute quality of the CD players because this is simply not the case. Instead both the 3D and 1kHz/-70dB plots are very much a 'fingerprint' of the oversampling filters, noise-shapers and DACs that are employed in each player.

It's very easy to recognise whether a player is using a Philips, NPC or Sony oversampling filter for instance or whether the DAC is a 16-bit or one bit chip from Philips, a MASH/PWM DAC from Technics or a PLM bitstream DAC from Sony.

In most cases I've tried to link the electronics with these plots to give you a feel for

what's going on inside the player - just refer to the individual Lab Reports.

## Complex subjective jigsaw

Knowing all this without even having to look inside the player can give you a pointer towards its potential sound quality, even though the quality of its transport, power supplies and final analogue electronics will all have vital roles to play. Infact the type and source of DACs is only quite a small part of the eventual sound of a machine and you shouldn't necessarily opt for a machine just because it uses a DAC which is currently getting a good press.

The clues which measurement can provide are tempered by the unpredictable influence of RF noise and it all adds up to an extremely complex subjective jigsaw, which our poor old ears are asked to sort out. However as we uncover more pieces of the technological puzzle, little by little, the overall picture will eventually snap into focus.





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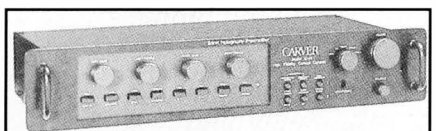
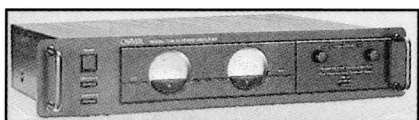
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Improve the sound of your hi-fi system with these top quality LC-OFC interconnects and PC-OCC speaker cables, available to Hi-Fi Choice readers at discount prices

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Furukawa speaker cables are manufactured from PC-OCC, better known to its friends as Pure Copper by Ohno Continuous Casting. This means that the single crystal copper conductors have virtually no grain, and therefore no grain boundary to impede the flow of signals. The speaker cables are available in a choice of terminations, either banana plugs, spades, pins or a combination of them. All terminations are gold plated and attached using a solderless connection to the cable.

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<i>Add £100 per stereo metre for other lengths</i>	

Please state termination required when ordering.

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FV1010 per 1m single .....	£42.50
FD1010 per 1m pair .....	£75
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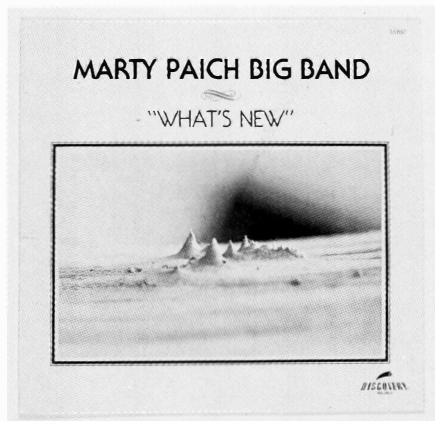
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Our mail-order service allows Hi-Fi Choice readers to buy some of the world's best audiophile records and CDs.



As top-quality 'audiophile' recordings seem to be becoming more and more difficult to find in High Street record shops, Hi-Fi Choice is making a determined effort to source some of the best recordings from around the world and make them available to readers by mail order.

You might stumble across one or two of these records in some specialist record shops, but for the most part these records and/or CDs are not readily available in the UK. You certainly won't find them in your local record store!

We have already added many exciting discs from specialist American record labels such as Reference, Wilson and Sheffield - and we expect our catalogue of LPs and CDs to expand considerably during the next few months.

## **RADKA TONEFF: Fairytale**

Ref LP1 £12.95

Ref CD1 £14.95

The well known audiophile (digital) recording of female voice and piano. Worth the asking price alone for the opening song, *The Moon's A Harsh Mistress*. Odin CD03/LP03

## **ARNE DOMNERUS' KVARTETT:**

**Blatner fra Frolldhaugen**

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**dances vocalise**

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## **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

## **TOTTI BERGH: I Hear A Rhapsody**

Ref LP4 £12.95

Ref CD4 £14.95

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

## **MARTY PAICH BIG BAND: The New York Scene**

Ref LP13 £12.95

Featuring Art Pepper, Victor Feldman, Jimmy Guiffre and Bill Perkins, this set includes extended modern stylings of some classic Broadway musical tunes by the likes of Cole Porter and Rodgers & Hammerstein. Discovery DS-844

## **MARTY PAICH: What's New**

Ref LP14 £12.95

Another superb recording of big band 'swing' jazz, this time featuring mostly Marty Paich original compositions. It doesn't seem possible that this was recorded in 1957. Like *The New York Scene* LP, which dates from 1959, the sound is quite breathtaking: vibrant, dynamic, and with a superbly natural soundstage. They knew what they were doing in those days. Discovery DS-857

## **OPUS 3 TEST RECORD 1: Depth Of Image**

Ref LP11 £12.95

Ref CD11 £14.95

Produced with the idea of analysing hi-fi systems and their ability to reproduce depth of image. This is Opus 3's best selling recording, containing examples of the work of many of its recording artists. Opus CD7900/LP7900

## **OPUS 3 TEST RECORD 3: Dynamics**

Ref LP12 £12.95

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Another compilation on the Swedish Opus 3 label, with musical extracts carefully chosen to illustrate what is

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Opus 3 CD8300/LP8300

**GREX VOCALIS: Renaissance For Kor**  
Ref CD15 £14.95

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**YTRE SULOENS JASS-ENSEMBLE / BARBARA ANN SHORTS: A Stone For Bessie Smith**  
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Blues and gospel singer Barbara Ann Shorts, backed by a small jazz ensemble with musical roots in the New Orleans tradition, pays tribute to the great US blues singer Bessie Smith who died in 1937. This collection of songs includes a fascinating re-working of Sting's *Moon Over Bourbon Street*. (Available on CD only.)  
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W805, WCD794/805.  
Another breathtaking example of Wilson Audiophile's pure analogue recordings, used as reference discs by hi-fi gurus around the world. The discs are hard to find in the UK.

**THELMA HOUSTON & PRESSURE COOKER: I've Got the Music In Me**  
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One of Sheffield Labs' most famous recordings. The original direct-cut has been out of print for many years and is now highly collectable — but the recording sessions were of course taped, and this issue will still blow your socks off! Sheffield ST200, CD2. Listed below are further highly collectable Sheffield Labs discs which are astonishing in their sense of realism and truly awesome dynamics:

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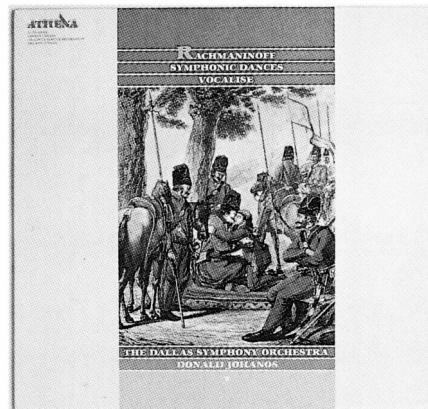
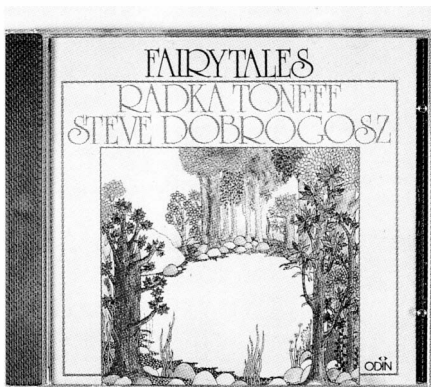
LAB14  
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CHRIS BROOKS HI-FI, 29 Gaskell St, Stockton Heath, Warrington. (0925) 61212/3. Tues-Sat 10-6. 2 dem rooms. Credit facilities. All credit cards Total absence of bull\*\*\*\* **BADA**  
CONGLETON HI-FI, 1/1a Duke St, Congleton, Cheshire, CW12 1AP (0260) 297544. Arcam, Linn, Naim Audio, Nakamichi, Epos, Audio Innovations, Marantz, Voyd, Royd, Rational Audio. Superbly appointed single speaker demo facilities. No appts nec, home trial facilities, free installation. 2 year guarantee on all equipment. Access, Visa. Mon-Fri 10-6, Sat 9.30-5.30, Other times by appt.  
NEW DAWN HI-FI, 1-3 Castle St, Lower Bridge St, Chester. (0244) 324179. Linn, Quad, Technics, National Panasonic, Denon, Rotel, Dual, Meridian, Aiwa, Philips.  
SOUNDSTAGE, 99 Brook St, Chester CH1 3DX. (0244) 341172. Linn, Alphason, Creek, Onix, Royd, Epos, NAD, Denon, Mission, Rotel. Two dem rooms. Home trial. Free installation. All major credit cards. Credit facilities. 9.30-6, 6 days. Evening dems by appt. Part exchange welcome.  
SWIFT OF WILMSLOW, 4-8 St Annes Parade, Wilmslow. (0625) 526213. Arcam, Denon, Kenwood, Musical Fidelity, Marantz, NAD, Cambridge. 2 dem rooms. Tues-Sat 9.15-6pm. No pressure! **BADA**

## CLEVELAND

GILSON AUDIO LTD, 172 Borough Road, Middlesbrough. (0642) 248793. Linn, Exposure, Arcam, Mission, Cyrus, Denon, Marantz, Rotel, Pioneer, Audioblab, Tannoy. Demonstration facilities in main shop and 1 dem. room, appt nec, home trial facilities, free install. on request, service department. Access, Visa, HP. 10-5 - 6 days

## CORNWALL

DEFINITIVE AUDIO, Redruth, Cornwall TR16 5NH. (0726) 844039. Voyd, Audio Innovations, Snell, Helius, Audio Note, System Dek, JPW, Deltac, Goldring, etc. Free Home Demo and Installations throughout Cornwall. Credit facilities. Open 7 days

## CUMBRIA

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. Dems 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, Kef, Kel Reference, Cyrus, Marantz, Revox, Rotel, Rogers, etc. Account and credit cards. Ring for opening times and free 'Fact Pack'. The only BADA member in Derbyshire. **BADA**

## DEVONSHIRE

CHELSTON HI-FI, 38 Walnut Road, Chelston, Torquay, Devon TQ2 6HS. Tel: (0803) 606863. Denon, Marantz, Rotel, Musical Fidelity, Acoustic Energy, NAD, Castle, Heybrook, Celestion, JPW etc. 2 dem rooms. Home trial. Free installation. Access, Visa, Amex, Diners, Hi-Fi Markets Chargecard. Credit facilities. 9.30-7.30 Mon-Fri, 9.30-6 Sat  
UPTON ELECTRONICS, 31 Torquay Road, Paignton, Devon. (0803) 551329. Pioneer, Denon, NWA, Musical Fidelity, Tannoy, Ruark, Arcam, Cambridge, Linn, Revolver etc. Single speaker dem room. Home dems. Apts. nec. 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.

## ESSEX

1ST AND FOREMOST HI-FI CENTRE, 49-55 North Station Road, Colchester, Essex CO1 1RQ. Tel: (0206) 549842. Fax: (0206) 762900. Tlx: 987873 SAIDG. Trio Kenwood, JVC, Akai, Aiwa, Sony, Pioneer, Technics, Nakamichi, Panasonic, Revox, etc. Home trial, free installation, Service dept. Instant credit available + all credit cards accepted. Mon to Sat 9am-6pm  
AUDIO T, 442/4 Cranbrook Rd, Gants Hill, Ilford. (081) 5180915. Mon-Sat, 10-6. Two dem rooms. Access, Visa. Sony Hi-Fi News Best Dealer '86 & '88 (National)  
BRENTWOOD MUSIC & HI-FI CENTRE, 2 Ingrave Rd, Brentwood. (0277) 221210. Alphason, Denon, Marantz, Quad, NMG, Rock/Glastonbury, E.A.R., Exposure, Kelvin Labs, Rotel, plus many more. Dem facilities, home trial, evening appts. (high end). Home installations. System problem diagnosis Mon-Sat 9.30-5.30 (Thurs from 10am, Sat from 9am). Credit facilities, Access, Visa, Hi-Fi Markets Chargecard. Service facilities  
LYON AUDIO, 16 Peartree Business Centre, Peartree Road, Stanway, Colchester, Essex CO3 5JN. (0206) 560259. Quad, Rogers, Mission, Denon, Cyrus, Marantz, Audioblab, Rotel, NAD, Wharfedale. Dem facilities. Mon-Sat 9-6. Installations. Access, Visa, Instant credit. Service dept  
RAYLEIGH HI-FI, 44a High Street, Rayleigh, Essex. (0268) 779762/747571. 216 Moulsham St, On-the-Parkway, Chelmsford. (0245) 265245. 132-134 London Road, Southend-on-Sea. (0702) 435255. A&R, Creek, Cyrus, Denon, Epos, Ion, Linn, Mission, Naim, Quad, Rega, Roksan, Rotel, Royd. 0% finance. **BADA**  
THOMSONS, 2 High Street, Great Baddow, Chelmsford, Essex. Tel: (0245) 71465. JVC, Kenwood, Mitsubishi, Toshiba, Tannoy, Mordaunt-Short, Acoustic Research, 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.  
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

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 plus others. Dem facilities, appointments necessary. 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.



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## HEREFORDSHIRE

ENGLISH AUDIO, 95 Whitecross Road, Hereford HR4 0DG. (0432) 355081. Musical Fidelity, Arcam, Pink Triangle, Denon, Marantz, Rogers, Audio Innovations, Rotel, Nakamichi, Heybrook and others. Dem room. Home trial. Free install. Service dept. Access, Visa, Credit arranged. Open Mon-Sat 10am-6pm.

## 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

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.

DYNAMICS, Welwyn, Herts. (0438) 714038. Mark Levinson, Threshold, Oxford Acoustics, Meridian, Infinity, Mirage, Proac, Melos, Air Tangent, Roland. We buy, sell & exchange all high end audio, special offers always. Demo room, available by appointment. Service. Installations. Access & Visa. Mon-Sat 10-7, Sun 10-1, or other times by apt.

HYPERTEC, 6 Bancroft Road, Hitchin, Herts SG5 1JQ. (0462) 452248. B&W, Denon, Marantz, Musical Fidelity, Pioneer Reference Point, Rotel, Tannoy, Wharfedale, Bang & Olufsen, Linn, Alphason. 2 dem rooms without appt. Private dem room + evening dem by appt. Home trial. Free install. Service dept, Access, Visa, Hypertec credit charge. 9.30-5.30. Closed Wed.

STUDIO 99, 82 High Street, Harpenden. (05827) 64246. Linn, Naim, Meridian, Rega, Nakamichi, Mission/Cyrus, Quad, Creek, KEF, Bang & Olufsen, Yamaha etc. Quiet single speaker dem room. Appts nec. Home trial, free install. Service Dept. Visa/c, Access/c & finance terms. 9-5.30pm (Mon-Sat). Closed Weds.

THE AUDIO FILE, 27 Hockerill St, Bishops 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

## 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.

## KENT

HI-FI CENTRE LTD, 65 King Street, Ramsgate. (0843) 590321. A.R., Aiwa, Ariston, Celestion, Goodmans, Kenwood, Marantz, NAD, Radford, Tannoy etc. + guaranteed recon. equip. Dem room + home dems. Hi-Fi repairs & servicing. Trade in & Cred facs. Mon-Sat (9.30-5.30).

THE HIFI FACTORY, 103 Kirkdale, Sydenham SE26 4JQ. (081) 291 0095. Bose, Tannoy, Mordaunt Short, Cerwin Vega, Celestion, JVC, Kenwood, Philips and many more. Plus cheaper ex-demo systems & separates available. Demonstrations available no appts nec. 7 day home trial, installation available, service and repair dept. Access, Visa. Instant credit available up to £1000 subject to status. Open 10.30-7.00 Monday-Saturday.

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

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 to 5 only). Service Dept.

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

TONBRIDGE HI-FI, 96 Woodlands Road, Gillingham, Kent. (0634) 52858. Linn, Naim, Rega, Pink Triangle, Exposure, Creek, JRT, Sony, Ruark, KEF, Arcam etc. If your interest is music pay us a visit & find out what we do  
TONBRIDGE HI-FI, 31 High Street, Tunbridge Wells, Kent. (0892) 24677. Linn, Naim, Rega, Pink Triangle, Exposure, Creek, JRT, Sony, Ruark, KEF, Arcam etc. If your interest is music pay us a visit and find out what we do

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, 131 Friargate, Preston PR1 2EE. (0772) 53057. Fax 562731 Sony Hi-Fi News Area Winner. Aiwa, B&W Loudspeakers, Denon, Marantz, Mission, Cyrus, Monitor Audio, Nakamichi, Quad, Roksan, Rotel & many others! 2 lux. dem. lounge. Home trial by arrangement. Free install. Service dept. Inst. cred. facs. with several companies. Most credit cards accepted, 6 days 9-5.30.

## LEICESTERSHIRE

ALPHA AUDIO, 1-3 Guildhall Lane, Leicester LE1 5FQ. (0533) 530 330. Allison, AR, Denon, Luxman, Proton, Revox, Teac, Thorens, plus lots more. 3 dem rooms. Jovial, friendly, crazy staff. Relaxed atmosphere. Home trial facilities, free installation, service dept on premises. Credit facilities (sort of interest free) 10-5, closed Thurs afternoons (sometimes)

MJS HI-FI, 80 Stapleton Lane, Barwell, Leicester LE9 8HE. (0455) 46977. The Rock, Audio Innovations, Kelvin Labs, Snell, Helius, Sugden, Ruark, Concordant, Valdi, JPW. Dem and home trial facilities. Mon-Sat 9.30-7.00. Free installation and service dept. Access, Visa.

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 only Bada member.

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, Creek, Ariston, NAD, Denon, Marantz, Castle, Rotel, JPW. Separate demo studio. Home trial. Free installation. Service dept. Access, Visa, Hi-Fi Markets Chargecard. Tues-Sat 9-5.30pm

## LONDON

ANALOG AUDIO, 849 High Road, London N12. (081) 445 3267. Denon, Dual, JBL, NAD, Marantz, Rotel, Wharfedale, Cerwin Vega, Teac, Mordaunt Short. 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, Originale, Orthophon MC3000II + MC5000 + T3000, Pirates, Rata, Revox, Rotel, Riso Industries, Rock Reference, Snell, Supra, Systemdek, Target, Triangle Products, Valdi, Vecture, Voyd & Reference Voyd. Home dems. 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 dem rooms. Closed Weds

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.

CORNFLAKE SHOP, 37 Windmill Street (just off Tottenham Court Road), London W1. (01) 631 0472. Mon-Sat 10-7. Rega, Roksan, Naim, Monitor Audio, Koetsu, Marantz, Yamaha, SME, DNM, Epos. Three dem rooms. Delivery and installation service. Credit facilities. Access, Visa

DOUG BRADY HI-FI, 14-18 Monmouth St. London WC2H 9HB. (071) 3794010. Wide range of top specialist hi-fi from Britain, America and Japan. 3 dem rooms.

GRAHAMS 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

THE HI-FI FACTORY, 103 Kirkdale, Sydenham, SE26 4JQ. 081 291 0095. Bose, Tannoy, Mordaunt Short, Cerwin Vega, Celestion, JVC, Kenwood, Philips and many more plus cheaper ex-demo systems & separates available. Demos available. No appts nec, 7 day exchange home trial, installation available, service & repair dept. Access, Visa. instant credit available up to £1000 subject to status. 10.30-7pm Mon-Sat.

JUST MUSIC, 52 Upper Tooting Road, London SW17 7PB. (081) 767 1233. Aiwa, Dual, Denon, Marantz, Quad, Rogers, Thorens, Musical Fidelity, Sugden, Heybrook and many more. Dem facilities. Appts can be arranged. Home trial. Free installation available. Access, Visa, Amex, Hi-Fi Markets Chargecard, Creditcharge, finance arranged. 10am-7pm Mon-Thurs, 10-6 Fri & Sat.

KAMLA ELECTRONICS, 251 Tottenham Court Road, London W1. (071) 323 2747. Alchemist, Alphason, Audio Innovations, B&W, Cerwin Vega, Conrad Johnson, Furukawa, Infinity, Jeff Rowland, JPW, Kenwood, Kuzma, Linn, Micromega, Moth, Nakamichi, Oracle, Philips, QED, Revolver, Ruark, SD Acoustics, Systemdek, TEAC, Wharfedale & millions more. Demo facilities and home trial. Major cards and currencies accepted. Mon-Sat 10-6

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).

SOUND ORGANISATION LONDON, 1 Cathedral Street, London SE1 9DE. (071) 403 2255/3088. Linn, Rega, Roksan, Micromega, Radford, Rotel, Nakamichi, Onix, Creek, Naim, Exposure, Royd, Heybrook, Epos. Interesting new equipment always under evaluation. Single speaker listening room. Credit facilities. Appts preferred, free install, Service dept. Open Tues-Sat 10-6. Late dem. by appt.

SOUND SENSE, 350 Edgware Road, London W2 1DX. (071) 402 2100. Alphason, B&W, Nakamichi, Celestion, Cambridge Audio, Dual, Denon, Monitor Audio, Marantz, NVA, Sony ES. Appts preferred. Installations available. Access, Visa, Standard credit facilities. Mon-Sat 9.30-6.30.

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, London NW6. (071) 624 8855. Linn, Naim, Meridian, Rega, Quad, Nakamichi, Mission/Cyrus, KEF, Bang & Olufsen, Yamaha, Creek etc. 2 single speaker dem rooms. Appts. nec. Home trials, free install. Service dept. Visa/c, Access/c & finance terms. 10-7 Mon-Fri, 10-6 Sat.

TIME AND TUNE, 218/220 Whitechapel Road, London E1 1BJ. (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

## GREATER MANCHESTER

THE AUDIO COUNSEL, 12 Shaw Road, Oldham, Manchester OL1 3LQ. (061) 6332602. 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

CHRIS BROOKS AUDIO, 10-12 Oak Street, Hazel Grove, Stockport SK7 4EJ. (061) 419 9050. Tues-Sat 10-6. 2 dem rooms, credit facilities. All credit cards. Just like the Warrington shop - total absence of bull\*\*\*\*

MURRAY HI-FI, 19 Middle Hillgate, Stockport. (061) 429 7666. Linn, Naim, Rega, Arcam, Yamaha, Royd, Epos, Creek, Nakamichi, Rotel. Full demo facilities, free installation & delivery, service dept. Full 2yr guarantee on all products. Access, Visa, Lombard Tricity, licensed credit broker. 10-6 Tue-Sat.

SWIFT HIFI 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

HARROW 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

NORTHWOOD AUDIO, 126 Pinner Road, Northwood, Middlesex HA6 1BP. (0927) 420877. Exposure, Musical Fidelity, Pink Triangle, Mantecore, Audio Innovations, Rotel, Ruad, Ruark, SD Acoustics, Moth. Dem room. Home trial Free install. Access, Visa. 9-6 Mon-Sat

RIVERSIDE HI-FI LTD, 422 Richmond Road, East Twickenham, Middlesex TW1 2EB. Tel. (081) 892 7163. Fax (081) 892 7749. A.R., Arcam, Audio Innovations, Castle, Dual, Denon, KEF, Luxman, Michell, Musical Fidelity, Micromega, Marantz, Nakamichi, Rotel, Spendor, 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

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UXBRIDGE AUDIO LTD, 278 High St, Uxbridge, Middx UB8 1LZ. (0895) 30404 (Multi-line). A&R, AR, Ariston, Creek, Cyrus, Denon, Dual, JPW, KEF, Mantecore, Meridian, NAD, Nakamichi, Quad, Rotel, Wharfedale, Yamaha, etc. 2 dem rooms. Mon-Sat 10-6 **BADA**

## MERSEYSIDE

BETTER HI-FI, 16 Cook St, Liverpool L2 9RF. (051) 227 5007. Linn, Naim, Quad, Arcam, Audio Innovations, Threshold, Creek, Denon, Yamaha, Mordaunt Short 3 dem rooms. Home trial. Free install. Service Dept. Access, Visa. Instant credit up to £1000. 0% on certain items. 9-5 Mon-Sat.

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. **BADA**

INCONCERT 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.

## NORFOLK

BASICALLY SOUND, The Old School, School Rd, Bracon Ash, Norwich NR14 8HE. (0508) 70829. Arcam, Linn, Naim, Denon, Spendor, Exposure, Audio Technica, Creek, Rega, Epos, etc. 2 comprehensive dem rooms. Home trial. Free installation. Visa, Access, HP facilities. Tues-Sat 9.30-1, 2-5.30

MARTINS HI-FI, 5 High Street, Kings Lynn. (0553) 761683. Est. 1968. **BADA**

MARTINS HI-FI, 85/91 Ber Street, Norwich. (0603) 627010. Est. 1968. **BADA**

SOUND APPROACH, 161a Unithink 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.

THE AUDIO SHOP, Coffee Tavern Court, High St, Rushden. (0933) 56651. Denon, Goldring, Ariston, Tannoy, Royd, Mordaunt Short, JPW, Ion Systems, Rotel, Creek. Dem room. Home trial and free installation. Mon-Sat 9.30-5.30 (Thurs 9.30-2). Service dept

## NOTTINGHAMSHIRE

CHANTRY AUDIO, Chantry Walk, 18a Eldon Street, Tuxford, Newark, Notts NG22 0LH. (0777) 870372. Pink Triangle, Royd, JPW, Rotel, S.D. Acoustics, NVA, Michell, Art Audio (valve), Kelvin Labs, Sumo and much more. 2 dem rooms, appts preferred. Home trial, free installation. Access, Visa & credit facilities and mail order. Mon-Fri 10am-4.30pm. Sat 9.30-5.30. Sun home dem by appt. Closed Weds

DEFINITIVE AUDIO, (0602) 813562. Voyd, Audio Innovations, Snell, Hellius, Systemdek, Revox, Deltec, JPW, Pirate, Loewe Audio Visual plus more. Home dems through Notts and E. Mids. Free install. 10-7, 7 days. Tel: (0602) 813562 for further info appt

## WEST MIDLANDS

AUDIO CENTRE MAINWAY, Sharing Asda Car Park, High Street, Bloxwich, Walsall, W. Midlands. (0922) 473499/493499. Meridian, Kef Reference, Arcam, Rogers, Musical Fidelity, TDL, System Dek, Moth, 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 **BADA**

GRIFFIN AUDIO LTD, 94 Bristol Street, Birmingham. (021) 692 1359/(021) 622 2230. Castle, Creek, Cyrus, Denon, Linn, Marantz, Naim, Quad, Rega, Rotel. Tues-Sat 10-6. **BADA**

HORNTON ELECTRONICS (1967) 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) 4292811. 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.

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. **BADA**

## OXFORDSHIRE

ASTLEYAUDIO 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

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 SY11 0J. (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.

CREATIVEAUDIO, 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, Deltec, Denon, Dual, Infinity, Kenwood, Mordaunt Short, Musical Fidelity, Etc. Demo room, free parking, free installation, repairs.

## SOMERSET

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. (0456) 72440. Aiwa, Castle, Dual, Denon, KEF, Ortofon, Quad, Rogers, Tannoy, Thorens, Yamaha. Dem and home trial facilities. Mon-Sat 9-1, 2-5.30, Wed 9-1. Free installation. Credit to £1,000. Access, Visa. Service dept.

## STAFFORDSHIRE

ACTIVE AUDIO, 29 Market Street, Tamworth, Staffordshire. (0827) 53355. Arcam, Ariston, Celestion, Denon, 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, 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 Bransford Road, Burton-on-Trent, Staffordshire DE14 3DQ. (0283) 33655. Audio Innovations, Arcam, Castle, Denon, Pink Triangle, Rotel, Rogers, Systemdek, SME, Quad, Voyd. Demonstrations facilities available, appointments necessary on Saturdays. Free installation. Service department. Access, Visa. 9.00-5.30pm. Closed Wednesday. Closed for lunch 12.00-12.30.

INTERSOUNDS, 62 Bennett Precinct, Longton, Stoke-on-Trent. (0782) 336233. Arcam, Denon, Dual, Mission, Musical Fidelity, NAD, Nakamichi, Revolver, Rotel, Systemdek, etc. G 000 8 different speaker manufacturers. 2 dem rooms. Free install. In-house service dept. Access, Visa, £1000 credit subject to status. 9.30-5.30 Mon-Sat. Closed Thurs.

MUSICAL APPROACH, Unit 7, Waddings Yard, Baileys 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. **BADA**

## 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. (0743) 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, 5 Mead Lane, Farnham, Surrey GU9 7DY. (0293) 619295. Audio Innovations, JPW, Luxman, Marantz, Ortofon, Rotel, Snell, Sugden, Teac, Voyd. Dem room and evening appointments available. Home trial facilities. Free installation. Access, Visa. 10.30-6 Mon-Sat. Closed Tuesday, 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.

SOUNDS EXCLUSIVE, 1 Kent House, High Street, Cranleigh, Surrey GU6 8AU. (0483) 268185. Marantz, Sumo, QED, Michell, Alphason, SME, Ortofon, Finestra, Proac, Bose. Home trial. Dems a pleasure. Appts. preferred. Service dept. Free install. Access, Barclaycard.

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. **BADA**

SURBITON PARK RADIO, 48 Surbiton Rd, Kingston-Upon-Thames, Surrey. (081) 546 5549. Quad, Dual, Denon, Kenwood, Nakamichi, Rotel, Pioneer, QED, B&W, Tannoy. Dem and home trial 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. Single speaker demo room. Appts not necessary, home trial facilities, free installation, service dept. Access, Visa, Mastercard. 9-6 6 days a week

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

## SUSSEX (EAST)

DEFINITIVE AUDIO BRIGHTON, 8 Dyke Road Mews, 74-76 Dyke Road, Brighton BN1 3JD. (0273) 208649. Voyd, Systemdek, Audio Innovations, Hellius, Audionote, JPW, Snell, Pirate Stands, Goldring etc. Home dems throughout Sussex. Credit facilities. Visa.

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. Marantz, Cambridge, Kenwood, Denon, Rotel, Infinity, Tannoy, Michell, KEF, Heco etc. Dem room. Home trial. Free installation. Service dept. Visa, Access. 9am-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



# The Choice Dealer Directory

BRITISH AUDIO DEALERS ASSOCIATION

# BADA

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## SUSSEX (WEST)

CHICHESTER HI-FI, 7 St. Pancras, Chichester, W. Sussex PO191SJ. Tel: (0243) 776402. Linn, Naim, Rega, Creek, Nakamichi, A&R, Denon, Roksan etc. Tues-Sat, 10-1, 2-5.15 (closed Mon).

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

BILL HUTCHINSON LTD, 87A Clayton Street, Newcastle-Upon-Tyne. Tel: (091) 230 3600. A.R., Aiwa, Denon, Dual, JVC, Mission, Mordaunt Short, Omar, Technics, Yamaha, etc. Demonstration facilities. Free installation, service department. Instant credit. Access, Visa. Mon-Sat 10-6.

RED RADIO SHOP AND HI-FI CENTRE, 11 Olive Street, (Off Park Lane), Sunderland (091) 567 2087. Castle, Denon, Bose, JVC, Kenwood, Mordaunt Short, Michell, Teac, Tannoy, Shure. Dem room, large with comparator facility. Free install. Service dept. Interest free credit and no deposit interest free credit. 9am-5.30pm daily

## WARWICKSHIRE

NAAM HI-FI VISION, 78 Lower Precinct, Coventry CV1 1DX. (0203) 632086. Technics, Pioneer, Kenwood, AR, Akai, Aiwa, Panasonic, Toshiba, Wharfedale, KEF. Demo facilities. Access, Visa, Amex, Lombard Tricity credit charge. 9.00-6.00 Mon-Sat

## WORCESTERSHIRE

WEST MIDLANDS AUDIO, 158 Ombersley Road, Worcester WR3 7HA. (0905) 58046. Linn, Naim, Rega, Absolute Sounds, Meridian, Mission, Arcam, Ion Systems, Roksan. 3 dem rooms for budget. High end & Audio Visual appointment necessary. Home trials. Free installation. Service Dept. Access, Visa, Amex, Diners, Lombard/Hitachi. Mon-Fri 9.30-8.30 by appt Sat 9-5.30

## YORKSHIRE (NORTH)

SCARBOROUGH HI-FI CENTRE, 53 Dean Road, Scarborough, N. Yorks YO12 7SN. (0723) 374547. Aura, B&W, Mission, Quad, NAD, Oxford, Alphason, Rogers, Nakamichi, Ruark, Voyd. Dem room, appointment preferred. Home trial facilities. Free installation. Service dept. Access/Visa/Creditcharge/£1,000 instant credit/Amex/Diners. 10-6 Tues to Sat

HARROGATE HI-FI CENTRE, 15 Commercial Street, Harrogate, N. Yorks HG1 1UB. (0423) 504274. Aura, B&W, Mission, Quad, NAD, Oxford, Alphason, Rogers, Nakamichi, Ruark, Voyd. Dem room, appointment preferred. Home trial facilities. Free installation. Service Department. Access/Visa/Creditcharge/£1,000 instant credit/Amex/Diners. 10-6 Tuesday to Saturday

SOUND ORGANISATION YORK, 16 Gillygate, York YO3 7EQ. Tel: (0904) 627108. Linn, Naim, Rega, Roksan, Sony, Arcam, Mission, Denon, Ion, Rotel 2 single speaker dem rooms. Appts preferred. Home trial. Free installation. Service dept. Access, Visa. Instant free credit available. 10am-6pm Tues-Sat. Sony dealer. Award nominated '86, '87, '88.

TRC HI-FI, 3 Kings Cross St, Halifax HX1 2SH. 0422 366832. Full demonstration facilities at any time, no appts nec, free install, service dept. Access, Visa, Lombards credit charge available. 9-5.30 Mon-Fri, Closed Thur, 9-5 Sat 10-4.

## YORKSHIRE (SOUTH)

HI-FI STUDIO, 5 Norman Cres., Sunnyfields, Doncaster (0302) 781387. Heybrook, Monitor audio, Art Audio, TDL, Michell, Sugden. Acoustic Energy, Alphason, Teac, Dual. Listening room demos, appointments necessary. Home trial. Free installations. Service available. Access, Visa. 10-8pm 7 days. Phone for further info

MOORGATE ACOUSTICS, 184 Fitzwilliam St, Sheffield. (0742) 756048. Roksan, Linn, Musical Fidelity, Denon, Meridian, Krell, Quad, Audio Research, Exposure, Nakamichi, 2 demo rooms. Free installation. Service Dept. Access, Visa, Credit 9.30-5.30 Closed Mon

MOORGATE ACOUSTICS, 8 Westgate Chambers, Rotherham. (0709) 370666. Roksan, Linn, Musical Fidelity, Denon, Meridian, Krell, Quad, Audio Research, Exposure, Nakamichi. A multitude of demo rooms. Free installation. Service dept. Access, Visa. credit facilities. 9.30-5.15 Closed Thurs

## YORKSHIRE (WEST)

AUDIO PROJECTS, 45 Headingley Lane, Leeds. (0532) 304565. A&R, Audiolab, Creek, Heybrook, Linn, Musical Fidelity, Naim, Quad, Rega, etc. Tues-Fri 9.30-6, Sat 2.30-5.30

AUDIO VISION (BRIGHOUSE) LTD, 5 Bethel St, Brighouse, W. Yorks. D6 1JR. 0484 713996. Largest range of Technics hi-fi in Yorkshire, Aiwa separates, Mordaunt-Short and Castle Acoustics Speakers. Panasonic, Finlux & Mitsubishi. Naim TVs & Hi-Fi VCR's. Excellent CD dems. using comparator facs & over 1000 CD titles. Appts. pref. please phone. Free expert install. In-store Service dept. Visa, Access, Credit charge. Licensed credit broker. Open Mon-Fri 9-6, Sat 9-5.30

ERRICKS, Rawson Square, Bradford, (Near John St Market). (0274) 309266. A&R, Linn, Quad, Exposure, Nakamichi, Mission, Denon, Kenwood Private demo rooms, no appt nec, home trial facilities, free installation, service dept. Access, Visa, licenced credit broker. Mon-Sat 9-5.30 (Tue 10-5.30).

HUDDERSFIELD HI-FI CENTRE, 4 Cross Church St, Huddersfield. (0484) 544668. B&W, Kenwood, Denon, Dual, Arcam, Musical Fidelity, Quad, NVA, Audio Lab, Philips, Mission, etc. Dem facilities - appointment reqd. Mon-Sat 9-5.30, Thurs 9-8. Closed Wed. Free installation, credit facilities. Access, Visa. IMAGE HI-FI Ltd, 8-10 St Annes Rd, Headingley, Leeds. (0532) 789374. AR, Audio Lab, Denon, Linn, Marantz, Meridian, Mission, Monitor Audio, NAD, Quad

IMAGE HI-FI, 17 The Springs, Wakefield, WF1 10E. (0924) 200272. AR, Audio Lab, Denon, Linn, Marantz, Meridian, Mission, Monitor Audio, NAD, Quad.

SELECTIVE AUDIO, The Forge Cottage, 19 Crossgate, Otley. (0943) 467689. Exclusively handles Alphason, Roksan, NVA, ProAc, TDL, JDI, in the area and other minimalist British designer products for the discerning listener. Dem facility. Member of the Cognoscenti. Mon-Sat 10-6.

T.R.C. HI-FI, 3 Kings Cross St, Halifax. (0422) 366832. Alphason, Castle, Denon, Harmon/Kardon, Kenwood, Quad, Rotel, Technics, Wharfedale. Free Installation. Service dept. No Appt nec. 9.00-5.30, closed Thur.

## NORTHERN IRELAND

### ARMAGH

LYRIC HI-FI, 84 Bridge Street, Portadown, Armagh, N. Ireland. (0762) 358 059. Linn, Naim, Rega, Arcam, Denon, Rotel, Musical Fidelity, Revox, Mission, Akai, Panasonic, etc. Mon-Sat 10am-6pm.

### BELFAST

LYRIC HI-FI, 163 Stranmills Road, Belfast. (0232) 381 296. Linn, Naim, Rega, Arcam, Denon, Rotel, Musical Fidelity, Revox, Mission etc. Mon-Sat 10-6, Late night Thurs.

ZEUS AUDIO, 6 Hope Street, Belfast. (0232) 332522. Audio Innovations, Pink Triangle, Roksan, Marantz, Celestion, Linn, Meridian, Mission Cyrus, Ortofon, etc. Mon-Sat 10.00-5.30, Late night Thurs.

## COUNTY DOWN

ASTON AUDIO, 17 Hillhead Road, Dundonald, Belfast. 0247 872431. Akai, Technics, JVC, Pioneer, Mitsubishi, Panasonic, Toshiba, Sharp, Sanyo. Demos available. No appts nec, service dept. Please phone for directions. Mon-Fri 2-8, Sat 10-4.

## LONDONDERRY

ZEUS AUDIO, 23a Kingsgate Str, Colrairie, BT52 4LB. (0265) 56634. Marantz, Mission Cyrus, Aiwa, Akia, Alphason, Sony, Pink Tri, Celestion, Rotel. Open Mon-Sat 10-5.30, Closed Thurs.

## EIRE

CEOL PRODUCTS, 185 Lower Rathmines Road, Dublin 6. Tel: 0001 975984 961358. Alphason, Audio Innovation, Exposure, Linn, Marantz, Monitor Audio, Mordaunt Short, Musical Fidelity, Rega, Roksan. Single Speaker listening rooms. Free installation. All major cards. Mon-Sat 9.30-6.00.

## SCOTLAND

### CENTRAL

HI-FI CORNER, 44 Cow Wynd, Falkirk. (0324) 29011. Nakamichi, Denon, TDL, Ruark, Technics, Luxman, Thorens. 9.30-5.30 Mon - Sat Closed Weds. Demo room available.

### EDINBURGH

BILL HUTCHINSON Ltd, 43 Clarke St, Edinburgh. (031) 667 2877. AR, Aiwa, Denon, Dual, JVC, Mission, Mordaunt-Short, Omar, Technics, Yamaha etc. Dem facilities. Mon-Sat 10-6. Free installation, instant credit. Access, Visa Service dept

HI-HI CORNER, 121b Rose Street Pedestrian Precinct, Rose St, Edinburgh EH2 3DD. 031 220 1535. Large range of products such as Nakamichi, Arcam, Audio Lan, Quad, Cyrus, Mission, Allison, Proton, NAD, Technics. Mon-Sat, 10-5.30pm, Thurs 10-7.00pm

RUSSANDREWSHI-FI, 34 Northumberland St, Edinburgh. (031) 557 1672. Linn, Naim, Rega, Arcam, Rotel, Marantz, Nakamichi, Quad, MS, MA, Yamaha Demos. 10-5.30 Mon-Fri, 10-5 Sat

## GLASGOW

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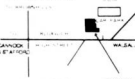
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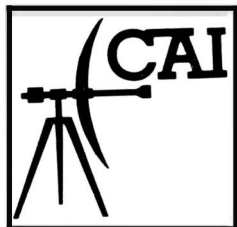
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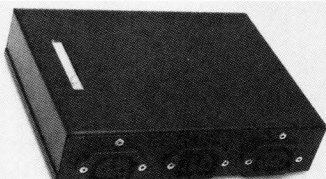
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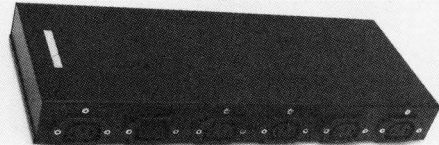
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# The Directory

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 meritworthy. The Best Buy tag means that a product not only offers good sound quality but is reasonably priced as well. With source components a price limit of approximately £300 is usually used as a guide. Recommended means that either the performance of a product is particularly good irrespective of price or, alternatively that a good value standard is achieved but overall attainment falls short of Best Buy classification. 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 electromagnetical 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 components, but only experiencing the actual combination will tell you whether it works for you.

The final column contains a reference to the issue of *Hi-Fi Choice* which featured the complete review. If you wish to get a better idea of a product by reading the complete review it is possible to order a copy (if still in print) through our back issues department. Every *Choice* issue contains a Back Issues page for this purpose.

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

## TURNTABLES & TONEARMS

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
<b>Acoustic Research EB-101</b> £230	Good Good	This genuine high fidelity product offers an impressive package at a competitive price	Subchassis, manual, 13.5g	BB	48
<b>Alphason Solo/Xenon MCS</b> £440/£320	Average Good	The deck is warm and euphonious with high levels of clarity. Wow artefacts occasionally just audible	Suspended motor unit, optional quartz PSU, 13g		67
<b>Alphason Sonata/HR-100S</b> MCS/Atlas £760/£500/£360	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
<b>Alphason Super Nova</b> £300	Good Good	Informative, easy to listen to and quite lively deck with good detail and occasionally uneven bass. Build quality of review sample not perfect	Subchassis, manual, belt drive, detachable arm, 12g	R	91
<b>Ariston Forte</b> £350	Average - Average	Heavy on engineering, short of soul? The Forte almost makes it, losing out only because of some residual pitch variations and a lack of bass power. The arm is modestly good	Manual 2-speed belt drive player and detachable arm, 10g		67
<b>Ariston Icon</b> £215	Good Good	A thoughtful and efficient design that offers good sound, excellent value and semi-automatic operation too! Good vibration isolation eases siting	Belt drive, suspended, semi-automatic, 10g	BB	79
<b>Ariston Pro</b> £180	Good Good	Remarkably clear and detailed for the price, very neutral. Benefits from cartridge upgrade	Manual, belt drive, 12g	BB	91
<b>Ariston Q-Deck</b> £165	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	BB	67
<b>Dual CS430</b> £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
<b>Dual CS5000</b> £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
<b>Dual CS503-2</b> £140	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
<b>Dual CS505-4</b> £160	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
<b>Goldmund ST4</b> £4589	Very Good Excellent	The Studio turntable takes on a cheaper tonearm than the T3F, yet provides a similar reference standard objective and subjective performance at £2,000 less, in a neatly integrated though bulky package	Solid subchassis, direct drive, parallel arm, detachable h/shell	R	60
<b>Heybrook TT2 turntable &amp; arm</b> £424/£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, belt drive, 14g	R	67
<b>JVC AL-FQ555</b> £170	Average - Poor	Clear midband sound but woolly bass and crude treble. Ease of use however ranks highly, and there's little to go out of adjustment	Auto, direct drive, 5.5g		67
<b>Kenwood DP-990</b> £400	Average Average	Smart, slick and massive player suitable for low compliance cartridges only. A good but not inspired performer	Semi-auto 2 speed direct drive, 16g		67
<b>Kuzma Stabi/Stogi Reference</b> £900/£700	Very Good Very Good	Beautifully made in a solid oak plinth, the Stabi also sounds very clear, detailed and extended. Stogi Reference is also most capable.	Manual, belt drive, subchassis, 12g	R	91
<b>Linn Axis/Akito</b> £433	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
<b>Linn LP12-Lingo/Ekos/Troika</b> £1128/£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
<b>Manticore Mantra/Musician</b> £340/£170	Good + Good +	Well engineered deck with satisfying sound. The arm is particularly fine and very good value	Belt drive, suspended, 15g	R	79
<b>Marantz TT400</b> £150	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
<b>NAD 5120</b> £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 arm, 9g	BB	67
<b>Omega Point Silver/Black</b> £895/£295	Good Good +	An avowedly stripped down turntable that lacks even an on/off switch, the Omega Point Silver offers fine midrange clarity and good stereo, but some HF compression and a lack of 'wellie'	Manual, solid, belt drive, unipivot, 11g		55
<b>Opus 3 Continuo/Decca London</b> International (Revised) £599/£99	Poor Good	Heavyweight motor unit with many fine properties, but which needs further development. The idiosyncratic arm is a suitable (though not ideal) platform for the Decca cartridge. For all its faults though, the whole transcends the sum of the parts	Belt-drive manual, damped unipivot arm, 12g		67
<b>Rational Audio Aura 01</b> £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
<b>Rega Planar 2</b> £155	Average + Good	A remarkable product at the price, surprisingly articulate and confident	Manual, 11.5g	BB	48
<b>Rega Planar 3</b> £207	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
<b>Revolver Rebel</b> £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
<b>Revox B291*</b> £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
<b>Rotel RP-855</b> £160	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
<b>Systemdek IIX</b> £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
<b>Technics SL-DD33</b> £110	Average Average	As with the QD33 though better value	Automatic, direct drive, solid plinth, 7.5g, P-mount	BB	48
<b>Technics SL-L20</b> £115	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



# The Directory

## INTEGRATED TURNTABLES

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES ARM EFF. MASS	VALUE	ISSUE
<b>Technics SL-QD33</b> £140	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
<b>Technics SLBD-22</b> £90	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
<b>Thorens TD 166 Mk V</b> £200	Good Good	Classic suspended-subchassis deck with clear, stable sound of no particular character. Unlikely to make enemies	Belt drive, suspended, 12g	BB	79
<b>Thorens TD 280 Mk II</b> £180	Good - Good -	Legendary Thorens build quality on the cheap - slightly unobtrusive sound but eminently liveable-with and very good value	Belt drive, solid, electronic PSU, 12g	BB	79
<b>Thorens TD 316 Mk II</b> £220	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
<b>Thorens TD2001</b> £630	Good Good -	Similar to TD320 but much dearer - why? Sound is comfortable but not very detailed	Semi-auto, belt drive, subchassis 15g		91
<b>Thorens TD320 Mk II</b> £350	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
<b>Townshend Rock Reference/Excalibur</b> £1995/£695	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
<b>Voyd Reference/Helios Cyalene</b> £5299/£1066	n/a Excellent	Voyd's flagship is equipped with three of the biggest motors in the business, a Lexan platter and a real brute of a power supply (it dwarfs most power amps!). A strong contender for best turntable in the known universe	Belt drive, 3 motors, subchassis, outboard PSU, 12/14g	R	Coll. '90
<b>Well Tempered WTAT</b> £1690	Average Very Good	Intriguing and challenging design. Musically it is not ideal, but it has a limpid quality and a lack of artificiality that sets standards as well as turning the ear, though it's not completely uncoloured. A charmer yet mainstream enough in its virtues to be viable	Manual 2-speed, damped, suspended arm, 7.5g	R	67
<b>Zarathustra S4/Pluto SA</b> 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
<b>Ariston Superior</b> £598	Good + Good	Good but slightly damped sound quality, with powerful and stable bass. The pro quo is a certain lack of pace, energy and resolution	Belt drive, subchassis, electronic		55
<b>CEC ST930</b> £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
<b>CS Audio Resan kit for Rega</b> £90	Good - Good	After-market kit to convert Rega 2 or 3 to semi-suspended subchassis style. Looks good and sounds tidier than original. Feedback is much reduced	Conversion kit, all work reversible	R	79
<b>Michell Gyrodec</b> £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
<b>Michell Syncro</b> £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
<b>NVA Senior</b> £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
<b>Oracle Alexandria Mk III</b> £1195	Very Good Very Good	One of the most beautifully presented players made, and fully supported by superb separation, dynamics and a euphonious style of delivery.	Manual 2-speed belt drive	R	67
<b>Oracle Paris</b> £595	Good - Average	Looks good but sounds coarse, confused and uneven, with bass liable to thump	Belt drive, semi-suspended, electronic		91
<b>Origin Live Oasis A</b> £495	Good - Average	Rather coarse sound with lack of detail resolution - but lively presentation may appeal. Appearance is industrial	Belt drive, external mains filter, 33rpm only, suspended		79
<b>Origin Live Oasis B</b> £199	Average Average +	Aesthetics are not its strong point, but its lively and articulate - if idiosyncratic - sound will please some tastes. Highly resonant construction is very sensitive to feedback	Belt drive, 33Gy1/3Gyrpm only, solid plinth/subchassis		79
<b>Oxford Acoustics Crystal</b> 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
<b>Pink Triangle Anniversary</b> £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
<b>Pink Triangle Export</b> £676	Very Good Excellent	Basically a PT TOO with built-in power supply. Retains features of great transparency and neutrality. Review sample had highish motor noise - presumed untypical	Suspended, belt drive, electronic	R	91
<b>Pink Triangle Little Pink Thing</b> £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
<b>Revolver</b> £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
<b>Systemdek IIXE</b> £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
<b>Systemdek IV</b> £495	Good Very Good	The level of wow is a theoretical concern at least, but elsewhere this player shines, combining euphony, information and imaging in a polished, untemperamental package	Two-speed manual belt drive	R	67
<b>Voyd "The Voyd Plus"</b> £2777	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, so we've dubbed it The Voyd Plus. Superb build and finish; colourful, dramatic performance. A thoroughbred	Belt drive, 3 motors, subchassis, outboard PSU	R	72
<b>Voyd Valdi</b> £699	Good - Very Good	Recent power supply upgrade has resulted in around improvements. This Perspex plattered, two motor deck is remarkably competent, revealing and neutral	Belt drive, suspended subchassis, electronic PSU		79
<b>VPI HW-19</b> £1317	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

## TONEARMS

MODEL PRICE	LAB SOUND	COMMENTS	ARM EFF, MAS	VALUE	ISSUE
<b>Airtangent 1B</b> £1990	n/a Excellent	A complex but superbly built arm for high quality systems, giving excellent stereo and resolution	7.5g (vertical)	R	60
<b>Alphason Delta</b> £190	Good Average +	A highly competent design from Alphason gives good sound quality but with slight blurring and treble fizz	16g	R	48
<b>Alphason HR100S</b> £440	Very Good Very Good	This S-shaped arm sounds smooth, but nevertheless reproduces transients with fine attack	10g	R	Coll. '86

# The Directory

## TONEARMS

MODEL PRICE	LAB SOUND	COMMENTS	ARM EFF, MAS	VALUE	ISSUE
<b>Alphason Opal</b> £130	Good Average	This is a straightforward adequate sounding low cost arm, priced just above where it rightly belongs	10g		55
<b>Alphason Xenon</b> £260	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
<b>Ariston Enigma</b> £99	Average Average +	Good but not the best in its class: mid-band sounds a little uneven; treble a trifle "brash"	11.5g		48
<b>Audio Technica AT1130</b> £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
<b>Decca London International</b> £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
<b>Eminent Technology</b> £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
<b>Goldmund T3F arm</b> £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
<b>Helius Orion 2</b> £490	Very Good Very Good	Excellently engineered with rigid bearings, free from slack. It remains expensive but the level of performance deserves Recommendation	12g	R	48
<b>Kuzma Stogi Reference</b> £699	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
<b>Linn Ekos</b> £1097	Very Good Very Good	Superb, state of the art design which builds significantly on Ittok's strengths	9g	R	67
<b>Moth Arm</b> £78	Good Good +	The ultimate budget arm? Refined, detailed, sweet and natural - performance improves in line with the rest of the system	12g	BB	60
<b>Naim Aro</b> £699	Good Good -	Designed for use on the Linn LP12, the Aro is a little bright and congested.	10 5g		91
<b>Rega RB300</b> £115	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
<b>Roksan Artemiz</b> £595	Average Good	Interesting design which works a treat on the Xerxes deck. Fits Rega cut-out.	8g		67
<b>Roksan Tabriz</b> £150	Good Good +	Though obviously targeted at Roksan's own Xerxes, it is also a good alternative to the Rega arms in many applications. A trifle bright.	9g	R	91
<b>SME 3009 Series III</b> £253	Good Average +	Comprehensively adjustable and very well made, suited to MM and high compliance MC cartridges	5g		48
<b>SME 3009 Series IIIS</b> £182	Good Average +	A simplified less flexible (as regards adjustment) Series III with a similarly 'soft' sonic character	5g		48
<b>SME 3009R</b> £335	Average + Average +	A higher mass version of the Series III designed for low compliance MC cartridges	12g		48
<b>SME 309</b> £495	Very Good Very Good	Beautifully made, finished and presented, this arm is fully and easily adjustable and a highly neutral performer	10g	R	79
<b>SME Series IV</b> £810	Excellent Very Good	Superb engineering and finish with a finely balanced sound giving impressive stereo focus and low coloration	10 5g	R	60
<b>SME Series V</b> £1247	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

## 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.

MODEL PRICE	LAB SOUND	COMMENTS	ARM OUTPUT/TYPE	VALUE	ISSUE
<b>Arcam C77</b> £22	Average + Average +	A sensible moving magnet package with good bounce at a competitive price	6-16g Normal, MM	BB	48
<b>Arcam C77Mg</b> £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
<b>Arcam E77Mg</b> £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
<b>Arcam P77Mg</b> £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
<b>Arcam PMX10</b> £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
<b>Audio Technica ART1</b> £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
<b>Audio Technica AT-420E</b> £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
<b>Audio Technica AT-F3/OCC</b> £74	Average + Good	Though the 'limited edition' badge is a trifle tongue-in-cheek, the 'F3' still offers excellent value	8-15g Low, MC	BB	67
<b>Audio Technica AT-F5/OCC</b> £106	Average Good +	This latest sample demonstrated some technical weaknesses but its spacious, fluid sound quality still represents a benchmark at this price	4-10g Low, MC	BB	67



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JPW : JVC : KEF : KENWOOD : KUZMA : LINDLEY : LINX : MAXELL  
MICROMEGA : MISSION : MITSUBISHI : MONSTER : MORDAUNT SHORT  
MOTH : NAKAMICHI : NVA : ORACLE : ORTOFON : PANASONIC  
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# The Directory

## CARTRIDGES

MODEL PRICE	LAB SOUND	COMMENTS	ARM OUTPUT/TYPE	VALUE	ISSUE
<b>Audio Technica AT-OC7</b> £265	Good + Good +	The OC9 is better if you can afford the extra. But OC7 is at least a taste of the high-end at a sensible price	6-13g Low, MC	R	54
<b>Audio Technica AT-OC9</b> £400	Average + Very Good	Tonal colours are reproduced faithfully and it rarely puts a foot wrong. Slightly less transparent than more costly MCs but it has got real wellie. Good value (really!)	6-14g Low, MC	R	60
<b>Audio Technica AT95E</b> £19	Average - Average	Clear, dynamic if richly balanced, the magnetic '95E is a definite Best Buy	8-14g Normal, MM	BB	48
<b>Audionote I02VDH</b> £895	Good Very Good	One of the best, giving 'an extraordinarily relaxing midrange clarity', needs a transformer	8-18g Very low, MC	R	43
<b>Audioquest AQ 404i-L</b> £400	Very Good Good +	Slight harshness detracted from the performance of this otherwise clear-sounding and detailed cartridge	8-16g Low, MC		84
<b>Audioquest AQ 7000</b> £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
<b>Audioquest MC5</b> £220	Average Average	Offers high-output benefits but the drooping frequency response and severe VTA error preclude recommendation	10-20g Normal, MC		54
<b>Cello Chorale</b> £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
<b>Denon DL 103</b> £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
<b>Denon DL110</b> £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
<b>Denon DL160</b> £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
<b>Dynavector 17D2</b> £280	Very Good Very Good	Clear, detailed, neutral and generally very informative - excellent	6-18g L ow, MC	R	91
<b>Dynavector OV-50X</b> £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
<b>Dynavector DV10X IV</b> £125	Average Average +	Fine sounding and realistically priced, damping is recommended to ensure successful tracking ability	8-18g N Normal, MC	R	48
<b>Dynavector DV23RS</b> £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
<b>Dynavector XX-1</b> £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
<b>Dynavector XX-1L</b> £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
<b>Empire 800 Mk II</b> £33	Good Average	This very high output MM appears to be based on the classic Ortofon VMS series. A trifle uninspiring overall	7-17g Normal, MM		67
<b>Empire Benz Micro MC-2</b> £600	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
<b>Empire MC-5M</b> £110	Average + Good	A very low compliance renders this MC best suited to heavy tonearms while its sweet, non-aggressive sound quality earns it a recommendation	13-20g L ow, MC	R	67
<b>Glanz GMC-10EH</b> £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
<b>Glanz GMC-10LX</b> £80	Average + Average +	Bearing some of the hallmarks of the '10EH, the '10LX is still less competitive in the sonic stakes	7-15g L Low, MC		67
<b>Glanz GMC-20E</b> £129	Good + Good +	Very good tracking, smooth sound and good detail. Very slight surface noise enhancement	5-10g Low, MC	R	91
<b>Glanz MFG-110EX</b> £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
<b>Glanz MFG-310LX</b> £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
<b>Glanz MFG-610LX</b> £90	Good + Good +	Similar to cheaper '310 but slightly clearer transients and bass. Benefits from lowish impedance loading	3-10g Normal, MF	R	85
<b>Goldmund Clearaudio</b> £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
<b>Goldring 1012</b> £40	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
<b>Goldring 1022</b> £60	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
<b>Goldring 1042</b> £85	Good + Good	Not terribly subtle, and not such good value alongside 1012 and 1022. Quite lively, though	7-12g Normal, MM		91
<b>Goldring Elan</b> £16	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
<b>Goldring Epic II</b> £26	Average Average +	An excellent budget choice though the limitations of the stylus are rather obvious at higher frequencies	5-12g Normal, MM	R	67
<b>Goldring Eroica</b> £100	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
<b>Goldring Eroica LX</b> £115	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
<b>Goldring Excel</b> £500	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
<b>Grado ZF3E + *</b> £47.50	Average - Average	Downtilting balance disguises the brightness of this cartridge; bit of a mixed bag at this price	9-20g (damping) Normal, MM		54
<b>Grado ZTE +1</b> £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
<b>Kiseki Blackheart</b> £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
<b>Kiseki Blue Goldspot</b> £450	Very Good Good +	Good bass and imaging, but hints of spit and coloration let the side down slightly	8-15g Low, MC		84
<b>Kiseki Lapis Lazuli</b> £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
<b>Kiseki Purpleheart Sapphire</b> £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
<b>Koetsu Black S</b> £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



# The Directory

## CARTRIDGES

MODEL PRICE	LAB SOUND	COMMENTS	ARM OUTPUT/TYPE	VALUE	ISSUE
<b>Linn Asaka</b> £365	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
<b>Linn K5</b> £37	Average Average +	Not as crisply focused as the costlier Linn magnetics, the K5 offers a smoother presentation	7-16g Normal, MM	R	67
<b>Linn K9</b> £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
<b>Linn Karma</b> £552	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
<b>Linn Troika</b> £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
<b>London Maroon</b> £149	Average Average +	Now manufactured under the London brandname this Decca cartridge is as iconoclastic as ever	9-20g (damp) Normal, MM		67
<b>London Super Gold</b> £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, damp Normal, fixed stylus MM		84
<b>Militek Aurora</b> £249	Good + Good +	An overall feeling of relaxed ease characterised this clear and atmospheric Kiseki-built cartridge	8-16g Normal, MC	R	Coll. '86
<b>Militek Olympia</b> £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
<b>Nagaoka MM4</b> £9	Average - Average -	Clear punchy sound that delivers the rudiments of a good performance	6-16g Normal, MM	R	54
<b>Nagaoka MP10</b> £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
<b>Nagaoka MP11 Boron</b> £40	Average Average +	Responding well overall in PM's equipment and listening room, this model was mildly criticised for low level and dynamic limitations	5-13g Normal, MM	BB	48
<b>Nagaoka MP11 Gold</b> £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
<b>Nagaoka Stilton TS10</b> £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
<b>Nagaoka Stilton TS11</b> £70	Good - Good	Differs from TS10 in having Vital stylus with better tracing but still some high frequency harshness.	5-10g Normal, MM		85
<b>Ortofon 510</b> £30	Good Good +	For the price, a good blend of virtues - weight, clarity and neutrality.	3-11g Normal, MM	BB	85
<b>Ortofon 520</b> £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
<b>Ortofon 530</b> £80	Good + Good +	Very clean and assured sound; transients not quite perfectly pure but plenty of detail.	4-11g Normal, MM	R	85
<b>Ortofon 540</b> £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
<b>Ortofon MC10 Super</b> £70	Average Good	"What a delightfully sweet-sounding cartridge this is . . ." we said	5-15g Low, MC	BB	48
<b>Ortofon MC20 Super</b> £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
<b>Ortofon MC30 Super</b> £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
<b>Ortofon MC3000 MkII</b> £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
<b>Ortofon MC5000</b> £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
<b>Ortofon Quartz</b> £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
<b>Ortofon Quasar</b> £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
<b>RATA RP20</b> £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
<b>RATA RP40</b> £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
<b>RATA RP70</b> £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
<b>RATA RP70vdH</b> £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
<b>Rega Bias</b> £34	Average Average +	Difficult to mount in some arms due to its shallow build, the bias offers a gentile, refined SQ that certainly makes it worthy of audition	4-10g Normal, MM		67
<b>Rega Elys</b> £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
<b>Revolver</b> £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
<b>Roksan Corus Black</b> £100	Good + Good	Recognisably related to Corus Blue, but distinctly more civilised and smoother.	7-12g Normal, MM	R	91
<b>Roksan Corus Blue</b> £60	Good + Good	Roksan-specified modified Goldring 1012; slight harshness detracts from otherwise good sound.	7-11g Normal, MM		91
<b>Shure M104E</b> £36	Average - Average	Capable in many ways, but giving no substantial improvement over the 92E in our view	5-15g Normal, MM		38
<b>Shure M105E</b> £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
<b>Shure M110HE</b> £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
<b>Shure M111HE</b> £72	Average Average	Early reviews of this cartridge complained principally of the price - which has since come down	5-10g Normal, MM		38 Summ
<b>Shure M92E</b> £17	Average - Average	Though lacking depth, the overall sound quality was competent, but treble was not its forte	10-15g Normal, MM		43
<b>Shure M99E</b> £29	Average - Average -	Sister to the 92E this is a solid but not particularly exciting cartridge	5-10g Normal, MM		38 Summ

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## CARTRIDGES

MODEL PRICE	LAB SOUND	COMMENTS	ARM OUTPUT/TYPE	VALUE	ISSUE
<b>Shure ME75ED</b> £26.50	Average Average -	Rather bright and splashy in the high frequencies but nevertheless a competent model	5-10g Normal, MM		38
<b>Shure ME97HE</b> £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
<b>Shure ML120HE</b> £95	Average + Average +	Quite decent sound quality and a generally fine balanced performance	6-18g Normal, MM		48
<b>Shure ML140HE</b> £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
<b>Shure Ultra 500</b> £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
<b>Shure V15 VMR</b> £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
<b>Shure VST V</b> £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
<b>Stilton/AT-F3</b> £110	Good + Good +	At a premium of some £40 this modified AT-F3 offers a startlingly refined performance and is strongly recommended	8-18g Low, MC	R	67
<b>van den Hul MC One</b> £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
<b>van den Hul MC Two</b> £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
<b>van den Hul MC1 Super</b> £800	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
<b>van den Hul MC10</b> £499	Good Good +	A neutral balanced performer giving transparent midrange, fine depth and focus with firm extended bass. Gosh!	5-10g Low, MC	R	60

## 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
<b>Acoustic Research A03</b> £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
<b>Acoustic Research A07</b> £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
<b>Aiwa XA-005</b> £130	Good + Average -	A technically competent amp with big, friendly but not overly engrossing sound quality	61W, MM 5 line inputs, source-direct		80
<b>Aiwa XA-006</b> £130	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
<b>Akai AM-52</b> £230	Average + Average -	Basically equipped, this amplifier offers a comfortable but hardly over-detailed sound	95W, MM/MC disc, 5 line inputs, loudness		74
<b>Akai AM-65B</b> £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
<b>Akai AM-93</b> £550	Average Average -	Unfortunately Akai's on-board D/A convertors were less successful than its conventional analogue CD input.	112W, coax and optical dig inputs. MM/MC		68
<b>Alphason Apollo</b> £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
<b>Amadeus Gold</b> £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 inputs	R	74
<b>Amadeus Silver</b> £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
<b>Aragon 4004</b> £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
<b>Arcam Alpha 2</b> £190	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
<b>Arcam Delta 110/120</b> £700/£500	Good+ Good	Overall performance is limited by the power amp - in isolation the PDM-preamp offers a remarkably open and detailed sound, particularly in 'digital' mode.	112W power amp, MM/MC + four line inputs + coax/opt digital input.	R/-	92
<b>Arcam Delta 60</b> £300	Good Good +	Very refined and highly detailed sound via MM and CD without any of the hardness noted via the MC stage	59W, 4 line, MM/MC inputs, no tone controls	R	68
<b>Arcam Delta 90.2</b> £400	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
<b>Ariston Amp</b> £219	Average Average +	Slightly veiled and thin sound but proved suitably attractive in the listening tests	32W, full logic control, MM and 4 line inputs	R	68
<b>Audio Innovations Series</b> 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



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## AMPLIFIERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Audio Innovations Series 200</b> £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
<b>Audio Innovations Series 300</b> £499	Poor Very Good	Something of an anomaly, the 300 is an integrated valve amp that looks awful in the lab but sounds remarkable in a system - now in mk II guise	10W, MM, 6 inputs	BB	63
<b>Audio Innovations Series 400</b> £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
<b>Audio Note Ongaku</b> £29,950	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
<b>Audiolab 8000A</b> £350	Very Good Good +	Exceptionally detailed, tactile and transparent via CD but slightly more clouded via disc. A stalwart design	72W, MM/MC, 4 line and full record out selection	R	74
<b>Audiolab 8000C</b> £325	Excellent Good	A well established preamp with a highly controlled sound, though it could do with more life and depth	MM/MC, 5 inputs, hdph, tone controls	R	62
<b>Audiolab 8000P</b> £495	Excellent Good +	A dynamic powerhouse, load tolerant and sonically reliable	100W	R	62
<b>Audion CD-1</b> £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
<b>Aura VA-40</b> £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
<b>Beard 506</b> £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
<b>Beard Audio CA35/P35mkII</b> £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
<b>Beard M70</b> £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
<b>Bryston 0.5B/2B</b> £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
<b>Bryston 12B/4B</b> £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
<b>Cambridge P25</b> £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
<b>Cambridge P50</b> £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
<b>Cello Audio Suite</b> £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
<b>Chord SPM-900</b> £1725	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
<b>Concordant Excelsior</b> £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
<b>Conrad Johnson Motif MC-8</b> £1995	Very Good Very Good	A cheaper alternative to the '7, this preamp is an undoubted success in maintaining the Motif sound but does not compare on sound quality	MM/MC	R	50
<b>Conrad Johnson MV50</b> £1995	Good + Good +	Coupled with the PV5, this CJ power amp performed well on audition	50W		Coll. '87
<b>Conrad-Johnson Premier Seven</b> £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. Absolutely gorgeous!	MM, 4 line inputs, sep. Rec Out, versatile cartridge matching	R	72
<b>Conrad-Johnson PV10</b> £1395	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
<b>Creek CAS 4140S2</b> £220	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
<b>Creek CAS-4040 S3</b> £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
<b>Croft Series 4S</b> £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
<b>Croft Series 4SA</b> £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
<b>Croft Super Micro A</b> £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
<b>Cyclone Catalyst</b> £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
<b>Deltec DPA 100S</b> £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
<b>Deltec DSP-50S DPA-50S</b> £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
<b>Denon DAP-2500/POA-4400A</b> £550/£600 pr.	Very Good Good	Denon's fully-fledged preamp also incorporates D/A converters that did not improve the sound of our £299 CD player. The power amps are brilliant!	172W, monobloks Opt/Coax dig + 2 tape, 4 line and MM/MC inputs		68
<b>Denon PMA-250II</b> £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
<b>Denon PMA-350</b> £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 + source direct.	R	92
<b>Denon POA-6600</b> £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
<b>DNM 3A</b> 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
<b>Dual CV5600</b> £150	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
<b>E.A.R. 549</b> £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
<b>E.A.R. 802/509mkII</b> £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
<b>Entire Sound EX50</b> £500	Average- Average+	A new and fairly costly Mostet 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

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## AMPLIFIERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Exposure VI/VII*/VIII</b> £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 inputs with full rec-out switching	R	68
<b>Exposure VII/VIII</b> £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
<b>Exposure XI/XII/VIII Super</b> £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
<b>Grant 60AMS</b> £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
<b>Hafner DH120 assembled</b> £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
<b>Hafner DH120 kit form</b> £295	n/a Average	Er, we didn't build one; see assembled version below	60W		44
<b>Hafner XL-600</b> £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
<b>Harman Kardon Citation 25/22</b> £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
<b>Harman Kardon HK6100</b> £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
<b>Harman Kardon HK6500</b> £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
<b>Harman Kardon HK6800</b> £700	Good + Good	Smoother and more evenly paced than previous H/K superamps, this model sounded both confident and nimble. A fine result	115W, 4 line + 2 tape i/p's + MM/MC	R	85
<b>Heybrook C3/P3</b> £400/£500	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
<b>Jadis JP30/JA30</b> £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
<b>Jeff Rowland Coherence One/Model 7</b> £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 variable loading options. Balanced topology	R	72
<b>JVC AX-A3TN</b> £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' controls.	R	92
<b>Kelvin Digital Integrated</b> £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
<b>Kelvin Integrated</b> £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
<b>Kelvin Labs Absolute Zero/M30</b> £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
<b>Kenwood KA-4010</b> £170	Good Average +	A flexible design at moderate cost. Smooth and cultured sound if slightly lean in balance	81W, MM/MC, 4 line inputs, source-direct	R	80
<b>Kenwood KA-5020</b> £210	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
<b>Kenwood KA-550D</b> £130	Very Good Average	Having dropped its moving coil input, this latest version has British style dynamics and rhythm but is not first grade yet	35W, MM, 4 inputs, hdph, tone controls	R	62
<b>Kenwood KA-7010</b> £300	Average + Average +	More powerful version of the 5010 but less successful in the listening tests. RF IMD is the likely cause.	123W, as above plus -20dB mute facility		74
<b>Klyne SK5a</b> £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
<b>Lecson Quattra</b> £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
<b>Lectron JH50</b> £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
<b>Linn LK1/LK280</b> £585/£747	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
<b>Linx Nebula</b> £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
<b>Magnum MP150/MF150</b> £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
<b>Marantz PM-30SE</b> £180	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
<b>Marantz PM-50</b> £250	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
<b>Marantz PM-75</b> £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
<b>Marantz PM-80</b> £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
<b>Marantz PM-95</b> £2000	Very Good Average +	Beautifully constructed, this amp was less convincing via its digital input than via line. Class A option best suited to sensitive speakers. Costly	151W with 30W available in Class A. Opt + coax inputs		74
<b>Meridian 201/205</b> £695/£500 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 remoteR/-capable straight line		62
<b>Mission Cyrus One II</b> £200	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
<b>Mission Cyrus PSX</b> £230	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
<b>Mission Cyrus Two II</b> £330	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. No tone controls	R	92
<b>Musical Fidelity A1</b> £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
<b>Musical Fidelity A100</b> £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
<b>Musical Fidelity B1</b> £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
<b>Musical Fidelity B200</b> £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



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# The Directory

## AMPLIFIERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Musical Fidelity MA50</b> £875 pair	Good Excellent	An audiophile bargain. One of the best sounding power amplifiers made	50W, monoblok	R	62
<b>NAD 3020i</b> £140	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
<b>NAD 3225PE</b> £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
<b>Naim Separates</b> £750 plus	Very Good Good	A consistent and coherent series of 'building blocks'. Sound quality ignores conventional audiophile standards of presentation, but achieves fine musical communication	40-70W, MM/MC etc	R	60
<b>Nikko Beta 400/Alpha 800</b> £225/£800	Very Good Good	Big, bold and gutsy, these are indestructible amps with a sound quality to satisfy all but the most demanding users	358W(!) with every feature necessary	R	85
<b>NVA P70MC/A60</b> £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
<b>Dakley S</b> £499	Good Very Good	Much improved version of the original Image preamp from Yugoslavia. This one won't disgrace itself even in top-notch systems. Image Six model ( £150 more) is really fabulous	MM plus 3 line inputs	R	78
<b>Dnkyo A-8000</b> £140	Good + Good +	A rare combination of style, features and very acceptable sound quality. Free of compression and 'grain' - undemanding	64W, 5 line + MM disc i/p's + full tone cont.	R	85
<b>Drell SA-040</b> £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
<b>Drell SA-040SE</b> £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. Tweak components.		71
<b>Philips DFA-888</b> £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
<b>Philips FA-880</b> £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
<b>Philips FA960 MkII</b> £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
<b>Pioneer A-300</b> £180	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
<b>Pioneer A-400</b> £230	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
<b>Proton 520</b> £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
<b>Proton AP-1000/AA-1150</b> £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
<b>QED A240 CD II</b> £199	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
<b>QED A240 SA II</b> £259	Very Good Good +	Redesigned 240SA has significant improvements over its predecessor, and provides a good moving-coil disc input in a competitive price	45W MM/MC 5 line inputs straight line	BB	62
<b>QED A270</b> £299	Good - Good +	Building on the strengths of the '240, the '270 sounds weighty, fast and dynamic. A bit 'lumpy' via MC	51W, 5 line and 2 disc inputs, pre-out	R	68
<b>QED C300/P300</b> £300/£300	Good Good	A cost-effective combo, limited in its resolution but no less beguiling as a result. Disc stage is sweeter but samey	58W, 2 tape, 3 line, MM/MC + mono/biamp opt.	R	85
<b>Quad 34</b> £299	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
<b>Quad 405</b> £389	Very Good Average	Not an impressive power amp but easy on the ear if not pushed and very reliable	100W		44
<b>Rational Audio</b> £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
<b>Ray Lumley Model 75</b> £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
<b>Revox B150</b> £1047	Very Good Average +	Beautifully constructed but hampered by Revox's convoluted logic control. Open and smooth	117W, CMOS sw. for 3 line, 2 tape and MM		68
<b>Revox B250</b> £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
<b>Rose RV-23</b> £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
<b>Rotel RA-810A</b> £120	Very Good Average	As a cut price RA820AII this is a very successful little amp that loses little in sound quality to its predecessor. Excellent value	20W, MM, 5 inputs, hdp, tone controls	BB	62
<b>Rotel RA-820AX</b> £150	Very Good Very Good	The spacious, detailed and very musical performance of this budget amp is almost too good!	47W, MM, 4 line inputs	BB	80
<b>Rotel RA-820BX4</b> £190	Good + Good +	Very authoritative but creamy-smooth and delightfully musical. Spatially convincing too, yet not as open as RA-820AX	39W, 4 line + MM/MC, dual-conc. R volume.	R	85
<b>Rotel RA-840BX4</b> £250	Good Good +	Very sedate and controlled in presentation but check phasing for optimum stereo effect	63W, MM/MC, 4 line inputs, tone controls		80
<b>Rotel RA-870BX</b> £300	Very Good Good +	A powerful blockbuster with solid and well focused sound, good versatility and fine load tolerance	85W MM/mc 7 line inputs tone controls	R	56
<b>Rotel RC/RB-850</b> £140/£160	Very Good Good +	Quality separate pre and power amplifiers at near budget integrated amplifier prices. A notable achievement	60W MM/mc 4 line inputs tone controls	BB	62
<b>Rotel RC/RB-870BX</b> £220/£230	Excellent Good +	Reduced price makes the 870 combo better value but, despite mods to the preamp, it is the power amp that must take the lion's share of credit	128W or 208W bridged CD direct, 4line, 2 tape and MM/MC	R	68
<b>SAE P102/A202</b> £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 + CD tuner and 2 tape tone memory, spk switching		74
<b>Sansui AU-X111</b> £110	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
<b>Sansui AU-X911DG</b> £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
<b>Sony TA-F630ESD</b> £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
<b>Sony TA-F730ES</b> £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
<b>Sugden A21a</b> £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 in Pure Class A.		92
<b>Sumo Athena/Polaris</b> £695/£695	Very Good Very Good	Very good value US pre/power combo with transparent, detailed and gutsy sound via all inputs	128W, MM/mc, 2 tape and 3 line inputs	R	80



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## AMPLIFIERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Teac A-X400</b> £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	R	85
<b>Technics SE-M100</b> £550	Very Good Good +	An unusual disc-less poweramp with volume control. Standard line input sounds very open and clean. Digital input is harsher and less convincing	123W, coax and opt digital inputs, var and direct CD no disc input	R	74
<b>Technics SU-810</b> £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	R	85
<b>Technics SU-V660</b> £250	Good Average	Chunky build but integrated output stage infers a weak, insubstantial and rather monophonic sound	107W, MM/MC, cd aux, tape + tuner + power amp-direct	R	74
<b>Technics SU-V900</b> £500	Very Good Good+	Massively built but with a light, fresh and essentially very neutral sound. Bulk notwithstanding it's not particularly suited to life with a difficult speaker.	125W, 5 line and both MM/MC inputs. Tone controls + power amp.	R	92
<b>Threshold FET 10e</b> system/Stasis SA-4 £5700/£5900	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
<b>Yamaha AX-330e</b> £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	R	80
<b>YBA 1 power amp</b> £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
<b>YBA 1 preamp</b> £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
<b>YBA 2 pre &amp; pwr</b> £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
<b>YBA Model 3</b> £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.	R	72

## 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	VALUE	ISSUE
<b>Acoustic Energy AE1</b> £748	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
<b>Acoustic Energy AE2</b> £897	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 space	88.5dB/w 45Hz	R	66
<b>Acoustic Energy AE3</b> £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 traditional monitoring virtues with the latest metal diaphragm technology	63 x 26.5 x 37cm low stands in free space	85dB/w 23Hz (in room)	R	86
<b>Acoustic Research AR-112</b> £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	R	66
<b>Acoustic Research AR-122</b> £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	R	68
<b>Acoustic Research AR-132</b> £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 wall	87dB/w 50Hz	R	66
<b>Acoustic Research Red Box</b> £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
<b>Alexander SE11</b> £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 competition	52 x 14 x 17.5cm stands close to wall	86dB/w 25Hz (in room)	R	82
<b>Alexander SE5</b> £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 mar good detail and clarity, and price is a little high	40.5 x 12 x 15cm ALS stands near wall	82dB/w 50Hz (in room)	R	78
<b>Allison AL100</b> £109	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
<b>Allison AL105</b> £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)	R	78
<b>Allison CD6</b> £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 wall	88dB/w 45Hz	R	71
<b>Alphason Amphion</b> £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)	R	78
<b>Alphason Artemis</b> £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)	R	94
<b>Alphason Orpheus</b> £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
<b>Apogee Caliper Signature</b> £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
<b>Arcam Alpha</b> £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
<b>Arcam Delta Two</b> £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
<b>Ariston Image</b> £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)	R	82

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## LOUDSPEAKERS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY	VALUE	ISSUE
<b>Ariston Q</b> £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
<b>ATC SCM20</b> £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
<b>Audio Electronics TC10 II</b> £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
<b>Audioplan Kontrapunkt</b> £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>B&amp;W 620</b> £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 and firmer bass.	74 x 23.5 x 30cm floor, free space	89dB/W 25Hz (in room)	BB	94
<b>B&amp;W CM1</b> £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>B&amp;W DM550</b> £149	Good + Average -	Beautifully presented, well engineered near-miniature with precise sound but a distinct lack of 'welligie'. Ideal for considerate flat dwellers	35 x 20.5 x 22.5cm stands in free space	86dB/w 70Hz		71
<b>B&amp;W DM560</b> £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>B&amp;W Matrix 801</b> £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 stereo imaging	77/99 x 56 x 43cm floor or stands, free space	86dB/w <20Hz (in room)	R	81
<b>B&amp;W Vision DS1</b> £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>B&amp;W Vision DS2</b> £180	Average Average -	Although the box is generous for the price, the DS2 is a rather uneven performer, both on the measurement and listening. Careful stand selection and placement is needed to control the enthusiastic mid bass	50 x 24 x 25cm stands in free space	89dB/w 43Hz (in room)		86
<b>Bose 305</b> £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
<b>Bose 901 MK6</b> £1600	Good Average	Still controversial after all these years, the pre-equalised multi-driver 901 is cleverly engineered to deliver exceptional loudness with a modest amplifier, but mid bass tends to dominate the sound and transparency is notably lacking	33 x 54 x 32cm rigid stands in free space	(92dB/w midband) 28Hz (in ro		86
<b>Bose Interaudio 3000XL</b> £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
<b>Boston A120</b> £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 genuine bass extension and a few rough edges	62.5 x 31.5 x 25cm stands in free space	89dB/w 48Hz	R	86
<b>Boston A40II</b> £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
<b>Boston Acoustics T830</b> £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
<b>Cambridge SoundWorks Ambiance</b> £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
<b>Castle Clyde</b> £159	Average + Average	A tidy little performer packing punch, but beginning to show its age in the light of new competition	37 x 21.5 x 22cm open space on stands	89.5dB/w 64Hz	R	46
<b>Castle Durham</b> £209	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	R	46
<b>Castle Pembroke</b> £229	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
<b>Castle Warwick</b> £179	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 wall	88dB/w 50Hz		66
<b>Castle Winchester</b> £1250	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
<b>Celef CF2 Nimbus</b> £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
<b>Celef Cirrus</b> £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
<b>Celestion 3</b> £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
<b>Celestion 5</b> £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
<b>Celestion 6000</b> £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
<b>Celestion DL6 Series II</b> £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
<b>Celestion DL8 Series II</b> £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
<b>Celestion SL12Si</b> £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 of walls	85dB/w 50Hz		66
<b>Celestion SL600Si</b> £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
<b>Celestion SL6Si</b> £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
<b>Creek CLS20</b> £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 space	88dB/W 30Hz		90
<b>Dahlquist DQ8</b> £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
<b>Dali 700</b> £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
<b>DCM Timeframe TF250</b> £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
<b>Doxa 5 - 2</b> £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
<b>Duntech PCL1000 Crown</b> Prince £6120	n/a Excellent	Immensely 'listenable', refined sounding speaker capable of creating lifelike musical images. Not overly transparent to source, but very civilised nonetheless	180 x 30.5 x 43.5 free standing away from walls	90dB/w 42Hz	R	72



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■ MODEL ■ PRICE	■ LAB ■ SOUND	■ COMMENTS	■ SIZE ■ PLACEMENT	■ SENSITIVITY	■ VALUE	■ ISSUE
<b>Duntech PCL500 Marquis</b> £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 walls	92dB/w 48Hz	R	65
<b>Epos ES11</b> £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
<b>Equation 0</b> £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
<b>Faraday Siren</b> £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
<b>Goodmans B-Max/Maxim 2</b> £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
<b>Goodmans HIM 440</b> £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
<b>Goodmans M100</b> £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
<b>Goodmans M300</b> £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 wall	89dB/W 50Hz (in room)	R	82
<b>Goodmans M500</b> £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
<b>Goodmans Maxim 2</b> £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
<b>Harbeth HL Compact</b> From £539	Very Good Average	The clean and neutral sound lacks resolution and gives rather unobtrusive though well differentiated stereo. Can be bi-wired to advantage	52 x 27.2 x 28.1cm open space, on high stands	87.5dB/W 65Hz		59
<b>Harbeth LS3/5A</b> £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
<b>Heco Interior 120</b> £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
<b>Heco Interior 430</b> £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
<b>Heco Interior 90</b> £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
<b>Heco Interior Plus 404</b> £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
<b>Heco Superior 740</b> £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
<b>Heco Superior 940</b> £999	Good Good	This large and beautifully finished floorstander has an impressively smooth and attractively transparent midband. Bass is well extended but follows rather than drives the music along.	110 x 26 x 31.5cm free space	88dB/w 20Hz		86
<b>Heybrook HB1</b> £199	Good Average +	No longer an over-bright character, a strikingly clear sound and fine transient performance now merits recommendation	47 x 29 x 23cm on stands near wall	88dB/w 61Hz	R	46
<b>Heybrook HB100</b> £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
<b>Heybrook HB150</b> £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 wall	89dB/w 42Hz (in room)		82
<b>Heybrook HB200</b> £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
<b>Heybrook Point 5 S2</b> £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
<b>Heybrook Point 7</b> £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 wall	85dB/w 60Hz		68
<b>Heybrook Solo</b> £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
<b>Infinity Kappa 6</b> £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
<b>Infinity Kappa 8</b> £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 space	89dB/w 33Hz		72
<b>Infinity Modulus</b> £695	Good Average +	Luxury high-tech miniature is carefully conceived and beautifully executed. Undeniably attractive in the midrange and treble, the Modulus failed to handle the bass end of the spectrum as successfully	30 x 18 x 26cm high stands 1ft from wall	84dB/w 45Hz (in room)		86
<b>Infinity RS2001</b> £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
<b>Jamo Concert II</b> £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
<b>Jamo Concert VII</b> £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
<b>Jamo Cornet 40</b> £100	Good Average	Prettily styled Danish miniature is good perceived value and delivers solid bass and midrange performance but is let down by an indifferent tweeter	31.5 x 19.5 x 21.5cm about 1ft from wall	87dB/w 48Hz		90
<b>JBL Control 1 Plus</b> £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
<b>JBL L20T3</b> £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
<b>JBL LX33</b> £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 performance	80 x 25 x 21cm floor, 1ft from wall	89dB/w 48Hz	R	82
<b>JBL LX44</b> £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
<b>JBL TLX12</b> £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
<b>JBL XPL 90</b> £699	Good Average +	Though undoubtedly pretty and very expensively engineered, this elaborate near-miniature didn't really convince our listeners that it could deliver a sound quality to match its elevated price	39.5 x 24 x 24cm stands in free space	85dB/w 45Hz (in room)		86
<b>JPW AP2</b> £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 stands	89dB/w 65Hz	R	53
<b>JPW AP3</b> £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

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<b>JPW Minim</b> £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
<b>JPW P1</b> £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
<b>JPW Sonata</b> £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
<b>JPW Sonata Plus</b> £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
<b>JRT AD1</b> £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 that makes this beautifully finished and generously proportioned model so enjoyable	59.5 x 28 x 36cm own stands close to rear wall	86dB/w 28Hz (in room)	R	86
<b>JRT AD1 Micro</b> £389	Average Good	Beautiful bijou miniature has delightful life and coherence and gives surprising impression of scale; some aggressive tendencies but very transparent to system tuning	28 x 17 x 21cm stands against wall	87dB/W 50Hz (in room)	R	94
<b>Kammerzelt Reference Mini Monitor</b> £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
<b>KEF 103/3</b> £750	Good + Good	Technically impressive, excellent bass/power handling for size, but not for the audiophile system. Better among cheaper components, and good in a large room	56 x 27 x 30cm supplied stands free space	90-95dB/w 35Hz		53
<b>KEF 104/2</b> £1,150	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
<b>KEF C15</b> £119	Good Average	One of the tiniest around delivers a surprisingly 'big' and well balanced sound, with excellent stereo from free space siting	26.5 x 18 x 14cm stands in free space	85dB/w 60Hz	R	71
<b>KEF C25</b> £149	Average + Average -	Very safe and competent, but rather short on inspiration, the '25 lacks the brio and flair of its smaller C15 brother	34 x 20.5 x 17cm high stands near wall	87dB/w 60Hz (in room)		78
<b>KEF C45</b> £219	Good Average -	Conventional and competitively priced, C45 delivers an impressively consistent and competent sound. As one listener commented: "Offensively inoffensive whether it be love or loathing, give me some emotion"	47.5 x 28 x 24cm uncritical	87dB/w 30Hz (in room)		86
<b>KEF C55</b> £249	Good Average +	Similar to but less good value than C75, the '55 provides Uni-Q stereo stability but not real wood veneer or good low frequency room match	48 x 24.5 x 25cm stands, free space	91dB/w 30Hz (in room)		82
<b>KEF C75</b> £339	Good Good	Compact floorstanding model's Uni-Q driver provides fine crossover integration, giving stable stereo and fine dynamic range within a slightly 'rich' balance	72 x 24.5 x 25.5cm floor in free space	90dB/w 45Hz	R	71
<b>KEF C85</b> £549	Good Good	Essentially a simplified vinyl finish version of C95, the 85 delivers a similarly coherent, neutral, rich and slightly lazy sound	88 x 25 x 22cm well clear of walls	89dB/w 27Hz	R	90
<b>KEF C95</b> £649	Good Good	Rich and lazy, but nonetheless very endearing in a cosy sort of a way, the '95 is a lot of speaker for the money, and delivers a big sound with grace and subtlety	88.5 x 24.5 x 31cm floor in free space	90dB/w 28Hz (in room)	R	78
<b>Lindley New Age</b> £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
<b>Linn Index II/KuStone</b> £235/£109	Good Good	Combination of stand and speaker looks and sounds very good for the price, with good bass extension and control, and dynamic range. Clean, clear, if a shade slow	44 x 21 x 23.5cm (box only) close to rear wall	86dB/w 28Hz	BB	90
<b>Linn Kaber LS500</b> £989	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
<b>Linn Kan II</b> £417	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 wall	82dB/w 35Hz (in room)		78
<b>Linn Nexus LS250</b> £449	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 supplied stands	89dB/w 60Hz		59
<b>Magneplanar MG1.4</b> £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
<b>Magneplanar MG2.5R</b> £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
<b>Magneplanar MGIIIa</b> £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
<b>Magneplanar SMGa</b> £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
<b>Marantz LD-50DMS</b> £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
<b>Martin Logan CLS II</b> £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
<b>Meridian Argent 2</b> £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
<b>Meridian M30</b> £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
<b>Mission 760</b> £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
<b>Mission 761</b> £130	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
<b>Mission 762</b> £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
<b>Mission 763</b> £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
<b>Mission 764i</b> £450	Good Average	Despite improvements, this large floorstander still lacks low frequency authority, which is probably a function of its comparatively modest price	1ft from wall, freestanding 87dB/W	below 20Hz (in room)		94
<b>Mission 767</b> £2300	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
<b>Mission Cyrus 780</b> £170	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
<b>Mission Cyrus 781</b> £250	Average + Good	Properly run in, the pretty little 781 delivers a fast, dynamic and informative sound which more than justifies its price. Take care to adjust placement to suit room and system	43 x 22.5 x 28cm matching stands 1ft from wall	88dB/w 28Hz (in room)	R	86
<b>Mission Cyrus 782</b> £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
<b>Monitor Audio MA1200</b> £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
<b>Monitor Audio MA1800</b> £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



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<b>Monitor Audio Monitor 11</b> £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	stands free space 87dB/W	48Hz (in room) R	94	94
<b>Monitor Audio Monitor 7</b> £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
<b>Monitor Audio Monitor 9</b> £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
<b>Monitor Audio Studio 10</b> £1200	Average Average +	Expensive, luxury build/finish and all-metal driver diaphragms provide engagingly transparent midrange and treble, spoilt by over-strong mid-bass.	40 x 20 x 25cm heavy stands clear of walls	87dB/w 45Hz		90
<b>Mordaunt-Short MS 3.10</b> £110	Average Average +	Probably the liveliest and most communicative miniature around, this beautifully presented design is probably better suited to budget 'real hi-fi' than the blandness of the midi system	28.5 x 17.5 x 20cm	88.5dB/w 48Hz	BB	78
<b>Mordaunt-Short MS 3.20</b> £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
<b>Mordaunt-Short MS 3.30</b> £200	Average Average +	A little too mid-forward for neutrality or formal recommendation, this attractive, good-sized model nevertheless has more than enough appealing qualities to merit serious consideration	46 x 23.5 x 27cm high stands 1-2ft from wall	87dB/w 38Hz (in room)		78
<b>Mordaunt-Short MS 3.40</b> £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 matching is a bit tricky	57 x 23.5 x 27.5cm stands in free space	87dB/w 30Hz (in room)		86
<b>NAD 8225</b> £150	Good Average +	Notwithstanding lacklustre styling and an unprepossessing appearance, this NAD miniature has a smooth and even midband plus an appealing overall jauntiness. The whole turns out to be worth more than the sum of its parts.	34 x 20 x 18cm stands close to wall	87dB/w 45Hz (in room)	R	86
<b>Naim NA IBL</b> £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	
<b>NVA Cube 1</b> £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
<b>NVA Cube 2</b> £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
<b>NVA Cubix</b> £1100	Average Good	Too idiosyncratic for formal recommendation, the Cubix possesses remarkable bass extension for its size, but is tricky to optimise and has aggressive tendencies	60 x 32.5 x 32.5cm	84dB/w 28Hz (in room)		78
<b>Opus 3 Capella</b> £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 bookcase	86.5dB/w 45Hz		66
<b>Opus 3 Credo</b> £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
<b>Pearl &amp; Oakley Victoria 200</b> £1099	Average - Average -	Extraordinary – and to many very attractive – 'ginger jar' presentation in Staffordshire ceramics, but let down by need for further acoustic and mechanical development	93 x 33 x 33cm on floor in free space	87dB/w 30Hz (in room)		78
<b>Philips FB815</b> £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 that somehow lacks genuine authority	63 x 27 x 27cm low stands in free space	85dB/w 30Hz		86
<b>Philips FB825</b> £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
<b>QLN Model One</b> £700	Good Average	Similar to Signature at third 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 stands, free space	85dB/w 28Hz (in room)		82
<b>QLN Signature</b> £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
<b>Quad ESL-63</b> £1860	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 wall	84dB/w 34Hz	R	60
<b>RAM Hermes</b> £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
<b>Richard Allan CD5</b> £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
<b>Rogers LS2a</b> £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
<b>Rogers LS4a</b> £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
<b>Rogers LS6a</b> £316	Good Good	Stereotypically a Rogers model with impressively even balance, prospective purchasers will have to weigh the fine 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
<b>Rogers LS7t</b> £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
<b>Rogers Studio 1a</b> £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
<b>Roksan Darius</b> £1395 (£345 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. The problem is affording the amplification to do it justice.	47 x 27 x 40cm own stands angled in space	82dB/w 20Hz	R	86
<b>Royd A14 II</b> £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
<b>Royd A7 Series 11</b> £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 wall	86dB/w 75Hz	R	53
<b>Royd Apex</b> £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
<b>Royd Eden</b> £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
<b>Royd Sintra</b> £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
<b>Ruark Swordsman</b> £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
<b>Ruark Talisman</b> £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
<b>SD Acoustics OBS</b> £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 walls	92dB/w 30Hz (in room)	R	82
<b>SD Acoustics Ribbon</b> £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 from walls	91dB/w 30Hz (in room)		81
<b>SD Acoustics SD1</b> £1350	Average Very Good	A large scale, airy and unusually detailed system with excellent dynamics. Current model has more civilised top-end and warmer balance than original model	123.5 x 38.2 x 31.9cm free space	90dB/w 50Hz	R	60

# The Directory

## LOUDSPEAKERS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY	VALUE	ISSUE
<b>SD Acoustics SD3</b> £379	Average Good	Neither cheap nor perfect, this near miniature (using OBS' mid driver down into the bass) sounds unusually lively and dynamic within inevitable physical constraints, and is ultimately both engaging and entertaining	38 x 19 x 29cm stands 10cm from wall	83dB/w	R	86
<b>Seventh Veil System IV</b> £1290 (£340 integral stand)	Average Good +	Lacks welly and loudness but delivers astonishing results with female vocals in particular. Antithesis of the 'good allrounder', this oddball design has considerable charm that the committed enthusiast might find irresistible	72 x 44 x 21 x 29cm own-stands close to wall	84dB/w 28Hz (in room)	R	86
<b>Shan Shimna</b> £280 (stands £75)	Average + Good	Pretty little miniature in cast mineral/plastics has limited dynamic range and could sound smoother, but integration is good and box effects slight	31 x 16 x 17cm stands near rear wall	84dB/w 65Hz	R	71
<b>Snell Type C</b> £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
<b>Sony APM-101ES</b> £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
<b>Sony APM-121ES</b> £150	Average Average -	Good perceived high tech value, but the balance has an artificial 'loudness' character, too rich in the bass and too strong in the treble	43 x 25 x 28cm stands, free space	86dB/w 25Hz (in room)		86
<b>Sony APM-141ES</b> £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'tizz) tendencies	61.5 x 26 x 32cm stands in plenty of free space	88dB/w 30Hz (in room)	R	78
<b>Sony APM-181ES</b> £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
<b>Sony APM-66ES</b> £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
<b>Spendor SP1</b> £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
<b>Spendor SP2/2*</b> £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
<b>Spica Angelus</b> £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
<b>Spica TC50</b> £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
<b>Spica TC50SE</b> £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
<b>Studio Power DMS100</b> £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
<b>Tannoy DC1000</b> £210	Average Average -	The smaller of two DC models with dual concentric drivers, the '1000 is much less well balanced than the larger, floorstanding '2000	50 x 24 x 25cm	91dB/w 53Hz		71
<b>Tannoy DC2000</b> £340	Good Good	Remarkably high sensitivity from unique dual concentric driver that has an involving but characteristic sound. Bass could be better	68.5 x 26 x 27cm floor in free space	93dB/w 55Hz	R	66
<b>Tannoy DC3000</b> £670	Good Good	Giving new meaning to terms like dynamic range and headroom, the magnificent '3000 is a must for those who enjoy high-level monitoring.	94 x 26 x 31cm Floor 1ft+ from wall	94dB/w 30Hz (in room)	R	78
<b>Tannoy E11</b> £140	Average Average -	Fundamentally turgid and slow, thanks to level 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
<b>Tannoy J95</b> £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
<b>Tannoy M15</b> £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 1-2ft from wall	88dB/w 40Hz (in room)	R	78
<b>Tannoy M20</b> £260	Good Good	Alongside fine build and presentation, the M20 provides an unusually clever combination of the 'traditional' virtues of transparency and low coloration with more trendy strengths of speed and pace	50 x 25 x 22cm stands in free space	87dB/w 25Hz (in room)	R	86
<b>Tannoy Westminster</b> £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 corners	96dB/w (manuf.)	R	Coll '87
<b>TDL Monitor</b> £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
<b>TDL Studio 0.5</b> £399	Average Good	This tiny floorstanding transmission line has good agility but doesn't provide the coherence or even balance of the slightly bigger Studio 1	55 x 20 x 30cm own stand, free space	85dB/w 40Hz (in room)		94
<b>TDL Studio 1</b> £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
<b>Technics SB-CS5</b> £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
<b>Technics SB-RX50</b> £500	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
<b>Technics SBC 250</b> £140	Average + Average -	Despite a fairly even tonal balance, the 250EK sounded muddled in the midrange and dull in character	36.5 x 23.5 x 20.5cm free space, stands	86dB/w 60Hz		46
<b>Toshiba SS33-M</b> £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
<b>Townshend Glastonbury IIS*</b> £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 soundstaging	91.5 x 28 x 4.6 free standing in room	88dB 27Hz	R	65
<b>Townshend Glastonbury Tor</b> £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
<b>Vandersteen Model One</b> £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 in view of the additional mid forwardness and bass imprecision.	100 x 30.7 x 25.6cm floor clear of walls	87dB/w 23Hz (in room)		86
<b>Videotone Minimax 2</b> £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
<b>Visonik David 6001</b> £173	Average - Poor	Sharp styling a classy looking miniature makes, but the complex grillework worsens a sound which starts off with too much top and not enough bottom	20 x 12 x 13cm against rear wall	87dB/w 130Hz		74
<b>Wharfedale 410</b> £130	Good Average-	One step up from the Diamond, this attractive and sensitive small bookshelf model sounds smoother but is also rather bland and uninvolving	34.5 x 22 x 22.5cm stand against wall	89dB/w 45Hz (in room)		94
<b>Wharfedale 505/2</b> £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
<b>Wharfedale Coleridge</b> £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
<b>Wharfedale Diamond IV</b> £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
<b>Yamaha NS 1000M</b> £900	Good Good +	Living up to its monitor label, and tonally well suited to digital material, the NS 1000M is superbly crafted and capable of high levels	67.5 x 37.5 x 32.5cm 30cm from wall, stands	90dB/w 40Hz	R	46



# The Directory

## 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
<b>Acoustic Research RD-06</b> £280	Average Average	Acceptable middle market player with very simple facilities and cramped control section, but unusually good looks	Dolby B/C/HX Pro, fine bias, counter memory, repeat		69
<b>Aiwa AD-F270</b> £90	Average Average	An excellent budget machine, adequately equipped and satisfactorily built. Sound quality is in severe danger of transcending the price category	Dolby B/C, fine bias adjust	BB	75
<b>Aiwa AD-F370</b> £130	Average Average	Adequate but uninspiring recorder with detail shortcomings but good control layout and successful sounding with recorded musicassettes	Dolby B, C, HX Pro, bias adjust		63
<b>Aiwa AD-F500</b> £150	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
<b>Aiwa AD-F700</b> £199	Good Average	Somewhat less than the sum of the (most fine) individual parts, this deck has an artificial quality which spoiled the efforts of a fine transport	Dolby B/C/HX Pro, fine bias, CD Direct input		75
<b>Aiwa AD-F800</b> £249	Good Very Good	Close to first class performance – and superb value. The Aiwa is purposeful and finely engineered. It provides a near irresistible blend of good mechanics and electronics	3 head, dual capstan, Dolby B/C/HX Pro, tape calibration	BB	75
<b>Aiwa AD-R470</b> £150	Average Good	For once, an auto-reverse deck with the performance of a decent uni-directional one at a similar price. The Aiwa is modern in concept, and has good, transparent electronics	Dolby B/C/HX Pro, auto reverse, cue & review, bias adjust	BB	69
<b>Aiwa AD-WX616</b> £150	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		93
<b>Aiwa AD-WX777</b> £179	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
<b>Aiwa AD-WX888</b> £249	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
<b>Aiwa AD-WX909</b> £400	Good Good	Convenience meets sound quality, and both win. An essentially clean, positive recorder which works alongside an auto-reverse player of lower standard – a sensible compromise	Dual deck, auto-reverse, track search, Dolby B/C/HX Pro, bias adjust, 3 Head	R	57
<b>Aiwa XK-007 Excelia</b> £400	Good Good	Downmarket version of XK-009 with simplified bias/equalisation adjustment section and more forgiving but less informative sound. Still good, but less exciting than XK-009	Dolby B, C, dbx, HX Pro, 3 Head, tape alignment		63
<b>Aiwa XK-009 Excelia</b> £550	Very Good Very Good	Excellent detail, stable articulate midband and slightly obvious treble. The most interesting Aiwa for yonks	Dolby B, C, dbx, HX Pro, 3 Head, tape alignment, CD direct	R	63
<b>Akai GX-32</b> £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
<b>Akai GX-52</b> £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
<b>Akai GX-65</b> £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
<b>Akai GX-95</b> £400	Good Very Good	Well designed and finished cassette deck with features well judged to please the audiophile – especially switchable Dolby HX Pro and switchable panel display. 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
<b>Denon DRM 700A</b> £150	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
<b>Denon DRM-400</b> £140	Poor Poor	Messy, confused sound terminally lacking in detail and space under all conditions of use due to high mechanical flutter levels	Dolby B/C, memory stop, track search		81
<b>Denon DRM-500</b> £180	Good Very Good	Powerful, refined and detailed sound, and an excellent transport are keys to the success of this cleanly styled addition to the range – but why no timer standby?	Dolby B/C/HX Pro, variable bias	BB	75
<b>Denon DRM-700</b> £250	Good Very Good	Stoppily executed (though attractive) user interface contrasts with a high standard of music making belying its modest price	3 head, Dolby B/C/HX Pro, record return	R	81
<b>Denon DRM-800</b> £330	Good Very Good	There are some niggling faults and limitations (no timer standby is particularly annoying), but as a means of recording music it sets a very high standard	Dolby B/C/HX Pro, off tape monitoring, dual capstan	R	75
<b>Denon DRW-650</b> £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
<b>Denon DRW-750</b> £250	Good Good	Polished and articulate, the only significant shortcoming is poor performance with prerecorded material	Dolby B/C/HX Pro, twin unidirectional, one records	R	69
<b>Dual 5850RC</b> £269	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
<b>Goodmans GSW-5200</b> £90	Poor Poor	Musically unimpressive but at least it's cheap!	Dolby B, twin, one records		69
<b>JVC TD-V621</b> £300	Very Good Good +	Sharp, stable sound with rock solid transport. Features count is extensive and useful. Only raw sounding electronics detract from the scoring.	3 head. Dolby B/C/HX Pro, 3 inputs, fine bias	R	93
<b>JVC TD-X321</b> £130	Average Average	Typical modern budget deck with acceptable sound quality, especially when making and playing it's own tapes. The transport is a little rough, but recommended on the basis of good value for money.	Dolby B, C & HX Pro	R	93
<b>Marantz CP230</b> £330	Average Average	This is a competitively priced portable recorder though not suited to replay of musicassettes	Dolby B, bias adjust	R	52
<b>Marantz CP430</b> £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
<b>Marantz SD-40</b> £170	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
<b>Marantz SD-50</b> £220	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
<b>Marantz SD-60</b> £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

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## CASSETTE DECKS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Marantz SD315</b> £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
<b>Marantz SD515</b> £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, Dolby HX Pro, parallel record capable	R	93
<b>Memorex SCT-5</b> £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
<b>Memorex SCT-84</b> £200	Average Average	The playback only transport is a little disappointing, but the record one is a quality item and the deck works well. Ergonomics are good, but styling and control feel are decidedly tacky.	Dolby B/C, fine bias, twin deck with auto-reverse record, unidirectional play	R	69
<b>NAD 6300</b> £550	Very Good Very Good	Solid and homogeneous sound quality and very good replay compatibility thanks to 'play trim'. Distinctive, musical – and costly	Dolby B, C, HX Pro, 3 Head, bias adjust	R	63
<b>Nakamichi Cassette Deck Two</b> £300	Very Good Very Good	Not completely neutral, this deck is assured, dynamic and quick, with abundant detail and some coarseness. Stable transport but only rudimentary features accompany fine engineering	Dolby B/C, manual tape type selection, bias adjust	R	93
<b>Nakamichi RX-202E</b> £545	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
<b>Philips FC566</b> £179	Average Average	Mostly well equipped, though some tape search facilities fail to exploit the auto-reverse capability. Sounds clean and stable – with prerecorded tapes too	Auto reverse, track search, Dolby B & C		57
<b>Philips FC567</b> £279	Average Poor	Well equipped but ergonomically substandard; sound quality is messy and lacking in clarity and dynamics	Dual deck, auto reverse, track search, Dolby B & C		57
<b>Philips FC870</b> £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
<b>Pioneer CT-225</b> £99	Poor Poor +	Budget deck with a strictly budget sound - but surprisingly strong range of features. An opportunity lost.	Dolby B/C, logic controls, track search		93
<b>Pioneer CT-337</b> £130	Average Average +	Simple but well made machine with a slightly soft but consistent standard of reproduction	Dolby C/HX Pro, CD synchro, mic inputs	R	87
<b>Pioneer CT-447</b> £170	Good Good	An excellent and affordable package, decidedly OTT in the display area but capable of genuinely fine musical reproduction	Dolby C/HX Pro, auto tape alignment, track search	BB	87
<b>Pioneer CT-656 Mk II</b> £250	Average + Average +	Reworking of original 656 has led perhaps unintentionally to a somewhat ill-conceived set of compromises. Excellent with prerecorded material, the deck is otherwise unbalanced.	Dolby B/C/HX Pro, 3 heads, track search, fine bias		93
<b>Pioneer CT-757</b> £350	Very Good Poor	Ostensibly fine deck is let down by inability to drive tape hard without loss of focus and consistency. Even prerecorded material, which didn't suffer these shortcomings, lacked detail.	Dolby B/C/HX Pro, 3 head, assisted tape calibration		93
<b>Pioneer CT-91a</b> £500	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
<b>Pioneer CT-959</b> £450	Very Good Very Good	Near state of the art for £450. Engineering is of a high order. An open window sound quality, but playback response is very bright (being corrected by manufacturer)	3-head, var bias & eq, multi-mode meters. Dolby HX Pro	R	87
<b>Revox B215</b> £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
<b>Revox B215-S</b> £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
<b>Rotel RD-845</b> £130	Average - Average +	Extremely fine transport and clean sounding electronics for the price. Bass lacks weight, but deck works remarkably effectively with chrome tapes.	Dolby B/C, manual tape selector	R	81
<b>Rotel RD-855</b> £180	Average Good	The transport is OK and the various frequency responses are erratic, but good basic electronics help the Rotel deliver. Coherent, enjoyable and informative	Dolby C memory stop & repeat, track search	R	87
<b>Rotel RD-865</b> £200	Good Very Good	Fine, architecturally solid sound quality in a package with a low gimmick count and strong audiophile appeal	Dolby B/C/HX Pro, fine bias	BB	75
<b>SAE C102</b> £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
<b>Sansui D-X211HX</b> £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	R	93
<b>Sansui D-X301i</b> £180	Average Good	Lively, informative and well equipped basic deck, if rather obscure operationally	Dolby B/C/HX Pro, variable bias, track search	R	69
<b>Sansui D-X501</b> £230	Poor Poor	Unhappy mixture of good looks, excellent ergonomics and mediocre, sometimes poor sound	Dolby B/C, random track search		81
<b>Sansui D-X701</b> £340	Average Average	A little flat and smeared under some conditions, this design is at its best with metal and prerecorded tapes	Dolby B/C, 3-head, variable bias & output, track search		81
<b>Sherwood DS-1135C</b> £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
<b>Sherwood DS-7000R</b> £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
<b>Sony (WMD6C) Pro Walkman</b> £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
<b>Sony TC-FX120</b> £90	Poor Poor	Neat and very simply equipped model has decent electronics but poor, unstable transport with predictable consequences.	Dolby B & C, variable bias		93
<b>Sony TC-K520</b> £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
<b>Sony TC-K650ES</b> £250	Average Average	Facilities are utilitarian but nicely presented, but sound quality, which is basically good, is slightly marred by some coarseness of tone.	3 head, Dolby B/C/HX Pro, fine bias	R	93
<b>Sony TC-K730ES</b> £500	Very Good Very Good	First rate cassette deck that scarcely betrays it is a cassette deck on audition. Features Not quite cheap enough to compete solely on price, the V-270C is a rather messy and unstable sounding deck	Dolby B, C, bias and equalisation adjust	R	81
<b>Sony TC-K850ES</b> £400	Very Good Very Good	Near state of the art recorder with excellent recording quality, and even better playback performance. Sounds — and looks — best with the display turned off	3-head, Dolby HX Pro, bias/level adjust, dual capstans	R	87
<b>Sony TC-RX110B</b> £90	Poor Poor	Woolly bass and scrappy treble combine to make a meal of many music types, despite accurate response shapes with most types of tape. Prerecorded material sounds dull	Dolby B/C		75
<b>Sony TC-TX55</b> £150	Average Average	The sound quality ranking is a good one for an auto reverse machine at this price level. Clean, sharp sound, only slightly let down in the deep bass.	Auto reverse, Dolby B, C & HX Pro	R	75
<b>Teac V-270C</b> £89	Average Average	Not quite cheap enough to compete solely on price, the V-270C is a rather messy and unstable sounding deck	Dolby B & C, bias adjust		63
<b>Technics RS-B905</b> £350	Good Good	Good, well set up cassette deck with a clean, accurate sound but some compression. dbx circuit sounds poor	Dolby B, C, HX Pro, dbx, bias adjust, 3 Head		57
<b>Technics RS-B965</b> £350	Very Good Very Good	Messy control layout, but ultra capable deck with clear electronics and excellent headroom, low noise, an ultra-stable transport - and first rate sound quality.	3 head, dual capstan, Dolby B/C/HX Pro, dbx, assisted tape alignment.	R	93



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## CASSETTE DECKS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Technics RS-TR355</b> £200	Average	Serviceable middle market dual deck without serious fault but with some annoying inadequacies, notably an inability to play side A and B and then stop	Twin auto-reverse, one records, Dolby B/C/HX Pro		75
<b>Yamaha KX-1200</b> £500	Excellent Average	A veritable rats' nest of buttons and dials, albeit well laid-out. This is nearly a great recorder, but lacks simplicity of sound	Real-time counter, track search, Dolby B, C, dbx, HX Pro, bias adjust, remote control		52
<b>Yamaha KX-250</b> £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
<b>Yamaha KX-330</b> £170	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
<b>Yamaha KX-530</b> £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
<b>Yamaha KX-930</b> £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

## DAT RECORDERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Aiwa Excelia XD-001</b> £1300	Very Good	Clear and very listenable recorder, roughly comparable to, but slightly sweeter sounding than Sony DCT-1000ES - but with an inferior front panel design	Track ID and search, remote	R	63
<b>Aiwa HD-S1</b> £600	n/a Average	The first portable DAT recorder, and already looking expensive and a little under endowed. Nevertheless, good build, controls and display help, and sound quality is adequate.	DAT recorder with separate A/D converter/battery unit. SP only, mic/line i/p		94 Supp.
<b>Denon OTR-2000</b> £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, digital fade, fine cueing, remote	R	93
<b>Grundig Fine Arts DAT-9000</b> N/a	Good Good	Conventional DAT recorder offering standard facilities. The deck is well made and equipped, and is engineered to a satisfactory quality standard. It performs to an acceptable standard, though it is not state of the art.	2/4 hour recording, mic inputs, digital in/out		69
<b>Kenwood DX-7</b> £450/£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.
<b>Luxman KD-117</b> £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
<b>Sony DTC-1000ES</b> £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
<b>Sony DTC-55ES</b> £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
<b>Sony DTC-M100</b> £799	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
<b>Sony TCD-D3</b> £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 record modes	BB	94 Supp.

## CD PLAYERS

Now entering its second decade, 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
<b>Acoustic Research CD-06SE</b> £450	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
<b>Aiwa XC-333</b> £149	Average-	Looks costly, well featured, well balanced technical performance and sound for money	multi bit, keypad remote, hdph (fixed)	R	88
<b>Aiwa XC-700</b> £170	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
<b>Akai CD-52</b> £249	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
<b>Akai CD-55</b> £230	Good	Budget model which fails to compare with the CD52	Remote, hdph, Good programming		83
<b>Akai CD-62</b> £330	Average	Looks, build quality and the technical specification are right up to date. As it stands it sounds good but if the indifferent lab performance could be improved, it would probably sound even better	Remote, programme, hdph, comprehensive display etc	BB	70
<b>Akai CD-73</b> £450	Good	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
<b>Akai CD-93</b> £700	Good	Undoubtedly a CD player of real class in build, presentation, lab performance and sound quality, but also a shade expensive for formal Recommendation.	Track entry remote, menu display etc		58
<b>Arcam Alpha</b> £420	Very Good	Arcam's new star, its best CD player yet and great value	Remote, etc, coax dig. out	BB	83
<b>Arcam Black Box 1</b> £210	n/a	This rich, powerful and articulate sounding DAC transforms the majority of medium price CD players	Needs D-out CD players	R	60
<b>Arcam Black Box 2</b> £260	Very Good	An addition to the BB 1, it also offers improved sound and more inputs	Optical and wired input digital decoder	BB	76

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## CD PLAYERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Arcam Black Box 3</b> £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, optical & coax	R	88
<b>Arcam Delta 170.2 transport</b> £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
<b>Arcam Delta 70.2</b> £600	Very Good Good	Now in Mk II form a further improvement is seen in features, performance and sound quality. Solidly built and British	Now adds simple remote vol + std features; also display off	R	76
<b>Arcam Delta 70.3</b> £699	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 digital outputs.		95
<b>Ariston CD1</b> £345	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
<b>Ariston Maxim</b> £500	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
<b>Cambridge Audio CD3</b> £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
<b>Carver TL-3100</b> £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
<b>Carver TL-3220</b> £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
<b>Carver TL-3300</b> £695	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
<b>Conrad-Johnson DFI</b> £1995	Average - Good +	Setting a decent standard and including an FET line preamplifier, the unusual DFI is worth investigating	Line preamp built-in, simple remote facilities		76
<b>Deltec PDM-One</b> £500	Average Very Good	A no frills audiophile bitstream converter at an affordable price	Coax-in, special cable and mains filter options	R	83
<b>Denon DCD 960</b> £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
<b>Denon DCD-2560</b> £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 and tape edit features, opt/coax digital output, 20bit 16x.		95
<b>Denon DCD-860</b> £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
<b>Dual CD5150</b> £300	Very Good Good +	In a real sense cloned from the rave Rotel RCD-855, this is also a great value all rounder: multi bit rules OK!	keypad remote, hdph (fixed), Philips based	BB	88
<b>Ferguson CD007</b> £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
<b>Ferguson CD008</b> £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
<b>Goodmans GCD-435</b> £140	Poor Average -	Goodmans has the power to source with more care than this, music centre quality!	multibit, remote, basic facilities		88
<b>Grundig CD9000</b> £1000	Good Good	Aimed at a market which puts external styling above sound quality. Although this player is of slightly above average competence, in most departments it is expensive	Remote, programme, hdph socket, calendar display etc		70
<b>Harman Kardon HD7450</b> £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 DAC.		95
<b>Harman Kardon HD7500II</b> £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 youthful enthusiasm.	Remote, variable, digital and headphone outputs. MASH/PWM DAC	R	95
<b>Harman Kardon HK7300</b> £200	Average Average -	Budget low bit technology, does not deliver enough for a recommendation	No remote, no digital out; basic control features		83
<b>Harman Kardon HK7500</b> £330	Average + Average	Decided improvement over 7300 in all respects. Still fairly unimpressive sound	Remote, hdph + vol, good programming		83
<b>JVC XL-V231</b> £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
<b>JVC XL-Z1010</b> £499	Good Average -	Despite some high tech design and a good lab result, this model did not deliver good sound quality	32 track prog., disp. off, auto fade, 2 digital op		76
<b>JVC XL-Z431</b> £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.	Remote operation, motorised volume + tape edit. PEM bitstream		95
<b>Kenwood DP-4030</b> £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
<b>Kenwood DP-7030</b> £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	R	95
<b>Luxman D105u</b> £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
<b>Marantz CD-40</b> £200	Very Good Good +	Like the Philips CD620 equivalent, this is the Philips/Marantz performance/value equation at its best	Multi bit, remote, hdph (fixed)	BB	88
<b>Marantz CD-41</b> £230	Good Average	Based on Philips' CD624/634 but stashed in the older CD-40 case, this player suffered from a loose, boomy bass quality together with an impure treble. Not a good advert for PDM	Remote, index scan but no digital output. SAA7321 PDM DAC		95
<b>Marantz CD-50SE</b> £330	Very Good Very Good	Souped up CD50 delivers reference performance in its class. Worthy successor to the '65SE legend	Full remote, power volume. Hdph, (fixed). FTS. Good programming	BB	83
<b>Marantz CD-60</b> £330	Very Good Very Good	Lacking the SE flair, the 0 remains a fine player by market standards. Second best is more than good enough	Multi bit, remote inc. vol., hdph, FTS etc	BB	88
<b>Marantz CD-60SE</b> £380	Very Good Very Good	Luxury '50SE with superior remote volume and variable headphone socket; a fine performance all round	Optical digital output, full remote, power vol. FTS, hdph	BB	83
<b>Marantz CD-80</b> £550	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
<b>Memorex CD1650</b> £200	Poor Poor	An overpriced music entre player. Surely the giant Tandy corp. can get a better standard than this?	remote, keypad, multi bit, midi		88
<b>Meridian 203</b> £495	Very Good Excellent	Exceptionally lucid, transparent and solid sound 'bitstream' converter. Always tidy and easy on the ear, but doesn't bulldoze the craggy bits	Stand alone converter, 32-48kHz, optical/electrical i/p	BB	87
<b>Meridian 206B</b> £950	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
<b>Meridian 208</b> £1575	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
<b>Micro Seiki COM100</b> £3850	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



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## CD PLAYERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Micromega Duo BS</b> £499	Good Excellent	With a good transport it delivers a sweet musical sound at a high quality level	Bitstream D/A convertor, auto input switching	R	88
<b>Micromega Optic BS</b> £695	Average Good +	A bitstream rebuild of a Philips chassis, this player shows promise for the future	Bitstream, remote, hdph (fixed)		88
<b>Mission Cyrus PCM II</b> £400	Very Good Good +	Improvements in price and performance keep this classic remote player in the running	Remote vol, phase inv, dig op. PSX option	R	83
<b>NAD 5425</b> £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
<b>NAD 5440</b> £290	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 DAC	R	95
<b>Nakamichi CD Player 4</b> £300	Average+ Good-	Attractively styled but suffers high-ish distortion for a modern CD player. Best suited to up-beat pop tracks rather than complex classical works which seem to lack focus and secure soundstaging	Remote with track access, headphone, coax dig. output. 18bit 8x		95
<b>Nakamichi OMS-5EII</b> £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
<b>Nakamichi OMS-7EII</b> £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
<b>Philips CD 850</b> £400	Very Good Very Good	An upgrade of the 840, Philips has got bitstream to work well here. A fine allrounder	Bitstream, keypad remote, FTS etc, etc	BB	88
<b>Philips CD624</b> £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
<b>Philips CD634</b> £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
<b>Philips CDV185</b> £350	Average + Average	Hard to value with the video singles facility but it all works well enough for a recommendation	Video singles + CD scart + digital out etc	R	76
<b>Pioneer PD-7500</b> £280	Very Good Average	Has potential but has not brought it off on sound. Good aspects of earlier models have been lost with the new technology	Low bit dual DAC, full remote, hdph		88
<b>Pioneer PD-8500</b> £400	Very Good Good+	One of a number of genuine 20bit CD players now available, the PD-8500 enjoys a thoroughly unrestrained and full-bodied sound. It rarely sounds hard or abrupt but prefers civilised classical CD's over pop, it has to be said.	Remote with tape edit and fader controls. Variable o/p. 20bit 8x	R	95
<b>Pioneer PD-91</b> £899	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
<b>Pioneer PD-93</b> £1400	Very Good Good+	The extremely civil, understated feel of its music contrasts markedly with the over-engineered construction of this player. It will not offend anyone but neither will it spark much excitement	Remote with fader and index facilities. Two dig o/p's. 20bit		95
<b>Pioneer PD-9300</b> £499	Excellent Average	A mid price flagship of excellent build and lab performance but only average sound - interesting though	Remote, 24 track programming, 2 dig. op		76
<b>Proton AC-120</b> £180	Average Average -	Fine styling, low price but barely average performance	15 track memory, simple design, remote, hdph		76
<b>Radford DAC1</b> £895	Good Good	Fine but slightly dated and costly package in performance terms — but flexible, musical and well built	DAC with 2 electrical + optical i/p, tape out		87
<b>Radford WS2</b> £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 chipset.		95
<b>Revox B126</b> £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
<b>Revox B226S</b> £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
<b>Rotel RCD-855</b> £250	Good Good +	Stripped for action, this well built Philips technology player delivers fine performance and sound. First rate value	Remote, 20 track prog, 1 audio op, 1 digital op	BB	76
<b>Rotel RCD-865</b> £300	Average Good	Curious mixture of bold musical presentation and foreshortened imagery. Grows on you though. One to audition with care	'bitstream', remote control	R	87
<b>SAE D102</b> £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, though styling is unusual	Remote (inc volume), skip, scan etc.		58
<b>Sansui CD-X211</b> £200	Good+ Good+	A new cheapie based on Philips' successful CD582 technology with a bold orange display and an equally bold, invigorating sound that is mercifully free of brightness or grittiness	Simple remote, programming and shuffle play. 16bit 4x	BB	95
<b>Sansui CD-X711</b> £600	Excellent Very Good	Luxury features, finish and sound from this classy Sansui; no excuses required here	Hdph + vol, remote full programming	R	83
<b>Sharp DX150</b> £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
<b>Sharp DX750</b> £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
<b>Sonographe SD1 (by CJ)</b> £799	Good Very Good	Distinctive with oak end-cheeks, using Philips based 14 bit x 4 oversampling, Conrad Johnson electronics make this a musically rewarding player	Full search programme and timing	R	Coll. '87
<b>Sony CDP-228ES</b> £400	Very Good Average +	Good value, this is Sony's best mid price design and comes superbly equipped	Hdph, remote, rem vol, custom file	R	76
<b>Sony CDP-338ESD</b> £600	Excellent Good	Only a bit better than the 228, the 338 is a good machine, but not quite good enough for formal recommendation at the price	Custom file, remote, rem vol, hdph, shuffle etc		76
<b>Sony CDP-790</b> £200	Good Average	Great on the test bench but new tech sounds worse than its predecessor. Who does the listening?	Low bit, full remote, comprehensive facilities		88
<b>Sony CDP-990</b> £300	Very Good Good+	Every feature under the sun is available on this busy-looking machine though its sense of pace and drive at bass frequencies is less hectic. Treble detail is crisp and sparkling by contrast.	Remote, Custom File program on scrolling display. PLM bitstream.	R	95
<b>Sony CDP-X77ES</b> £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
<b>Stax Quattro</b> £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
<b>Teac CD-P3000</b> £169	Good+ Average	A new budget bitstreamer though one that fails to match the success of recent NAD and Kenwood players. Pleasantly open and airy sounding but lacks guts and solidity.	Most facilities moved to remote. Midship drive. MASH/PWM DAC		95
<b>Teac CD-P4000</b> £299	Good+ Average-	An updated version of the CD-P400 but one that seems less successful with its rather thin and scratchy sound. Very poor bass resolution dilutes the impact of all recordings. MASH/PWM	Most features on remote, two parallel outputs on player.		95
<b>Teac CDP-400</b> £249	Good Average	Fine in the lab, but good build quality is not reflected in the rather average sound	Low bit, keypad remote, hdph, versatile prgm'ing		88
<b>Technics SL-P277A</b> £160	Very Good Average +	High value, budget priced, yet well equipped and finished, a strong example in its group	Remote, programming, hdph + level. No d. op.	BB	83

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MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Technics SL-P550</b> £220	Very Good Average	Superb, slick presentation, well equipped, average sound, fine build	Hdph, rem. prog., edit/fade, dig optical		83
<b>Technics SL-PA10</b> £450	Good + Good	Built to partner the SU-MA10 upmarket integrated amp/DAC, this transport has the unusual limitation of only optical output. Reassuringly solid and more immune to vibration than most	CD transport, optical output only, remote		88
<b>Wadia WT-2000/Digimaster 2000</b> £5495/£6500	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
<b>Yamaha CDX-1030</b> £500	Good + Average	New tech but Yamaha hasn't managed to get this one sounding right. Otherwise its fine	Low bit, remote with vol, very versatile		88
<b>Yamaha CDX-530E</b> £180	Average + Average	A well balanced example using established DAC technology - worthy of consideration if not recommendation	Multi bit, keypad remote, hdph (fixed)		88

## CD MIDI SYSTEMS

So you want a hi-fi, but you don't want to make a fuss about it. A pre-packaged system with everything matching up and no aggravation may not rank with carefully chosen separates on sound quality, but there's no denying the attractiveness or popularity of this approach - the market for pre-packaged component hi-fi systems is considerably bigger than that for separate items, even ignoring the vast numbers of low-cost single unit stacker systems.

The arrival of compact disc led to a new

fashion for shelf-standing compact systems, or 'midis' as they are known in the trade, as a replacement for earlier floor-standing rack systems (themselves the upmarket development from music centres). Only some 330mm wide, midis can more or less match full-size (430mm) rack components for performance, and are certainly cheaper to make, ship, sell and buy.

Whereas specialist hi-fi is moving steadily towards ultra-simple 'no frills' components, midi systems tend to be sold on a feature count at a

price point, usually with little opportunity for demonstration and comparison. Our test programme includes extensive auditioning and lab testing, while making allowance for the different aspirations of designers and expectations of users. Key features valued highly by customers include system remote control, automatic switching, and double 'dubbing' cassette decks. The top end of the market is developing with surround sound audio/video-ready packages.

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Aiwa NSX-800</b> £550	Average Poor	Undetailed, undynamic and largely unmusical system which throws it all away for an excessive range of tape related features	One box miniature plus remote and speakers dual auto reverse tape etc		89
<b>Aiwa X-D100</b> £1000	Average - Average	Very fully equipped with wide ranging in and outputs but poor upgradeability. Sound quality is reasonable on the whole	Digital & optical in/outputs, dual auto reverse, disc file CD		77
<b>Aiwa X-D80K</b> £550	Poor Poor	Congested and harsh sound quality, the cassette deck, amp and loudspeakers being well below par. The built-in timer adds some operational flexibility	Auto-reverse, CD synchro record, remote, timer		77
<b>Akai FX-800CD</b> £700	Very Good Very Good	Well thought through as a functioning system. Lacks the usual surfeit of controls, and sound quality is of an unusually high order. An excellent buy even at this price	Twin record & auto reverse cassette etc with 'intelligent' remote	BB	89
<b>Ferguson HFD28</b> £300	Poor Poor	Similar to Goodmans 5000 system but with greater power and marginally superior sound	One-piece, semi-remote		77
<b>Grundig Studio Line 1</b> £330	Poor Average +	Intriguing package with warm, woolly but attractive sound let down by poor attention to detail and suspect cassette deck. Amplifier appears to be inadequately protected	CD/cassette tuner plus preset equaliser		77
<b>Hinari DK200 Disc Deck</b> £300	Poor Poor	Confused user interface is matched to inadequate electronics. Poor - and poor value	Single unit, two cassettes, CD, tuner, remote		77
<b>JVC Midi-W53</b> £500	Average Average	A potentially excellent middle price system spoiled by the loudspeakers and - to a lesser extent - the record player	Midi system with SEA equaliser		89
<b>Kenwood M-54CD/CDS</b> £600	Average + Average +	The M-54CD is the version without speakers and is the one to buy. The control system is A1 and the range of facilities offered is dazzling, but the amp and CD player are crude	Dual auto-reverse cassette, tuner/timer, CD, turntable with or without speakers	R	89
<b>Memorex System-550</b> £500	Average Average +	Above average electronics let down by very poor loudspeakers. Worth considering if the latter are replaced	Dual CD & cassette deck, tuner/timer, semi-auto turntable		89
<b>Pioneer S-11</b> £510	Average - Average -	Fine lower middle market system, with one useful extra - the built in timer. Only the record deck is disappointing	Twin auto reverse cassette, built in timers, one piece amp/cassette		77
<b>Pioneer S-330D</b> £1080	Very Good Very Good	High standard of reproduction on all sources, though mistracking with Dolby C was a limitation. There are few gimmicks and plenty of fine engineering	Dolby C/hx pro, multi-disc, amp with DAC etc	R	77
<b>Pioneer S-555</b> £800	Good Good	Confusingly well equipped, in some respects rather gimmicky system, weak on record performance (surprise!) but quite or very good elsewhere	Full feature midi system with graphic, dual disc CD player	R	89
<b>Pioneer XR-P500</b> £400	Good Very Good	Costly but high grade compact with excellent consistency between sources and plenty of presence	Compact system, remote control, dual auto-reverse cassette	BB	89
<b>Proton AI-3000II</b> £650 w/o spkrs	Average Very Good	Simple facilities and good, no-nonsense engineering combine to produce a system with genuine class. It's as easy to listen to as it is on the eye	Single box amp/tuner/CD/cassette with remote control; no loudspeakers	R	89
<b>Sanyo 39CD</b> £260	Poor Average -	Acceptably compromised basic low end system, offers broadly respectable if unambitious music making for those on a tight budget	One piece + CD, non-remote, manual tuner		77
<b>Sanyo 49CD</b> £300	Poor Average -	Similar to 39CD, but with Dolby B, preset tuning, remote control and more power. Audio wise, it's more of the same, but there's greater stature when loud and cassettes are helped by	One piece + CD, partial remote control, digital tuner Dolby B	R	77
<b>Sanyo 59CD</b> £380	Average - Average -	Adequate performance overall, though endemic lack of pitch integrity takes edge from tape and records. Some inconsistencies in control system too	As 49CD, + full remote, auto source select, separate turntable		89
<b>Sanyo SYS-801 CD</b> £360	Poor Poor	Typical low end midi system: simple controls, adequate CD and tuner, poor turntable and cassette, awful loudspeakers	Remote control midi system		89
<b>Sharp 320E</b> £500	Poor Poor	Poor quality system featuring tacky styling, a lack of sophistication - and overpriced	One box midi & turntable with surround matrix		89
<b>Sony Compact 302CD</b> £400	Average Average +	Fine low to middle price system whose only significant weaknesses are the poor tuner behaviour with weak signals and the turntable	Auto-reverse record, unidirectional play cassette, graphic equaliser etc.	R	89
<b>Sony Compact 702CD</b> £700	Average + Good	Creditable up-market system with reasonable speakers and excellent cassette deck, amplifier, and a relative absence of superfluous gadgetry	Twin auto-reverse cassette deck, tuner/timer, video in/out circuitry	R	89
<b>Technics CDC30</b> £600	Good Good	A fine record player-less system whose electronics are well made and of moderately good performance, it's rescued from anonymity by excellent loudspeakers	5 disc multiplay top loading CD player, twin auto-reverse cassette, tuner	R	89
<b>Technics CDX50</b> £750	Very Good Very Good	Conventional, well built but button bound sound system with a nearly adequate turntable and excellent loudspeakers etc.	Dual auto-reverse cassette system (tested with optional equaliser)	R	89
<b>Yamaha AST-C10</b> £530	Average + Very Good	Brilliant if flawed luggable with weighty, powerful bass, and a rare combination of expressiveness and clarity unprecedented from such a small package. Good features.	Mains portable twin cassette/CD/radio system detachable speakers, remote	R	77
<b>Yamaha YST-C11</b> £600	Average + Good	The cassette deck is a little wobbly in tone, but CD and FM are excellent, and bass depth is unusually prodigious from such small loudspeakers, though paid for with some loss of subtlety	'Astarte', dual auto reverse cassette, luggable, with remote control		89

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## 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.)

■ MODEL ■ PRICE	■ LAB ■ SOUND	■ COMMENTS	■ FEATURES	■ VALUE	■ ISSUE
<b>Aiwa XT-003</b> £100	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.
<b>Akai AT-52L</b> £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
<b>Akai AT-93L</b> £250	Good + Good +	By AM standards presentable (good) while FM delivers the goods	All bands, aerial switch	R	65
<b>Arcam Alpha 2</b> £180	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.
<b>Arcam Delta 80</b> £330	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
<b>Creek T40 Series 3</b> £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.
<b>Denon TU-260L</b> £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.
<b>Harman Kardon Citation 23</b> £600	Good Very Good	Fine performance, interesting features and ease of use are this tuner's forté, and the sound quality is top notch	FM/AM seek/manual adjustment muting 16 presets remote control	R	60
<b>Harman Kardon TU9400</b> £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 + hi-blend + signal strength meter.	R	93 Supp.
<b>Linx Theta</b> £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
<b>Magnum Dynalab FT101</b> £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
<b>Marantz ST-40L</b> £130	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.
<b>Meridian 204</b> £595	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
<b>Naim NAT 01</b> £1294	Very Good Very Good	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
<b>Nakamichi ST-7E</b> £750	Good + Good +	Exceptionally good for weak-signal areas, and good all round	16 AM/FM presets, auto time digital		55
<b>Onkyo T9090 II</b> £590	Very Good Very Good	It has most of the facilities you could possibly want and more besides. Lab performance and sound quality are both good enough to ensure recommendation even at this price	FM only, digital, 20 presets, auto scan etc.	R	72
<b>Pioneer F-447L</b> £130	Average+ Average+	Equipped with a various IC-controlled servo and tuning aids, great fun to play with but of little practical benefit. Sounds OK but, on past form, we would expect more from Pioneer.	FM/AM digital, 36 presets, CCTS +SS + manual/auto seek tuning.	R	93 Supp.
<b>Pioneer F91</b> £350	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
<b>Proton AT-300</b> £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
<b>Quad FM4</b> £329	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
<b>Revox B260</b> £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
<b>Rotel RT-830AL</b> £110	Good + Good	Fine sounding budget audiophile material, no frills, no fuss	Manual dial analogue, FM, MW, LW	BB	55
<b>Rotel RT-850AL</b> £180	Good + Good +	Scoring well on listening tests and one of the best sounding tuners at its price level, it was a bit let down on AM but RF performance was good	FM/AM, digital	BB	50
<b>Rotel RT-870L</b> £230	Very Good Very Good	Rotel's top tuner is ruggedly built and includes plenty of sophisticated electronics. It's a very slick machine to use with a sound that's equally confident and refined.	FM/AM digital, 16 presets, selectable IF/RF + RF attenuation + signal readout.	R	93 Supp.
<b>SAE T-102</b> £449	Good + Good +	Expensive for all the radio you get, but sounds interesting. AM - poor	FM/MW only	R	65
<b>Sony ST-S530ES</b> £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 tuning		93 Supp.
<b>Technics ST-G70L</b> £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 facility, decent signal strength meter.	R	93 Supp.



# The Directory

## 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	LAB SOUND	COMMENTS	TYPE	VALUE	ISSUE
<b>Aiwa HP-V99</b> £50	Good - Average +	Horn loaded in-ear miniatures with plenty of guts but not enough transparency or bass to compete with the headbanded competition	Intra-aural, closed-back, dynamic		75
<b>Aiwa HP-X30</b> £30	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
<b>Aiwa HP-X80</b> £50	Good Good	A headphone that's highly suited to non acoustic music and portable sources, nicely made and slickly finished. Sound quality doesn't quite match the price	Supra-aural, closed-back, dynamic		75
<b>Aiwa HPEX-200</b> £90	Good Good	Modern looking and well finished, the Excelsias, as they are dubbed, had meaty bass and sounded reasonably open for the type	Circumaural, closed-back, dynamic		63
<b>AKG K135</b> £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
<b>AKG K145/S</b> £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
<b>AKG K240 Monitor</b> £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
<b>AKG K280 Parabolic</b> £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
<b>AKG K340</b> £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
<b>Audio Technica ATH909</b> £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
<b>Audio Technica ATH910</b> £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
<b>Audio Technica ATH911</b> £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
<b>Beyer DT 325</b> £30	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
<b>Beyer DT330 Mk II</b> £45	Good Poor	Not the most revealing 'phones encountered, the 330s were nevertheless enjoyable and rarely offended	Circumaural, semi-open, dynamic		55
<b>Beyer DT550</b> £69	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
<b>Beyer DT880</b> £90	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
<b>Beyer DT990</b> £100	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
<b>Beyer IRS690</b> £200	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
<b>Jecklin Float Electrostatic</b> £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
<b>Jecklin Float Model One</b> £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
<b>Jecklin Float Model Two</b> £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
<b>JVC HA-D990</b> £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
<b>Koss K/6X Plus</b> £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
<b>Koss TD/60</b> £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
<b>Pioneer SE-72</b> £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
<b>Quart Phone 30</b> £40	Good Average	Whilst not as seductive as their PMB25 predecessor, the 30s are reasonably neutral and do improve on some of the competition - though not stunning	Circumaural, semi-open, dynamic		63
<b>Quart Phone 70</b> £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
<b>Quart PMB 25II</b> £40	Good Good	Despite a somewhat unconventional suspension system, the 25s put in a convincing and enjoyable performance with warm yet lively balance	Circumaural, open-back, dynamic	BB	55
<b>Quart PMB 65</b> £70	Good Good	Quite revealing and neutral albeit with the usual closed back sound, this competes well with more established models	Circumaural, closed-back, dynamic	R	55
<b>Quart PMB 85</b> £90	Average Very Good	These more expensive Quarts bear a striking resemblance to the Jecklin Float models and use two drivers per ear. Sound is a bit bass heavy but not bad overall	Circumaural, open-backed, dynamic		63
<b>Realistic Pro-X</b> £25	Poor Average -	Robust, unanimously uncomfortable and heavily veiled in sonic terms - not a great success	Supra-aural, closed-back, dynamic		75
<b>Ross RE-2760</b> £35	Poor Average	Stylish white cans from the only British firm in the business. Unfortunately sound quality is not up to par in this price range	Supra-aural, closed-back, dynamic		63
<b>Ross RE2530 CD</b> £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

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## HEADPHONES

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Ross RE2560 CO</b> £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
<b>Sennheiser HD40</b> £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
<b>Sennheiser HD450</b> £35	Good Average	Modern, simple and lightweight phones that are remarkably robust and which turned in a relaxed if weighty performance that was at worst pleasant	Supra-aural, semi-open, dynamic	R	63
<b>Sennheiser HD480</b> £45	Good Average	Using the same shell as the 450s, the 480s were a little softened and unrevealing by comparison with their competitors	Supra-aural, semi-open, dynamic		63
<b>Sennheiser HD520</b> £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
<b>Sennheiser HD530</b> £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
<b>Sennheiser HD540 Ref Gold</b> £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
<b>Sony A21 EX</b> £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
<b>Sony MDR V3</b> £30	Average Good	Portable stereo oriented phones that are very nicely made and combine clarity with a pleasant lack of distortion	Supra-aural, closed-back, dynamic	BB	63
<b>Sony MDR V7</b> £70	Very Good Very Good	Classy sounding cans that are very slick and work well with all types of music, setting the standard in their price range	Circumaural, closed-back, dynamic	R	63
<b>Sony MDR-CD999</b> £120	Good + Very Good	A very nice headphone in all respects, the 999s are worthy of the best headphone outputs and high quality sources	Supra-aural, semi-open, dynamic	R	75
<b>Sony MDR-R10</b> £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
<b>Stax Gamma pro/SRD-X pro</b> £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
<b>Stax Lambda Signature/SRM-T1</b> £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
<b>Stax SR Gamma</b> £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
<b>Stax SR Lambda Pro/SRD-7SB Mk2 Adaptor</b> £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
<b>Stax SR Lambda Pro/SRM-1</b> Energiiser £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
<b>Stax SR34</b> £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
<b>Stax SR84</b> £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
<b>Yamaha YHL-006</b> £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

## 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	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Aiwa HS-PL300</b> £110	n/a Average	Good looking, simply laid out player with a sensible selection of features and reasonable sound quality for a small player of this price	Dolby NR, chrome/metal eq, remote		78
<b>Aiwa HS-PX303</b> £150	n/a Good	Chunky and macho styling combines with comprehensive features and a half decent transport to make a powerful personal	Dolby BC, chrome/metal EQ, remote	R	78
<b>Panasonic RQ-P505</b> £100	n/a Poor	Very attractive and neat little player with nicely designed controls and XBS bass boost, but sonically it's limited by distinct wow and flutter	Dolby, chrome/metal eq, remote		78
<b>Panasonic RQ-P525</b> £120	n/a Average +	Fitted with what is effectively a bass only tone control and harbouring all the necessary features, the 525 also has a knack with tape replay	Dolby B & C, chrome/metal eq, remote	R	78
<b>Saisho PS90R</b> £40	Poor Poor	A bit of a jumble of features and gadgets, the PS90R has on-board speakers, an extending aerial and even records, but sound quality is dubious	Graphic EQ, types I, II & IV, AM/fm, recorder		56
<b>Sharp JC-270E</b> £130	n/a Average -	Slightly old fashioned design combines with a basic feature count and mediocre sound quality to make an apparently uncompetitive player	Dolby, chrome/metal eq, remote		78

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## PERSONAL CASSETTES

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Sony Walkman Pro</b> £249	Good + 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
<b>Sony WM-701C</b> £200	n/a Good -	Beautiful little machine with all the necessary buttons'n'switches and a fundamentally exceptional sound quality, marred unfortunately by wow and flutter	Dolby B & C, chrome/metal eq, remote, folding phones		78
<b>Sony WM-BF65</b> £90	n/a Average +	Regular size radio/clock/cassette player with a bright even open balance and Sony's forward facing phones. Not as glamorous as slightly more expensive models but sonically not bad	Dolby, chrome/metal eq, radio, alarm clock	R	78
<b>Toshiba KT-4549</b> £80	n/a Poor	Fully equipped with 10 preset radio and alarm clock, the KT-4549 is a bit aggressive on the sonic side and the bass boost system lacks balls	Dolby, chrome/metal eq, radio, alarm clock		78

## PERSONAL CDS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Aiwa DX-P50</b> £150	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.
<b>Denon DCP-100</b> £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.
<b>Denon DCP-50</b> £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.
<b>Goodmans GCD-10</b> £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
<b>Kenwood DPC-41</b> £150	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.
<b>Kenwood DPC-77</b> £270	Good + Very Good	Very chunky and well made, the DPC-77 is the only player to include a digital output and sounds very good through its analogue output - a suitable domestic alternative adaptors	12.8 x 3.5 x 14.5cm, 750g, digital output, mains & in-car	R	66
<b>Kenwood DPC-81</b> £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.
<b>Philips AZ6897</b> £150	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.
<b>Sanyo CP-12</b> £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
<b>Sony D-350</b> £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.
<b>Sony D-66</b> £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.
<b>Technics SL-XP1</b> £130	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.

## 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.

## INTERCONNECT CABLES

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Audio Technica AT6115</b> £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
<b>Audionote Copper ANA</b> £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
<b>Audionote Flexible Silver ANS</b> £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
<b>Audionote Silver ANV</b> £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
<b>Audioquest Livewire Ruby</b> £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
<b>Audioquest Livewire Topaz</b> £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
<b>Budget OFC</b> Circa £7	Average Average	Subjectively, this cable did lift much of the aural fog experienced with scrawny standard hook- up leads.	OFC		59
<b>Budget Patch Cords</b> (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
<b>Chord Mono-t</b> £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.



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## INTERCONNECT CABLES

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Deltec Black Slink</b> £152	Excellent Excellent	Inherently neutral, the cable faithfully reproduced broad and deep stereo soundstages with precise focus and a sense of facility	8 silver plated OFC strands PTFE dielectric	R	59
<b>Deltec Gortex Black Slink</b> £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.
<b>Deltec Slink</b> £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
<b>Denon LC-OFC</b> N/A separately	Very Good Average	Supplied with Denon's dearer CD players, this cable introduced a peculiar 'twangy' coloration at high frequencies, and a slightly soft bass	LC-OFC, non-magnetic gold plated plugs		59
<b>DNM Solid-core</b> £23	Average Good	Transparent in the midband and full of sparkling detail in the treble, low bass was slightly curtailed (unterminated price £2.30 per m.)	Single strand nickel-plated copper. Unshielded	R	59
<b>Isoda Electric HC-05-PSR</b> £54	Good Good	A pleasantly lively and fluid sounding cable though softens some subtle, midband detail	Aluminium + brass multistrand cable	R	83 Supp.
<b>Kimber Kable KC-1</b> £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
<b>Kimber Kable PSB</b> £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
<b>Monster Interlink 300</b> £24	Average + Average	A big, larger-than-life sound but with some emphasis of midband detail and loss of bass	Screened, symmetrical cable		83 Supp.
<b>Monster Interlink 400</b> £34	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
<b>Origin Live Soli-Core Super</b> £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
<b>QED Incon Graphite GP1 Gold</b> £18.95	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
<b>QED Incon P1-Gold</b> £15.95	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
<b>Sterling</b> £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
<b>Supra EFF-1</b> £60/0.75m	Average Average	A new, costly and mildly disappointing addition to the range. Edgy, smeared sound	Screened, symmetrical dir. cable		83 Supp.
<b>Thorens SAC 100</b> £50	Good Average	Performance is undermined by a slightly coarse and splashy treble, not necessarily bright, simply rather confused - and fine detail lacks resolution	Silver-plated OFC, coaxial		59
<b>van den Hul MC-D300II</b> £45	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
<b>van den Hul MC-Gold</b> £250	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
<b>van den Hul MC-Silver</b> £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
<b>van den Hul MCD-1021II</b> £69	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
<b>van den Hul Thunderline</b> £150	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
<b>Yfere LC-OFC Quad</b> £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.

## LOUDSPEAKER CABLES

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Absolute Wire Force 4</b> £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
<b>Audio Innovations OR-200</b> £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
<b>Audio Technica AT6120</b> £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
<b>Audionote AN-SP</b> £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
<b>Audiquest Livewire Black</b> £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
<b>Audiospec Latitude L4</b> £3 per metre	Average + Average +	Warm, ruddy but also mildly muddy sound with some slight emphasis of bass notes	Fig.-of-eight multi-strand, PVC diel.	R	83 Supp.
<b>Bellwire</b> 12p per metre	Poor Average -	Broadly speaking it delivered a bright and tizzy sounding treble with a fairly open and detailed mid with little or no bass resolution	0.5mm single strand, PVC dielectric		64
<b>Deltec 8S</b> £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
<b>Deltec Gortex Black 16</b> £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.
<b>DNM Solid core</b> £3 per metre	Average Average	A good general-purpose solid-core, though too bandwidth limited for high-end applications. Sounds great in some systems	0.65mm single strand, webbed PVC dielectric	R	64
<b>Exposure</b> £2.50 per metre	Good Good	It could sound a trifle matter of fact but this emotive flattening was also somewhat dependent on the music program. It is also highly suited to long runs	56 OFC strands, webbed PVC dielectric	R	64
<b>Furukawa FS-2F09</b> £3.50 per metre	Good Average +	Some loss of bass weight but otherwise offers a fresh and open sound. Good value	Multi PC-OCC stranding, PVC dielectric	R	83 Supp.
<b>Furukawa FS-2T15S</b> £50 per metre	Good + Very Good	An advanced solid-core cable with a highly fluid, detailed and inherently musical sound	Single 1.5mm Super PC-OCC	R	83 Supp.
<b>Kimber 4VS</b> £7.15 per metre	Average + Average	Similar construction to 4TC but dissimilar materials infer a slightly tizzy sound	Open-weave, multistrand, PVC ins.		83 Supp.
<b>Kimber Kable 4PR</b> £54 - 5m pair	Average Average +	This directionally marked cable benefited from an open and airy treble quality but seemed notably leaner than 4TC. Bass was well round and satisfyingly taut	4 x 7 copper strands per conductor, PVC diel.		64
<b>Kimber Kable 4TC</b> £17.65 per metre	Good Good +	4TC made a great impression in the listening tests with an open midband, a smooth and unfatiguing treble with slightly rich but suitably weighty bass	OF copper, PTFE dielectric	R	64
<b>Linn K20</b>	Good	Subjectively, it erred on the forward and bright side of neutral but enjoyed an essentially	56 OFC strands, webbed PVC		64

# The Directory

## LOUDSPEAKER CABLES

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
£2.88 per metre	Average	clar and punchy delivery	dielectric		
<b>Marantz ML-55S</b> £30 - 10m	Average	Subjectively, this cable offered a loose and splashy treble which, though not overtly bright, did compromise both tonal and timbral accuracy	30 OFC strands, 3 conductors PVC diel.		64
<b>Mission Cyrus</b> £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
<b>Monitor PC Silverline PC4</b> £5.75 per metre	Good Average	Sonically, it laboured under a heavy and claustrophobic balance, lacking the see through transparency and lucidity of the better solid core cables	2072 x 0.07mm silver plated copper strands		64
<b>Monster Original</b> £4.50 per metre	Good Average +	Original sounded relatively congested and murky at higher frequencies but possessed weight and conviction in the bass	Multistrand		64
<b>Monster SCI 16-4</b> £3 per metre	Average Average	Not as thick-sounding as early Monster cables but still slightly unbalanced. Versatile construction	4 x 16-gauge conductors, OFC strands		83 Supp
<b>NVA LS1</b> £6 per metre	Average + Good	A light and breezy sounding cable best suited to short lengths, NVA benefited from a clear and transparent outlook	7 x 0.25mm silver alloy strands, PTFE	R	64
<b>Origin Live Soli-Core Ordinary</b> £1.80 per metre	Good Average +	Subjectively it bettered the performance of the costlier Super version, affording a pleasantly detailed and spacious soundstage with firm bass but slightly coarse treble	1.8mm and 0.5mm single strands	R	64
<b>QED 79-Strand</b> £1 per metre	Good Average	For much of the last decade QED 79-Strand has been the first port of call for enthusiasts on the upgrading ladder, a tradition that should still hold true today	79 strand, PVC dielectric	R	64
<b>QED Flat 200</b> £2.20 per metre	Good Good	I detected a degree of confusion at low frequencies but this did not stifle the acoustic atmosphere which remained open and positive	200 strands, flat webbed PVC dielectric	R	64
<b>QED Incon Graphite</b> £2 per metre	Average + Average +	This graphite version of Incon sounded cruder and generally more heavy handed than the cheaper unshielded type. Overall presentation was mildly restricted and cloaked in a faint aural fog	OFHC, polymeric screen		64
<b>Rotel Supra 10</b> £8.95 per metre	Good + Good	Supra 10 provided a very free and open sound that was unhindered by any excess at low frequencies. Worth its weight in scrap copper!	2,562 OFC strands, webbed PVC dielectric	R	64
<b>Rotel Supra 4</b> £3 per metre	Good + Good	Ideal for both long and short runs, it furnishes a big sound that benefits further from a smooth, unfatiguing treble	1,036 OFC strands, webbed PVC dielectric	R	64
<b>Solid core lighting cable</b> 36p per metre	Average + Good	It enjoys much of the smooth treble and articulate midrange usually associated with the better solid core derivatives. Lean but taut and rhythmically coherent	1.5mm square, 3 cores, PVC dielectric	BB	64
<b>Sterling</b> £99 per metre	Average Average	This pre-production sample possessed a strangely muddled and reserved sound quality. It suffered from a progressive instrument modulation	Pure Silver, PTFE dielectric		64
<b>Townshend Isolda</b> £400 - 5m pair	Average + Good	Isolda possessed a truly dark background out of which rose a very solid and extended bass together with an excellent sense of transparency through the upper octaves	8 coax cables per conductor - very thick	R	64
<b>van den Hul CS-122</b> £5.95 per metre	Average + Good - treble	Characterised by a driving and powerful bass, CS-122 is a heavy sounding cable. Mid treble detail was refreshingly clear but there was a slightly muted air about the extreme treble	19 x 0.45mm silver plated strands, webbed rubberised	R	64
<b>van den Hul CS-352</b> £12.95 per metre	Good Average +	Subjectively it sounded like CS-122 only more so, the deep rumbling bass tending to overwhelm subtle musical details. It also appeared a trifle peaky in the treble	7 x 0.76mm + 168 x 0.125mm silver plated strands, rubberised diel.		64
<b>van den Hul SCS-12</b> £29.95 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	19 silver plated strands of 12 different gauges, PTFE dielectric	R	64
<b>van den Hul SCS-2</b> £99.95 per linear metre	Good + Good +	Overall it was commendably neutral and transparent but nothing less would be acceptable bearing in mind the tremendous cost of a stereo pair	665 silver plated matched crystal copper strands, PTFE dielectric	R	64
<b>Vecteur R-CV30</b> £5.40 per metre	Average Good	Subjectively the better of Vecteur's cable line-up offering a neutral overall perspective but slight loss of detail resolution at both frequency extremes	4 x 0.8mm LC-OFC PTFE insulated strands	BB	64

## STANDS AND 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.

## LOUDSPEAKER STANDS

MODEL PRICE	LAB SOUND	COMMENTS	TOP PLATE SIZE, HEIGHT	VALUE	ISSUE
<b>Appolo A10</b> £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
<b>Appolo A820</b> £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
<b>Audio Dimensions Classic 2</b> £110	4 leg Average	Built in the heavyweight tradition and damped with chalk. Solid, stable, tactile sound	20.3 x 20.3x52cm	R	83 Supp.
<b>Foundation Fred</b> £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
<b>Foundation Maggi</b> £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
<b>Foundation Pi</b> £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

# The Directory

## LOUDSPEAKER STANDS

MODEL PRICE	LAB SOUND	COMMENTS	TOP PLATE SIZE, HEIGHT	VALUE	ISSUE
<b>Foundation Sir Fred</b> £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.
<b>Golding Black Satin</b> £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.
<b>Heybrook HBS1</b> £99	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
<b>Heybrook Point 5</b> £55	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
<b>Linn Kan II</b> £99	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
<b>Linn Sara</b> £110	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
<b>Monotrak Engineering M1</b> £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
<b>Monotrak Engineering M4</b> £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
<b>Monotrak Engineering M4S</b> £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
<b>Origin Live Advanced</b> £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
<b>Origin Live Three Leg</b> £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
<b>Partington PP4</b> £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.
<b>QED TS22 Tristand</b> £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
<b>Stand Design Z20</b> £70	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.
<b>Target HJ15/3</b> £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
<b>Target HS20</b> £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
<b>Target T-40</b> £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.

## EQUIPMENT SUPPORTS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE (H x W x D)	VALUE	ISSUE
<b>Alphason R444</b> £120	Rack Good	A heavyweight structure with stressed MDF shelves, ideally suited to the Sonata turntable	82 x 60 x 39.5cm	R	83
<b>Audioquest Sorbothane Feet</b> £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
<b>Cornflake TCS6</b> £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.
<b>Foundation Stable Table</b> £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
<b>Origin Live Skyline Super</b> £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
<b>Roksan Equipment Table</b> £169	Rack Good	An upgradable/expandable system suited to Roksan's Xerxes if not other competing turntables	65 x 52 x 38cm		58
<b>Sound Organisation Table</b> £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
<b>Sound Organisation Wall Stand</b> £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
<b>Sound Organisation Z022</b> £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
<b>Stand Design Duplex</b> £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
<b>Target TT2</b> £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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# 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
<b>Ferguson 51L5</b> £499	Average Good	This nicely (monitor) styled set delivers a fine all round performance at a very competitive price. Ergonomics are better than most thanks to good on-screen graphics	51cm MP FST, NICAM, Fastext, OSG	R	86 Supp.
<b>Grundig ST-63-460TT</b> £649	Average - Average +	Bulky set's shape resembles a square-rigged sail; screen tilts back slightly, so might suit floor mounting, though beware room reflections. Picture quality is good, if a touch bland, but ergonomics are fairly impenetrable - no on-screen graphics either. Halfway respectable sound quality is over-enriched by cabinet drone.	59cm FST, NICAM, Fastext		76
<b>ITT Nokia</b> £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
<b>JVC AVS250</b> £500	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
<b>Panasonic Prism TK-24 W1</b> £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
<b>Philips 9752</b> £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.
<b>Pioneer SD-21AV1</b> £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.
<b>Sony KVX 2132U</b> £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.
<b>Toshiba 217D9B</b> £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	SCREEN SIZE, FEATURES	VALUE	ISSUE
<b>Akai VS-75EK</b> £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
<b>Akai VS-967EK</b> £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.
<b>Grundig VS680</b> £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 titling & graphics		86 Supp.
<b>Nordmende V4405K</b> £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
<b>Panasonic NV-F65</b> £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.
<b>Panasonic NV-FS1</b> £1000	Poor Good	The control system is poorly organised, with cramped legends and some strange machine logic. Bar code programming is hardly a great achievement either. Picture and sound quality are good, but not state of the art	S-VHS, Hi-fi, NICAM, bar code programming	R	71
<b>Philips VR-6585</b> £500	Average Average	Fine middle-ranking deck with full LP operation and easy controls and displays	Hi-fi, NICAM, transmitter LCD remote, LP/SP		86 Supp.
<b>Sanyo VHR-D4890E</b> £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.
<b>Sharp VC-S1000H</b> £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.

# Personal Messages

*Our regular loudspeaker reviewer was the man for the job when it came to putting the Epos ES14s to the test. Over to you, Paul.*

**H**aving reviewed 200 loudspeakers over the past couple of years, the laws of statistics and significant sampling ought to have given me a fairly solid perspective on the marketplace as a whole, and a pretty good idea of the position of the goalposts and the boundaries of the field upon which the competing manufacturers are playing.

It therefore comes as a bit of a shock to come across a model that's been around for nearly seven years, that costs less than £500, yet which defines performance standards in certain areas that models twice the price rarely - if ever - approach.

## Marshalling the forces

Since long before I took over the *Choice* loudspeaker reviewing role, I've been trying fruitlessly to coax Robin Marshall into letting me try the Epos ES14, originally for my own interest and subsequently for inclusion in the normal formal reviews. Now I've succeeded, in the former endeavour at least (I'm still working on the formal review), it has become immediately and abundantly clear why this model has achieved cult status amongst cognoscenti.

One reason for Robin's reluctance is that the 14 is very much his own baby; the product he used to create and grow his own company prior to its takeover by Mordaunt-Short. His protectiveness was hardened by experiences with reviewing soon after the launch, and the realisation that the 14 was all too capable of being misunderstood by revealing deficiencies earlier in the chain.

That same caveat is just as relevant today. Having fallen for the new and smaller ES11 last month, I managed to persuade Epos to bring over the 14s, but was warned I might not necessarily like the results. With hindsight, I can understand why. The 14 adds rather more of its own character than the essentially neutral 11, which some might regard as a demerit, though to my ears and on the end of my own undoubtedly well suited Linn/Naim system, there was more than enough gained elsewhere to more than make up for a little extra coloration.

In fact I was surprised at how much better the 14 is, underneath a superficially somewhat coarser presentation. When the 14s arrived, I started off by getting my bearings with the 11s, first with one power amplifier and then bi-amped. The latter, using two grand's worth of

power amplifiers to drive £300/pair loudspeakers, isn't what I or anyone else would call a balanced approach, but it certainly made a worthwhile improvement to the sound, further enhancing my respect for these little compacts.

Bringing in the larger 14s brought one surprise for starters. The original 14 was a pioneer of the bi-wire movement, yet these samples had just a single terminal pair. Apparently dealers had been so perplexed by the extra terminals on the originals that Epos took the easy way out and reverted to 'normal' wiring; how time flies.

## Driving options

Not permitting bi-amp drive (I've now acquired the bits, but have yet to find the time to undertake the minor modification involved), the 14 was going to be slightly disadvantaged in my set up. I needn't have worried. It took about four bars to establish that, even with just a single amplifier, it was in a quite different league from its little brother. The treble is not as smooth or sweet, but is no less detailed or informative, while the midrange sounds altogether faster and more coherent, exerting a grip on dynamics and subtle shading

that takes the listener several important steps closer to reality.

There is more coloration than one would ideally like, as well as a some discontinuity around the crossover point. But there's also an uncanny combination of solidity and transparency that I find very hard to resist. Vocals are reproduced with a tension and tangibility that had me rummaging around amongst favourite old discs in search of new enlightenment, and I wasn't hurrying to bring my *Isobariks* back into the room, for all their extra bass and headroom. In fact the ES14's pseudo-reflex bass is rather clever. It's quite lively, quick and well extended, though one wouldn't describe it as particularly authoritative or powerful.

Instead it's carefully balanced to play a slightly subservient role, supporting rather than driving that delicious midrange. Reasonably free from obvious resonances, it responds well when placed fairly close to a wall.

Including the cost of the well matched open frame stands, this Epos will cost close to £600. It's not a cheap loudspeaker, and there is obvious competition from newer slim floorstanding designs like the Ruark *Talisman*, Royd *Apex* and Rega *ELA*.

I haven't been able to make back to back comparisons, but I'd be most surprised if the Epos didn't distinguish itself even in this honourable company. It simply makes listening to music highly enjoyable, even though rocking the rafters and pummelling the floorboards are not on the agenda. Good though the new baby ES11 undoubtedly is, the 14 shows the greater commitment towards a personal ideal. To put it another way: it's got more soul.

*It therefore comes as a bit of a shock to come across a model that's been around for nearly seven years, that costs less than £500, yet which defines performance standards in certain areas that models twice the price rarely - if ever - approach.*



SOUND AND STYLE



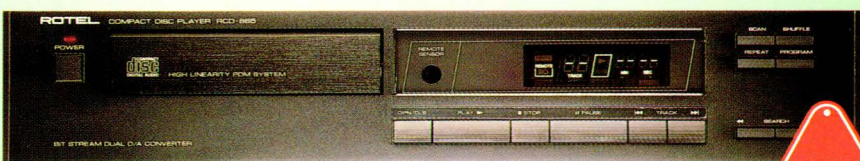
# REACH FOR THE BEST



## RCD855 COMPACT DISC PLAYER DUAL D/A CONVERTER

At a time when others are becoming lost in the bit war Rotel's no nonsense approach to quality engineering sets new standards for this Classic 16 bit 4 times oversampling system with a product which will offer lasting value. This new model from Rotel incorporates the very latest in understanding of circuit board layout and component selection resulting in very high levels of performance and musical involvement together with outstanding build quality.

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## RCD865 COMPACT DISC PLAYER PULSE DENSITY MODULATION

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These fine components are but a small selection from Rotel's award winning range of performance Hi-Fi Products which offer very high standards of technical excellence and musical enjoyment. The RCD855 and RCD865 are supplied with a numeric remote control handset and are fully remote compatible with Rotel's new RTC850L Tuner-Preamplifier. Phone or fax Rotel UK for further information and nationwide dealerlist.

UK DESIGN AND DEVELOPMENT

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