

HI-FI CHOICE

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

SEPTEMBER 1992 £2.95 US \$5.50

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on 23 loudspeakers**

Digital Compact Cassette -

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Castle loudspeakers**

The Directory

RESULTS OF OVER 1,000 FULL RE-
VIEWS, OUR OWN COMMENTS NOT
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FA 930 AMP



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FT 930 TUNER

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 D&T, Manchester 061-445 2694
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 G.F. Manders, Grimsby 0472 351391
 Miller Brothers, Doncaster 0302 321 333
 Scarborough Hi-Fi, Scarborough 0723 374 547
 Thompson Bros., South Shields 091-456 2551
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**1963
COMPACT CASSETTE**



**1983
COMPACT DISC**



**1992
DCC**

DIGITAL COMPACT



DIGITAL
dcc
COMPACT CASSETTE

Philips DCC is a giant leap forward for earkind. At last you can have the digital sound of CD combined with the convenience of cassette.

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Deans, W2	071-723 4630
Desgate/Galaxy, E1	071-247 0567
Francis, Streatham	081-769 0466
Harp Electronics, W1	071-636 4611
Hi-Spek, N3	081-349 1166
Hi-Way Hi-Fi, W2	071-262 9267
Hyper-Fi, Barking	081-591 6961
Studio 99, NW6	071-624 8855
Tempo, Kingston	081-547 0404
Woolfmans, Ilford	081-553 2587

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Adams & Jarrett, St. Leonards on Sea	0424 437165
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Chew & Osborn, Epping	0992 574242
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Smythe & Barrie, Eastbourne	0323 29192
Standens, Tonbridge	0732 353540
VJ Hi-Fi, Folkestone	0303 56860

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Leveitt & Ward, Colchester	0206 210 844
McCullough, Cambridge	0223 426766
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R.C. Snelling Ltd, Norwich	0603 712 202
Whealers, Kings Lynn	0553 774 037

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Bryants Hi-Fi, Aldershot	0252 20728
Burden Electronics, Swindon	0793 490613
Churcher Audio Video, Worthing	0903 230558
Cosmic, Weybridge	0932 854 522
Hemmings, Farnborough	0252 520 472
Hickmans, Swindon	0793 537 971
C.F. Lake, Slough	0753 538287
Mid-Sussex Electronics, Burgess Hill	0444 242 336
Power People, Bicester	0869 320280
P. Shee Television, Farnborough	0483 503606
Sinclair Youngs, Basingstoke	0252 28623
Suttons, Salisbury	0722 327171
Tru-Fi, Redhill	0737 766 128

Wales and West

M.A. Buzzard, Banbury	0295 250 036
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Horns of Oxford, Oxford	0865 511 241
Hutchinsons TV, Cheltenham	0242 573 012
F.H. Moss, Bath	0225 465 085
Radford Hi-Fi, Bristol	0272 240 878
Radiocraft Sonus, Cardiff	0222 231 166
Paul Roberts Hi-Fi, Weston-Super-Mare	0934 621 204
T.E. Roberts, Wrexham	0978 364 404

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Chelston Hi-Fi, Chelston	0803 606 863
Dorchester Hi-Fi, Dorchester	0305 264 977
ETS, Helston	0326 573 801
Ford & Sons Electrical, Sidmouth	0395 512 501
Hi-Fi Attic, Plymouth	0752 669511
James TV, Barnstaple	0271 43731
Manning Audio, Yeovil	0935 79361
Movement Audio, Poole	0202 730 865
Upton Electronics, Paignton	0803 551 329

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McCartneys TV & Video, Shrewsbury	0743 368972
Naam Hi-Fi Vision, Birmingham	021-633 4944
Queens Park Radio, Birmingham	021-427 4008

PHILIPS

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

HI-FI CHOICE

ISSUE NUMBER 110 SEPTEMBER 1992

EDITORIAL

FAX: 071 323 3547

Editor Andy Benham

Consultant Editor Paul Messenger

Art Editor Andrew Ryan

Deputy Editor Jason Kennedy

Production Editor Janet Moorhouse

Assistant Editor Andrew Cartmel

Contributors Barry Fox, Alvin Gold,
Dan Houston, Paul Miller, Ian Ward

Photography Chris Richardson

ADVERTISING

TEL: 071 631 1433 FAX: 071 636 1640

Group Advertisement Manager Fiona Hunt

Assistant Advertisement Manager Miriam Young

Sales Executive Alison Perry

Classified Sales Executive Julian O'Kelly

PRODUCTION

TEL: 071 436 1770 FAX: 071 580 6430

Production Manager Jim Bulley

Advertisement Production Sara Bray

SUBSCRIPTIONS & MAIL ORDER

TEL: 071 580 6163 FAX: 071 580 6170

Subscriptions Manager Mary Bramble

Mail Order Manager Julia French

DENNIS PUBLISHING LTD

Publishing Director Marianne McNicholas

Group Art Director Jimmy Egerton

Advertisement Director Alistair Ramsay

Managing Director Colin Crawford

Chairman Felix Dennis

PUBLISHED by Dennis Publishing Ltd, 19 Bolsover Street, London W1P 7HJ

Tel: 071 631 1433.

Company registered in England.

Origination Those nice people at Graphic Ideas.

Printing Riverside Press, St Ives Plc.

Distribution SM Distribution, 6 Leigham Court Road, Streatham, London SW16 2PG.

Tel: 081-677 8111.

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PUBLICATION

PRODUCTS AND EDITORIAL SUBMISSIONS

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

READER DIFFICULTIES

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

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SUBSCRIPTION ENQUIRIES

Hi-Fi Choice is available on subscription. The standard rates are (UK) £22.95 (1yr), £37.95 (2yr); rest of Europe £32.95 (1yr), £62.95 (2yr); rest of world £49.95 (1yr), £79.95 (2yr). Please address all subscription enquiries to Mary Bramble, Subscriptions Manager, *Hi-Fi Choice*, Dennis Publishing Ltd, 19 Bolsover Street, London, W1P 7HJ. Back issues of the magazine are also available, please refer to page 45 for full details.

THE GET OUT CLAUSE

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

This edition ©1992, Felden Productions. ISSN No. 0955 111 5.

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Menu

Much has been written recently about the demise of the vinyl album, but it looks as if things are set to get even worse with the English language itself being digitised as a final body blow to the cadaver that was once vinyl.

This was graphically brought home to me the other night at the JVC Capital Radio Jazz festival. JVC had kindly provided me with a free ticket to go and see Rickie Lee Jones, who was being supported by one Art Palmer. The aforementioned American gentleman, although quite remarkably talented with a wide variety of wind instruments, appears to think that he records and sells Compact Discs rather than albums.

Now when I was a kid people 'cut' albums, which could then be issued on the format of their choice, be it wax cylinders, 78s or whatever. Nowadays, at least according to Mr Palmer, an artist records CDs and introduces his next song by announcing its availability on his latest CD rather than his latest album. If this had only happened the once I might have passed it off as temporary slip of the tongue, but this occurred three times, even to the point where we were entreated to go out and buy his latest Compact Disc.

"Can't I have it on tape or vinyl?" I was tempted to inquire, but the thought of announcing myself as a technological Luddite in front of several thousand Royal Festival Hall goers stayed my hand, or rather my mouth.

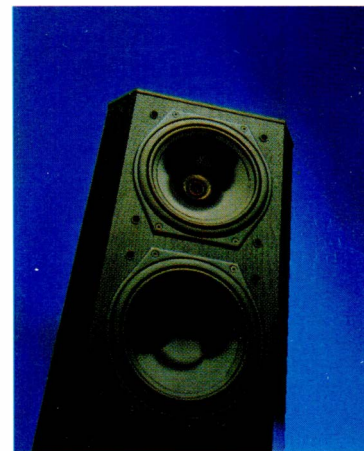
While I suppose I have to acknowledge the fact that vinyl is fast disappearing, it seems a little excessive to seek to excise even its memory from our everyday speech. I'm sure that referring to albums as albums isn't going to trigger an anachrophile backlash that will lead to people buying up the entire remaining stocks of albums at HMV in a single weekend, so why do we have to change the very word? Surely that's just rubbing salt into the wounds.

Happily the be-dinnerjacketed compère put matters into perspective by thanking Mr Palmer for his endeavors and pointing out that his new 'album' had been in the shops for a couple of weeks.

Perhaps this is just me over reacting to something that is already common in America but unlikely to take off over here. It wouldn't be the first time that the Americans have decided to slaughter the English language after all.

In any case may I use this opportunity to warn record shop assistants everywhere, the next time I go shopping for music, I intend to purchase an album, I don't care whether its on CD, cassette, vinyl, Mini-Disc, DCC, CD-I, CD-ROM or any other format, its an album. Here endeth this month's polemic.

Andy Benham



Cover photograph by
Chris Richardson.

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Top: the ds/d Decode 1 digital to analogue convertor. Below: Pink Triangle's Anniversary. Both waiting for you in Statements (page 17).

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Concise information, prices and what we thought of every product ever reviewed in our pages. Don't be fooled by inferior imitations, read the real thing!

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CONCLUSIONS, BEST BUYS AND RECOMMENDATIONS

Which speakers sank and which ones sailed to victory? Paul Messenger summarises the results of this month's review survey.



More loudspeakers than you can shake a tweeter at (page 50).



Delta's Black Boxes take 5

As we predicted in the June issue Arcam has produced a *Black Box 5* D/A convertor to match the *Delta 170.3* transport. Following in the footsteps of the *Black Box 3*, which will remain in production, the *BB5*'s main new feature is a sync lock circuit, allowing the *BB5* and *Delta 170.3* to run off a single master clock in the DAC, thus reducing jitter. The reason for the apparently illogical skip from *BB3* to *BB5* is the rather gruesome connotations that the number four has in the Far East.

The *Black Box 5* will cost £450 and should be in the shops by the time you read this. Unlike the Bitstream *BB3* the *BB5* uses a hybrid DAC chip which incorporates both multibit and bitstream technology. It uses an eight times oversampling, 18-bit digital filter coupled to a DAC based on Burr-Brown's PCM67 chip that's said to combine the attack, boogie factor, dynamics, call it what you will, of multibit with the low level linearity of bitstream. To be more

specific the upper ten bits are converted using multibit, and the lower eight with single bit technology.

The *BB5* achieves the above mentioned synchronicity with its *170.3* partner via a separate optical link that carries a 2.8224MHz signal. It's possible to compare the synched and

unsynched signal via a front panel switch.

It has two inputs (optical and electrical) and two outputs, as well as a phase inversion switch on the front panel.

Owners of the *Black Box 3* might be interested to know that that model can be upgraded to *BB5* status at a cost of £250.



Revealed: the interior of Arcam's new Black Box 5.

Limited edition picture disc?

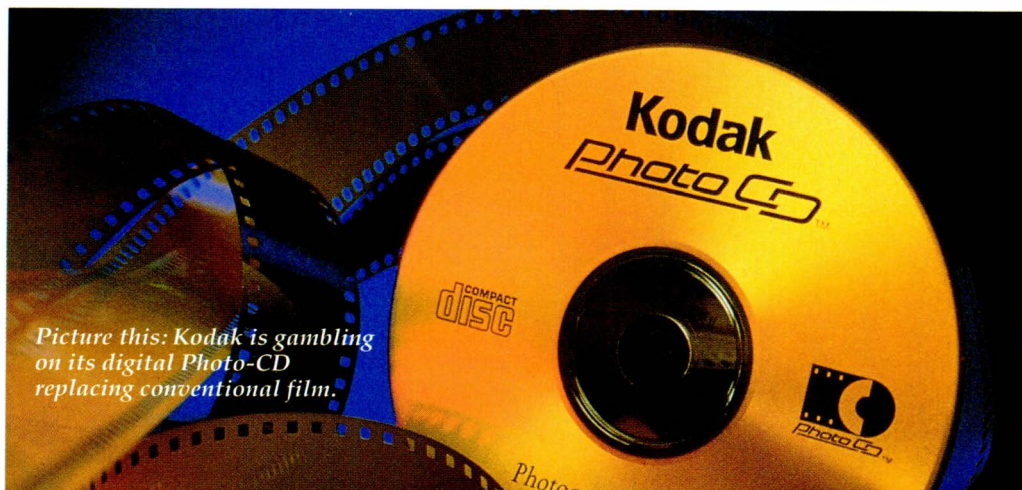
Kodak has unveiled the pricing structure for Photo CDs. Based on CD ROM technology, Photo CDs can store up to 100 images taken from 35mm photographic film (either negatives or positives) and can be played back via a television. To play them you need a Photo CD player, of course. These start at £300, but they do play ordinary CDs as well.

The price of getting your pictures processed and onto disc, but without prints, starts at £8.75 for 24 exposures or £12.11 for 36 plus the initial cost of the disc; £4.99. If you want to transfer existing negatives onto a disc the minimum price is £9.75 for 20 images plus 40p per extra image. If you only want to transfer specific negatives or

transparencies the price rises to 50p per image plus £1.75 handling charge, and if you want them in a particular order this rises to 70p plus £3.00. In all cases there is a 20 exposure minimum order.

Both machines and processing centres are on schedule for a September launch, with a roadshow touring the country throughout August.

We inquired as to whether the blank discs would be sold in unrecorded form, which would allow them to be used as recordable digital software (for instance, in a CD-R machine). The answer, most unfortunately, was of the negative variety.



Picture this: Kodak is gambling on its digital Photo-CD replacing conventional film.

The London CES

Rupert Murdoch's pet publishing house, *News International*, is organising what could be the first serious consumer electronics show to hit these shores for many a moon. Due to be held at Olympia in September 1993 LIVE '93, as it's known, will cover all aspects of entertainment technology including ICE, A/V, home computers, photography and of course hi-fi.

With *News International*'s collective titles reaching 47 per cent of adults in the UK the show looks likely to attract a lot of visitors and could turn out to compete with the big international exhibitions like Berlin's Funkausstellung and the Las Vegas CES. So far Sony, Technics, JVC, Pentax, Atari, Amstrad and BADA among others have signed up for LIVE '93, BADA having taken on a substantial area in the Grand Hall for its members.

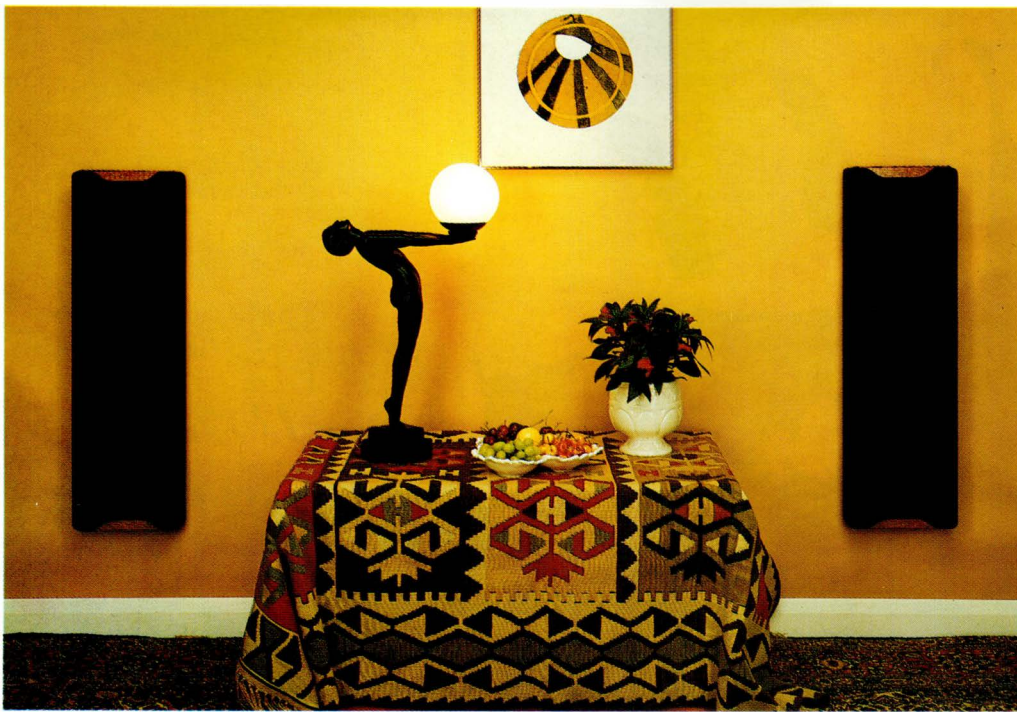
The show will run from the 16th to the 20th of September next year.

Bel canto

Hailey Audio, which was recently appointed the sole distributor of Magnum amplifiers and REL Acoustics subwoofers, has taken on a new loudspeaker brand called UKD. This Anglo/Italian venture has just created the *Caruso*, which is a floorstanding model featuring two 130mm bass drivers, a midrange unit of the same diameter and a 25mm ceramic dome tweeter. The aesthetic design work is the creation of Stefano Cassio who has used solid walnut for the top and sides, with appropriately veneered MDF baffles. The idea behind the hardwood being to create a "harmonic tuned box".

The engineering work was done by Peter Wallis who is responsible for the unusual three way, four drive unit configuration. The *Caruso*, which is handbuilt, costs £1,195 and stands nearly a metre high. UKD is in the process of making a smaller model called the *Super Pavarotti* which will retail for £525.

For further information call Hailey Audio on (0992) 714811.



Hanging out with Sequence speakers

Sequence, a new name on the British loudspeaker scene, has made its debut with a slimline design that can be hung on the wall like a picture. Retailing for a few pennies under £200 the Sequence 30 is only 70mm (under three inches) thick and uses a pair of conventional drivers in a 850mm high by 250mm wide cabinet.

What you see of the speaker are solid wooden endcaps at

top and bottom and an expanse of (dark or light) grille cloth. Thus the Sequence 30 is a very unobtrusive design that's well suited to use in A/V installations or anywhere that the sight of loudspeakers is not desirable.

Designer Paul Burton has used a 125mm, doped fibrous coned mid/bass driver which is apparently decoupled from the cabinet, and a 25mm composite

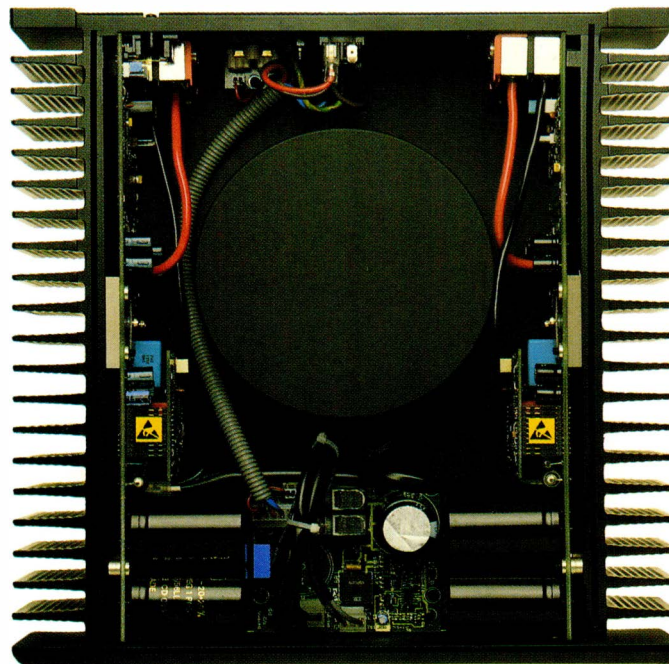
material tweeter. The Sequence 30's unusually shaped cabinet is said to suffer less from traditional box type resonances and is optimised to work at or near room boundaries. Nominally an eight ohm design, the 30 will give you 87dB per watt sensitivity and is claimed to go down to 45Hz.

For further information contact Dennis Wratten on (081) 941 6737.

Packing plenty of Klout

Linn Products has launched the Klout stereo power amplifier, an 80watt design that retails for £1,694. In Linn's words the Klout is designed to be the 'LP12' of power amps, and has been solidly engineered to improve both sonic performance and long term reliability. The case is made up out of aluminium extrusions that ensure rigidity and act as heatsinks for the surface mount transistors inside. Linn has used surface mount components wherever possible in the Klout as it considers them to offer higher reliability and performance than discrete components.

The Klout is protected from current overload, short circuits and overheating by electronics which allow it to be used with unfriendly speaker loads. It is equipped with three sets of output terminals allowing easy tri-wiring if required, and line in and output sockets for each channel to allow 'daisy chaining' in multi amp installations.



There appears to be a Klout in your ampstream — Linn's new power amplifier makes its debut.

Analogue goes digital

Meridian's new 601 preamplifier incorporates the first digital RIAA equaliser to be used on a commercial product. The £2,750 601 is described by Meridian as a "no compromise audiophile DSP preamplifier" and it certainly seems to have covered all the bases in its array of features and in/outputs. It has six (four electrical, two optical) digital inputs and five analogue ones, including the aforementioned phono input which features adjustable gain and loading. There are four digital outputs (half of them optical) which can be processed or unprocessed, and two analogue outputs, one of them balanced. Both D and A outputs can be fixed or variable.

On the conversion front the 601 comes complete with a single A/D for incoming signals and Crystal delta/sigma (single bit) D/A systems for two analogue outputs. One of the latter can be used in Hafler mode for a four speaker set up.

There are eight DSP modes covering a wide range of potential requirements including use with KEF speakers in place of a Kube bass equaliser, headphones, octave equalisation and disc equalisation for formats including 78s.

You can also set up presets within the 601 for various combinations of requirements. Finally it comes with a full system remote control.

Silence of the Lambdas

Denon has launched a brace of affordable CD players in the form of the £200 DCD-690 and the £170 DCD-590. Like the rest of Denon's CD player range both models have multibit Lambda DACs and 20-bit, eight times oversampling digital filters, combined with DC configuration audio amps this is said to deliver a "fast, dynamic sound with a very low noise floor".

The transport in each is isolated with a visco elastic damped suspension system which is said to improve tracking. Both models feature full remote control, volume control, auto most things and 20 programme memories. The DCD-690 has an optical digital output and is said to have the edge in sound quality.

Cinema DSP

Where
The
Real
Action
Is.



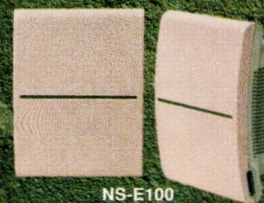
DSP-E1000
DIGITAL SOUND PROCESSING
AMPLIFIER



RX-V660
CINEMA DSP
AM/FM STEREO RECEIVER



DSP-A500
DIGITAL SOUND PROCESSING
AMPLIFIER



NS-E100
EFFECT SPEAKERS



Imagine the awesome power and majesty of Niagra Falls in your own home; the scale and atmosphere of a live concert; or the edge-of-your-seat action of a blockbuster movie in true Cinema 70mm Dolby surround. Unforgettable.*

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Yamaha continues to lead the world in audio/visual entertainment technology. Cinema DSP will integrate easily with your existing Hi-Fi and Video system to bring you a whole new home entertainment experience. Or you can build a system from start around it.

A wide range of components, including the award-winning DSP-A1000 and the budget DSP-E200 digital sound processing amplifiers, plus a range of surround speakers and subwoofers, means you can select the perfect combination to suit your environment. And your pocket.

To find out more about Cinema DSP, contact your Yamaha dealer today - it's where the real action is.

*music
naturally*

All Yamaha HiFi products carry an exclusive 2-year guarantee. For your **FREE** catalogue, contact:

YAMAHA HIFI

Rotel prices tumble

Rotel has reduced the retail price of many of its products. Apparently the pound has been doing so well against the dollar that the distributor has been able to cut prices by up to £50. The products that have been affected are the RA940BX (down £40 to £200), the RA960BX and RA980BX (both down £50, to £250 and £350, respectively).

Perhaps more surprising, given these apparently selective reductions, is the fact that both Rotel CD players, including the acclaimed 965BX, have also come down. The RCD-955AX is down £20 to £230 and the RCD-965BX drops by £40 to £380.



Riding the analogue wave

Fancy livening up the look of your record collection? Check out KDA Wave Shelves. These free standing units are designed so that your records follow their undulating contours forming a wave of spines on each shelf.

Available in two, three or four shelf form the Wave is made of birch plywood with powder coated, tubular steel legs holding the lowest shelf either 360mm or 540mm from the floor. At 1220mm wide it can support approximately 330 LPs per shelf.

Prices start at £229 for two shelves and increase by £60 per extra shelf.

Currently on sale in London's Cornflake Shop and Brighton's Power Plant the KDA Wave is also available by mail order. Call (0273) 858 259 for further details.



X marks the upgrade

Pioneer has launched a replacement for the A300 amplifier in the form of the A300X. At £200 it is £40 more expensive than its predecessor, a rise which is ascribed to the use of higher quality components, said to have improved the sound. Basically the A300's power supply has been updated to include the same complementary capacitors used in the A400, the volume pot has also gone up to A400 standard and the PCB has been revised to improve signal/noise performance.

Perhaps the most esoteric change to what is essentially a budget, 30W, amplifier is the removal of the headphone socket for sonic reasons. All that lies between the A300X and its famous brother now is £50 (yep, it's gone up again), 20W and an MC phono input.

Ruark's Swordsman sharpened

Ruark Acoustics Limited of Essex has announced a revised version of its Swordsman Plus loudspeaker.

Called (wait for it) the Swordsman Plus II, the new speaker now offers for the first time the option of bi-wiring.

Crossover components are hard wired onto a medite board mounted on the terminal pod. The

company has also upgraded the tolerance of the capacitors and made some alterations to the appearance of the cabinet.

Available finishes include black ash and American walnut.

Reportedly offering improvements in terms of rhythm and soundstaging, the Plus II is being sold at £299, an increase of £20 over the Plus.



Trumpeting some new speakers: Ruark's Swordsman Plus II.

In Brief

Celestion has taken on distribution of the American Adcom range of audio electronics. Adcom makes pre and power amplifiers priced from £299 for the GFP345 preamp to £899 for the 300W GFA565 power amp. The company has also reduced the price of the Celestion 1 loudspeaker by £5 to a more consumer friendly £100.

It looks like Yorkshire will be having a show this year courtesy of Sound With Style. Due to be held at the Moat House Hotel, Warmsworth, Doncaster on November 1st it promises demonstrations from some of the country's leading manufacturers. Call (0742) 737 893 for more details.

CAD (Campaign Audio Design) is marketing a shorting plug for the analogue outputs of CD players that are used with outboard DACs. These 50kohm devices cost £3 each and are claimed to 'clamp' the analogue and D/A sections of the player. The company also markets a 75ohm digital output shorting plug for the same price. Call 0222 779 401 for further information.

Budapest will be having its first hi-fi show this November (6th - 8th). Organised by Merlin Audio the International Budapest Hi-Fi Show will take place at the Platanus Hotel and feature products from around the audio world, but the accent will be on the high-end.

Bib has produced a new CD storage rack. An upright steel column that will hold up to 50 discs, the rack stands over a metre high and is 148mm in diameter. It is available in black, white or blue as standard or any colour to order. Price is £79.

KAB Electro-Acoustics has produced a brush called Stylus Sweep, designed to clean both cantilever and stylus. It uses ultra fine nylon and is small enough to be held underneath a cartridge. Price is \$4 including postage; call KAB on (0101 908) 754 1479 for details.

The image features a close-up, low-angle shot of a highly reflective, metallic surface, likely a CD or DVD, with a series of raised, circular patterns. The lighting is dramatic, creating bright highlights and deep shadows, emphasizing the texture and curvature of the object. The background is a soft, out-of-focus blue gradient.

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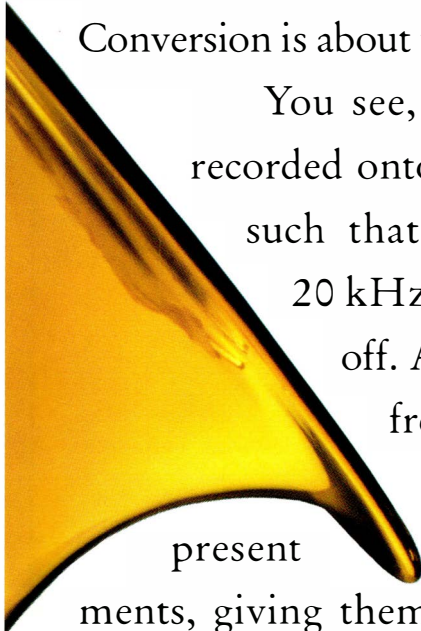


LEGATO LINK
CONVERSION

When CDs first appeared, they were hailed as being the perfect music medium.

However, some people maintained that CDs sounded harsh and lacked the warmth of vinyl records.

Now, Pioneer's Legato Link Conversion is about to change everything.



You see, when material is recorded onto CD, the format is such that frequencies above 20 kHz are abruptly cut off. And it is these upper frequencies which are abundantly present in musical instruments, giving them their warmth and natural timbre. Although you cannot hear these upper frequencies, you can actually feel when they are missing.

Pioneer's Legato Link Conversion now addresses the problem by putting back that original, natural warmth.

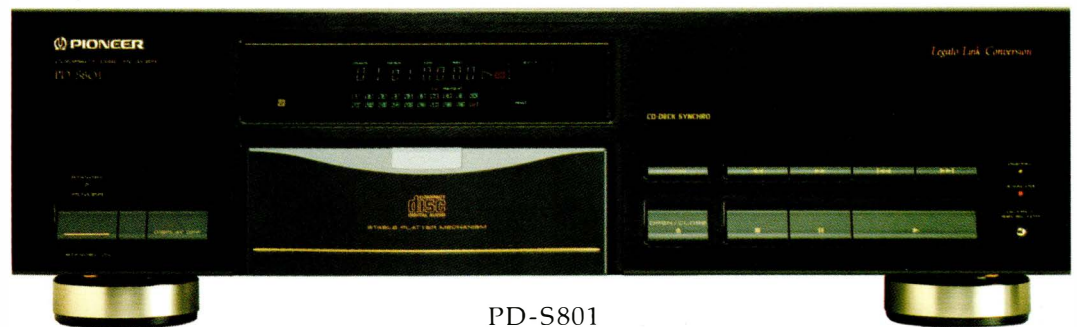
Using data already on the disc, Legato Link Conversion calculates almost exactly what and where the missing data should be and literally recreates a sound wave pattern that is much closer to the

original music. It's a revolutionary new technology that takes CD a real step forward and puts natural sound within the reach of every enthusiast.

Pioneer's unique Stable Platter Mechanism is also a key contribution to this more natural performance, giving full width support to the disc for reduced vibration and truly transparent sound.

Out of sight but certainly not out of mind, twin Pulseflow D/A converters cancel noise generated in and out of the audible range. While Direct Connection enables the music signal to travel along the shortest, most logical path possible for minimal interference.

So why not listen to Pioneer's new range of CD players (PD-95, PD-S901 and PD-S801) very soon? Because if CDs have left you cold until now, you'll



PD-S801

certainly warm to the sound of Legato Link Conversion.

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Cassette Decks on test

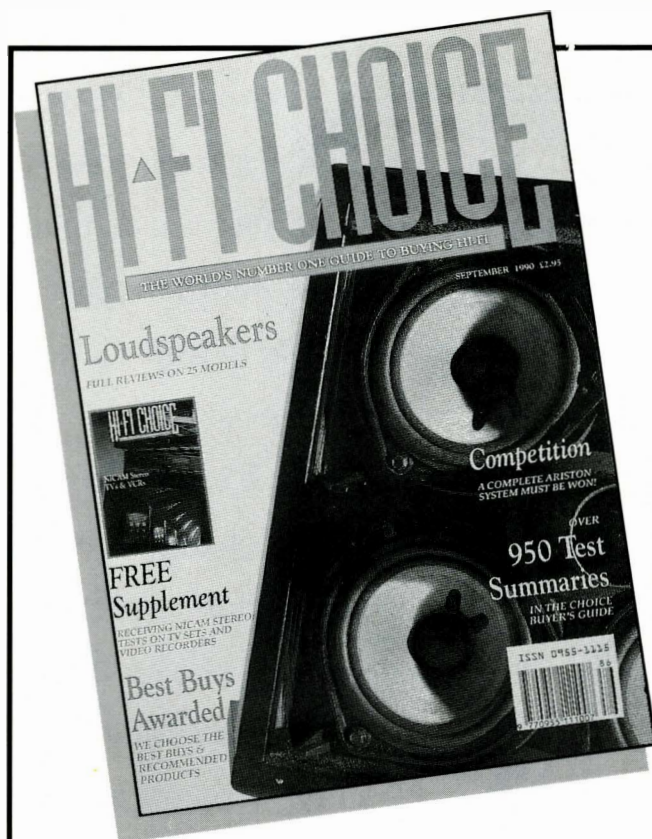
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HI-FI CHOICE

**OCTOBER ISSUE ON SALE
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Choice Sessions

by Andy Benham

Solid as a Sink

Townshend Audio has been branching out into isolation platforms; AB has been getting his vibes damped.

'Solid as a rock' has got to be one of the most abused clichés in the English language, but, just for once, it's an appropriate phrase to apply to the latest product from affable Australian Max Townshend. Townshend, who makes the *Rock Reference* turntable, has recently been turning his engineering expertise to the subject of equipment supports and the first fruit of this exercise is the *Seismic Sink*, a not insubstantial lump of iron with an asking price of £169.

The *Sink* is basically a cut down version of the suspension system employed on the *Rock Reference* and consists of a high mass plinth supported on three adjustable feet. The plastic feet are used to level the *Sink*, with the aid of a circular spirit level set into the top of the plinth, and you place whatever it is you wish to isolate from the rest of the world on top.

I say rest of the world because in this case that is exactly the intention. Rather than adopt the approach of providing a 'mechanical earth' for your equipment whereby any extraneous vibration is fed down to the ground by means of spikes or whatever, the *Sink* is intended to isolate the equipment completely and prevent any vibration caused by traffic vibration, minor seismic shocks (I kid you not) or more ordinarily, loudspeakers, from finding its way back into the equipment.

The isolation platform itself is made up of a 19mm MDF stiffening piece forming the meat in a steel sandwich with a 3mm thick top plate and a 1mm thick bottom plate taking the place of the bread. This massive platform is floated on three fluid damped air springs, and although the exact details are secret, the fact that our review sample had a bit of residue left underneath revealed that trough style silicone fluid was lurking inside.

Apparently the idea for the *Sink* came about when Townshend was designing the *Rock Reference* and discovered that when the stylus was placed on a stationary record and the volume turned right up the *Rock Reference* was capable of picking up considerable, and audible, ground borne vibration. This led to the design of the suspension that was included in the

specification of the record player.

The most obvious candidate for this sort of support is a CD player so the *Sink* started off under a *Meridian 200/203* combination, or rather it would have done if it were big enough, but the width of the *Meridian* combo meant that only one part would fit. I thought that the drive would probably benefit the most, so the *200* was the first piece of equipment to get the *Sink* treatment.

Tremors in Forest Gate

Truth be told I was a bit suspect about the benefits of isolating a CD drive from mini earthquakes and the like, particularly as *Forest Gate* isn't exactly a well known earthquake belt, but my initial cynicism was soon overturned by the results. The difference brought about by placing the *Meridian* on the *Sink* was so large that I found myself checking the cabling to make sure that I hadn't inadvertently changed anything else at the same time. I was listening via a *Celestion System 6000* (which you'll be able to read about in the *Collection* later on this year) which is not exactly shy when it comes to delving into the lower frequencies. With the unsupported *Meridian* drive I wasn't aware that anything was missing but once the drive was placed on the *Sink* the bass expanded quite dramatically both in terms of quality and quantity. Not only was there more of it, but the leading edges were better defined and intricate bass

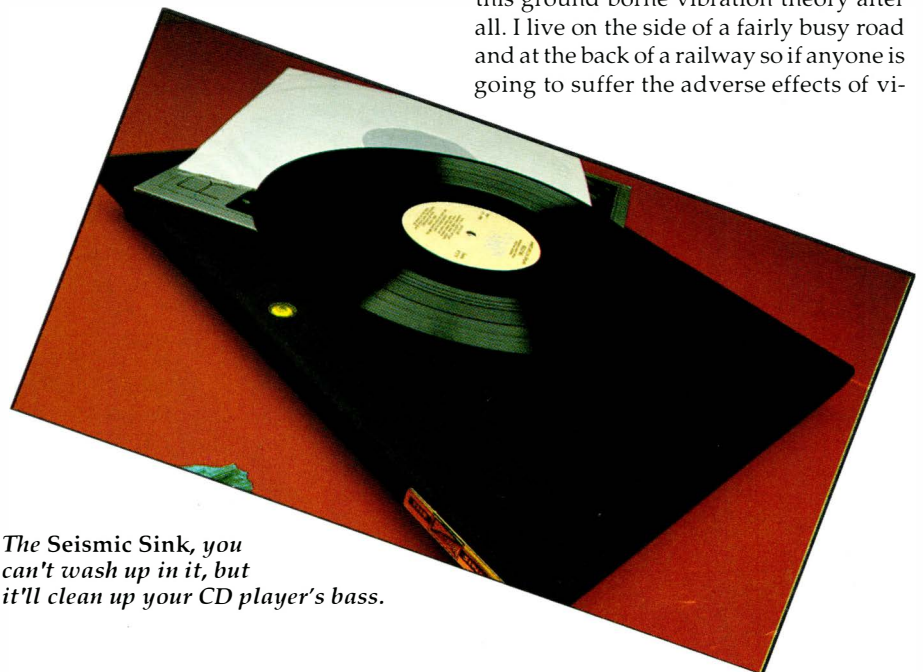
lines became far easier to follow and more lifelike. It also has a similar effect on deep male vocals, the a cappella introduction to Paul Simon's *Diamonds On The Soles Of Her Shoes* being a good case in point, the *Sink* bringing a quite astonishing degree of realism to the male vocals.

Interestingly enough the *Sink* also played its trick with the *Meridian* DAC, although here the initial improvement was less obvious, but more evenly spread across the frequency band.

However, the *Sink* really came into its own when I tried out an older CD player, in this case a *Marantz CD85*. Here the improvements were nothing short of astonishing, the treble was smoothed out and lost the fatiguing edge so common with this generation of CD players and the bass, while still retaining the impact that multibit players are famous for, was also far better controlled and extended. The overall improvement was nothing short of astonishing and shows up quite graphically why some of the latter machines to use this DAC, *Arcam's Alpha* for example, go to quite extraordinary lengths to try and isolate the convertor.

When I heard about the *Sink*, I was also told that it could improve the picture quality of *Laser Vision* players, so, albeit rather cynically, I placed my *Pioneer* player onto the *Sink*. And guess what? It's true! *Seismic Sinks* do improve the picture quality, markedly reducing drop outs.

It looks at though there is something in this ground borne vibration theory after all. I live on the side of a fairly busy road and at the back of a railway so if anyone is going to suffer the adverse effects of vi-



The Seismic Sink, you can't wash up in it, but it'll clean up your CD player's bass.

bration then I suppose it's going to be me. There is also the fact that the Celestion sub-bass units I was using at the time are more than capable of shaking the floor boards and no doubt the *Sink* also had a positive effect in this respect as well. Whatever the reason the *Seismic Sink* was a resounding success, the only problem being that I ended up wanting half a dozen of the things so that I could put one under just about everything and combine all the various improvements at the same time.

Decoding Alchemy

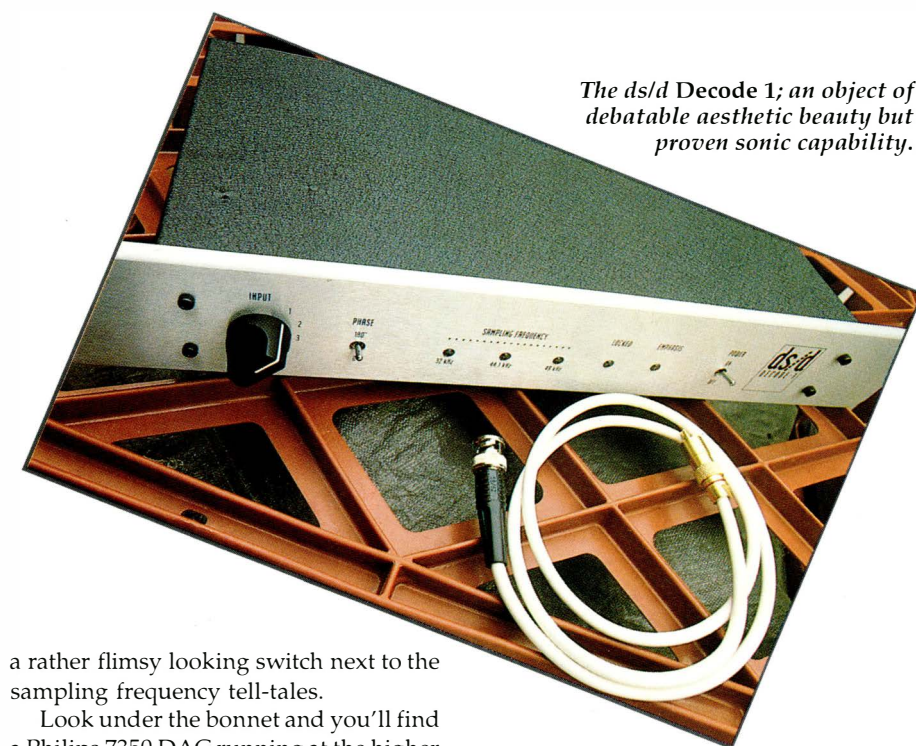
The Audio Alchemy DDE now has a brother but it's from a different digital stable. The Editor has been listening.

The last time we had an in depth look at digital to analogue convertors, Audio Alchemy's *Digital Decoding Engine* romped home to a Best Buy, based both on its sound quality and its flexibility. Although it is sold over here under the ds/d brand name, the *Decode 1* is obviously from the same stable. The company which manufactures the guts of both the *Decode 1* and the Audio Alchemy DAC is an American outfit by the name of LM Acoustics; it also builds digital goodies sold under the Music and Sound brand name.

Visually the *Decode 1* is rather utilitarian and looks as if it would be more at home in the studio than the listening room, although opinions were sharply divided on this matter with Jason Kennedy considering it to be quite appealing.

In common with the other products I've played with from this stable the *Decode 1* is far more than just a 'chip in a box' type DAC and is intended instead as a digital switching centre to take the output from your CD transport, DCC, Mini Disc, DAT and just about anything else you care to throw at it. No less than four digital inputs are provided, three connecting by means of BNC sockets and the fourth by TOSLINK. You take your pick by means of a rotary control on the front panel. A further BNC on the back panel provides you with a digital output which will route your selected source out to the digital recording device of your choice. Analogue output is by means of a pair of generously gold plated phonos.

The front panel has a row of tell-tales which light up according to the sampling frequency of the incoming signal (32, 44.1, and 48kHz are supported) and indicate both digital lock and whether the signal has had high frequency emphasis applied, in which case the *Decode 1* will remove it. Digital domain phase inversion is also provided and can be selected by means of



The ds/d Decode 1; an object of debatable aesthetic beauty but proven sonic capability.

a rather flimsy looking switch next to the sampling frequency tell-tales.

Look under the bonnet and you'll find a Philips 7350 DAC running at the higher 384 times oversample rate used by Deltac rather than the 284 times rate used by Arcam and Philips itself. In fact the similarities with Deltac's *Little Bit* don't stop there because LM has also chosen to use a Yamaha eight times oversampling filter to feed the Philips chip.

One of the problems we turned up with this chip combination when we reviewed the Deltac *Little Bit* was the fact that it needed an external mains filter to give of its best. It's interesting to note that the literature supplied with the *Decode 1* makes great play of the time and effort that has gone into the design of the internal power supply, including the fact that completely separate power supplies are provided for the analogue and digital sub-systems. Completely separate in this instance meaning exactly that, with independent transformers, rectification, filtration and regulation being provided for both operations.

Hooked up with Telecom

Connecting up the *Decode 1* might cause a few problems because of the BNC sockets but seeing as the *Decode 1*'s importers, MPI Electronic, had provided a suitably terminated cable, setting the whole thing up only took a couple of minutes. Interestingly enough the cable MPI provided was a standard British Telecom spec data transmission cable which has a sub £20 price tag and proved to be quite an excellent performer when used with a Meridian 200 front end.

Sonically I've no real complaint about the performance of the *Decode 1*. At the time of writing I've been listening to it for a couple of months and in that period I've found it to be consistently impressive. The unit replaced a Meridian 203 which was used for most subsequent compari-

sons. Although the two units are a little different in the way they present music, it has to be said that there isn't a lot between them. Which considering that the 203 is one of my favourite DACs says a lot for the *Decode 1*.

While the Meridian has a rather laid back characteristic the *Decode 1* veers the other way with a slightly tighter bass and a little more impact to the music. This can be viewed in one of two ways. With modern rock, based around complicated guitar lines and drums, the *Decode 1* has the edge. Its slightly better resolution and feeling of weight leads to a greater feeling of involvement but with simpler material, solo female vocals for example, this extra definition can leave the *Decode 1* sounding a little too brash or thin. We are only talking of very small differences here and it will be a matter of personal taste which you prefer. In absolute terms the *Decode 1* is not brash or thin sounding, it's just that compared to a more laid back performer, such as the Meridian, it can inject a little more bite. Which presentation sounds more accurate is down to the listener and my preference for either unit could even swing from one to the other in the course of the same track. A good example of this was the eponymous Baby Animals album where the *Decode 1* tended to win on the biting edge it gave to the lead guitar riffs while the excellent female vocal sounded slightly more natural via the Meridian. Another example of the same effect was Peter Gabriel's *Don't Give Up* where Tony Levin's stick bass was more accurately rendered by the *Decode 1*, which gave it more impact and slightly more weight while the same effect applied to Kate Bush's vocals could leave her sounding a little thin and bright. The Meridian gave a rounder presentation

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which was easier on the ear.

For a £595 DAC the *Decode 1* is very definitely up there with the best and the extra degree of flexibility imparted by the four digital inputs could well give it an edge over the obvious opposition in a system with more than one digital source. Overall a very creditable performance and a sure addition to the audition list for anyone shopping for a DAC at this price point.

Motion pictures

Ever fancied a NICAM stereo TV but couldn't afford it? Resident couch potato Andy Benham has found an affordable alternative.

Motion Electronics' NICAM tuner has been around since September 1989, although the company's involvement with TV tuners dates back over 20 years. The *Mk3 NICAM TV Sound Tuner*, to give it its full name, is not actually the company's third NICAM tuner, the *Mk3* is there to differentiate this current model from earlier non NICAM models.

Regular readers of *Choice* may remember the Motion tuner from some three years ago when, as the first standalone NICAM tuner, it attracted considerable press coverage. As is often the way with these things, the company that built the units for Motion proved to be completely incapable of keeping up with the demand that this publicity attracted and as a result long waiting lists and other supply problems developed. However that was a couple of years ago and Motion has now changed suppliers and is vehement in its belief that the supply problems are now a thing of the past, hence our decision to take another look at it.

For those of you unfamiliar with the terminology, a NICAM tuner is a standalone unit used to decode the stereo soundtrack that is now broadcast with a lot of our terrestrial TV programs. NICAM coverage varies from area to area but is increasing just about every day and the sound quality is generally quite good. The idea behind a standalone NICAM decoder is that either you buy one to add stereo capability to an existing TV or video or that you use it in your hi-fi system as an upgrade to the NICAM facilities fitted to many of the latest TVs and videos.

Visually the *Mk3* is rather old fashioned looking, although in its favour it is considerably smaller than Arcam's well known NICAM unit and is far easier to conceal.

The *Mk3* tuner is also different from

Arcam's unit in that it has a built in amplifier and can be used as a standalone unit driving a pair of loudspeakers either side of a TV set without the need to connect it into your hi-fi system. The amplifier concerned is hardly a powerhouse, offering just six watts per channel and into a four ohm load at that, but in use you'll probably get away with it if you use very sensitive speakers and don't expect to bring the roof down.

In fact it's quite surprising how much of an improvement can be had just by slapping a couple of cheap speakers on either side of the set and driving them directly from the *Mk3*. It is certainly a worthwhile upgrade from the internal speakers that come with most sets nowadays, even those that cost an awful lot of money. Used in this manner the *Mk3* is quite a good little toy and could well end up doing sterling service if your TV is in a different room from your main system but you still want to upgrade the TV's sound system. It would also be a useful way of upgrading an older second set to full NICAM capability. Used in this manner the *Mk3* also proved itself to be a decent tuner on the video side as well, the Philips video chip set producing some very realistic skin tones and turning in a better performance than many budget video recorders and TVs.

A slight whinge here is that the speakers have to be connected to the unit by means of rather cheesy looking DIN sockets, but in Motion's defense there's a set of plugs supplied with the unit, so making up your own leads shouldn't pose too much of a problem.

However much fun it is to play with

the unit in a secondary mode, the crunch is how well the *Mk3* performs when wired into a full blown AV system, where the signal is taken out at line level and fed to an amplifier.

Here again the connections proved to be a bit of a drawback because Motion has used DIN connections for the line outputs, both for the main output and the tape out provided so that you can dub a stereo soundtrack onto a video cassette.

Buddy can you spare a DIN?

The problem with this arrangement is that decent cables terminated with a male five pin DIN on one end and a pair of phonos on the other aren't exactly common. Motion attributes its choice of socketry to the demands of its dealers so there shouldn't be any excuse for the aforementioned dealers not to have the requisite cables in stock, but certainly in my system the choice of cables lent the Arcam unit with which it was compared something of an advantage.

The *Mk3* uses a Toshiba NICAM decoding block and I was very impressed with the sound, naff cabling or not. Compared to the sound from either my video or TV, both of which are NICAM equipped the *Mk3* had a clear edge in just about every department, deeper, faster bass, improved imaging and a smoother top end being just a few comments which cropped up time and time again.

Priced at £210 the Motion represents good value and the provision of on-board amplification is a definite plus point. Overall the unit is moderately easy to use and the infra-red remote means that you don't ever have to stoop down to press a button. Apart from the socketry, which Motion informed us could well be changed in the not too distant future, the unit is well built and offers good value for money.



The affordable face of NICAM stereo TV reception.

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What the press say

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WHAT HI-FI, JUNE 1992

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AUDIOFILE, JUNE 1992



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Statements

by Ian Ward and Paul Messenger

It just so happens that Pink Triangle's tenth anniversary coincides with my acquisition of the original *PT* turntable in 1981. In what was very much a Linn *LP12* dominated era I felt like a pariah and an outcast, but the *PT* sounded, ahem, simply better.

Since then, and despite the emergence of new and improved competing decks, I have remained loyal to the marque. My original *PT* was converted to *TOO* spec in 1987, and for the last few months I have been coming to terms with the company's latest flagship, the *Anniversary*.

Internally, the *Anniversary* subchassis is thicker than the *PT2/Export* version, the latter's aerolam sheet supplemented by balsa wood in the *Anniversary*. The armboard is supplied in the same sandwich of materials to maintain continuity from armbase to subchassis. Besides Pink's established inverted bearing assembly, the subchassis is also host to a quiet running DC motor (the commonly used AC motors are generally too prone to vibration for such a location). The spaces between subchassis and plinth are filled with shaped blocks of medite to reduce plinth resonances. Speed selection (33/45) is achieved via a marshmallow lookalike acrylic knob on the front of the power supply.

True pink

In true Pink tradition the suspension is delightfully free and bouncy, and to keep it that way a thin-wire flexi-link arrangement is incorporated between the arm base and two phono sockets on the rear of the plinth. While this arrangement offers users their own choice of interconnects between deck and preamp, take note that many of the more fashionable interconnects on the market are unscreened and are therefore unsuitable for this application. Having searched high and low for a suitable screened cable for the *Anniversary*, my best find to date is Sonic Link *Violet*. It has a refreshingly open, transparent quality which matches the deck well. At £80 for a terminated metre *Violet* is reasonably priced in the context of a £1,200 turntable and the quality of arms and cartridges likely to be fitted to it. No point in spoiling the ship for a ha'p'orth of tar.

Some *PT* owners have expressed concern at the suspension's habit of imitating a major earth tremor when stiff arm cueing

devices are operated. Here's a tip from yours truly; when cueing with the first finger rest the second finger lightly on the nearest corner of the armboard. When descent begins, gently remove both fingers; this will reduce wobbles to a mere twitch. Practice makes perfect — I can do it, and I'm left handed.

Owners of the *PT TOO/Export* models will no doubt be curious as to whether an upgrade to the *Anniversary* is worthwhile. As a long term *PT TOO* user I find that the *Anniversary* offers subtle improvements in almost every area of performance, resulting in another step towards Pink's stated aims of clarity, neutrality, and faithfulness to the master tape. Indeed my own experiments thus far persuade me that the *Anniversary* is virtually transpar-

scuppered this belief by revealing hitherto unnoticed subtleties.

Ian Anderson's breathy flute style and occasional vocal grunts and sighs, minor percussion details, the interplay of the various rustic instruments on *Songs From The Wood*, the effective sparseness of production on the debut album *This Was*.

The languorous mood of the jazz-tinged instrumental *Serenade To A Cuckoo* from the same album was captivating; even old chestnuts like *Bouree* from *Stand Up* came up as fresh as new paint.

To assess the *Anniversary* on a more recent album, I chose Ron Kavana's *Home Fire*. Highly regarded by those in the know, this LP scores for its down to earth production and the exclusive use of acoustic



Pretty in pink. The *Anniversary* turntable plus power supply from Pink Triangle.

ent. If anything, it is the subtle characteristics of partnering arms and cartridges which tend to make themselves apparent. My aforementioned comparison of the original *PT/LP12* in 1981 highlighted the ability of the Pink to allow the music to speak for itself. To hear this virtue improved upon firstly with the *TOO*, and now even more so with the *Anniversary* is quite an enlightening experience.

Already pleasantly surprised by the deck's resolution capabilities with classical material, I turned to rock music via some early to mid-period Jethro Tull records, which I swore I knew off by heart. The *Anniversary* delicately

instruments.

Having had the undoubted privilege of seeing Mr Kavana live recently, I was pleasantly surprised to hear the same spirit injected into this studio recording as witnessed at his live performance. The *Anniversary* commendably conveyed the unbridled gusto of these performances, the biting sincerity of the lyrics and the clean, natural production to good effect.

By this time the *Anniversary*'s virtues were wholly apparent; astonishing detail retrieval, clean bass reproduction, sweet treble, kind treatment of surface noise, and superb resolution of three dimensional clues. For the benefit of the rhythm

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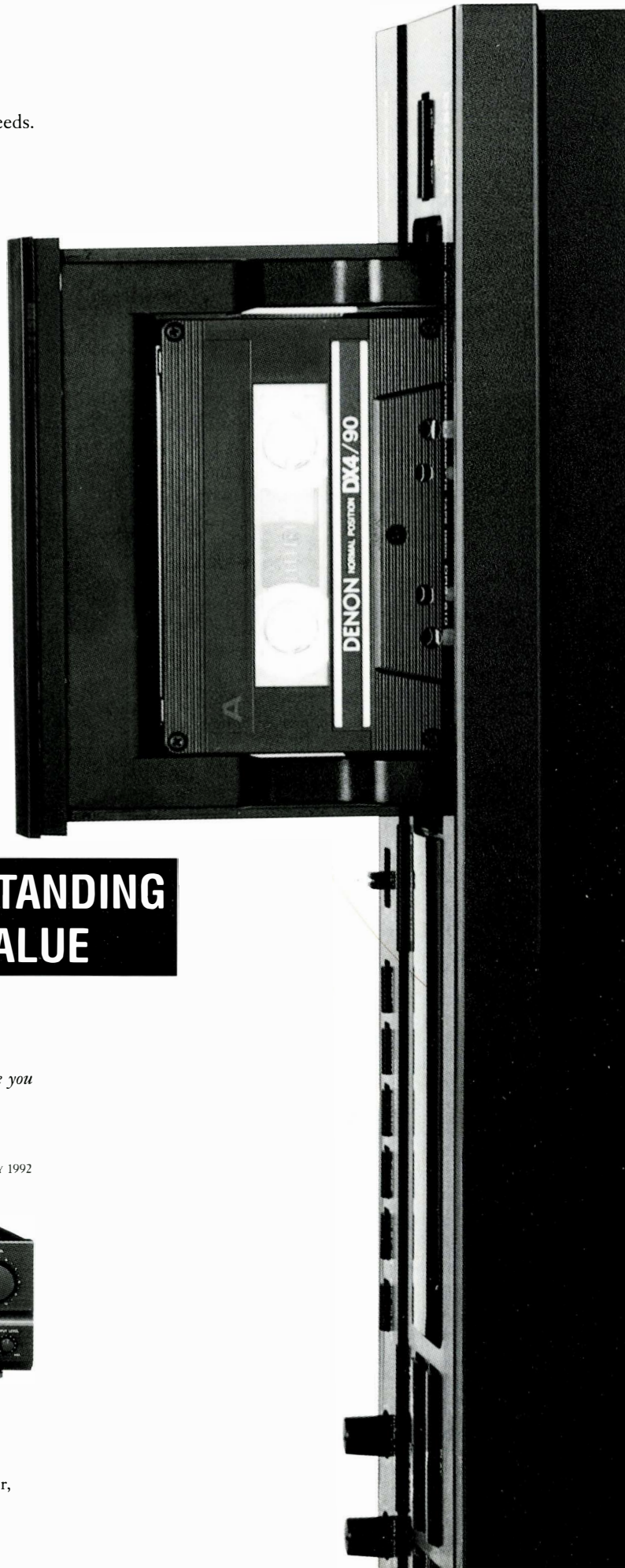
"It's smooth, dynamic and above all 100 per cent confident."

WHAT HI-FI, MAY 1992



DENON

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and timing brigade, rest assured that the various boogie factors essential to most forms of music were also preserved intact.

As far as I can tell, coloration is non-existent, maintaining Pink's reputation as a producer of neutral turntables. Some of the other top flight decks I have heard seek to seduce the listener by stamping their own personality on the music via subtle euphonic enhancements.

You may have gathered that the PT *Anniversary* does nothing of the kind, which is why I have decided to invest in one for my own use.

Ian Ward

An impressive performance by the first Diamond Acoustics loudspeaker to come under *Choice* scrutiny (the £895 *Reference III*, issue 106) was reason enough to put one of the more upmarket models from this loudspeaker wing of the John Jeffries empire through its paces.

This *Reference II* shares some philosophical common ground with its cheaper stablemate, but is considerably more elaborate and complex, both in the cabinet and the driver array, so much so that the hefty £2,000 pricetag comes as no particular surprise.

Taller and much heavier than the *III*, the *Reference II* is still a relatively compact design, made visually all the more so by the narrow baffle top section, though the multiplicity of shapes and grilles, perched on a low and very heavy stand with drain-pipe centre pillar, gives a rather bitty overall effect that lacks the simple elegance of the cheaper model.

Both *References* share the same classy Volt bass driver, the advantage here being that it doesn't have to share the total enclosure volume with an additional bass/mid driver, so has more volume in which to work, and less tendency to generate the excessive midbass of the *III*.

The substantial difference lies in the *II*'s unusual mid/treble array. Four small wide-bandwidth metal-cone Bandor drivers are mounted in pairs above and below a single tweeter.

Arranged in this way, the very slim open-back baffle will provide automatic low frequency roll-off and the Bandors will act as a line source dipole, somewhat similar in practice to a ribbon type driver, ensuring a sonic performance distinctly different from the herd. For starters, there's no rear box to cause colorations, while the panel immediately behind the drivers is angled to direct the rear radiation out sideways, optional insert damped grilles providing a measure of absorption



Tall, dark and possessing rather a lot of drivers: DA's Reference II.

(and reflection) if desired.

A line source generates a cylindrical waveform from along the length of the line, which gives fine consistency and a welcome freedom from hot spots, providing the listener's ears are within the beam or window defined by the top and bottom of the line, which in this instance is rather limited, not to mention limiting.

A theoretical problem of a hybrid (line/point) combination such as this is that the line source acts somewhat as a lens, focusing the sound of this section so that its intensity is better maintained as one moves away from the speaker than the output of point-source woofer and tweeter. In practice this didn't seem troublesome within normal room dimensions, a rear panel two-way switch providing a measure of control over midband output.

With access to the tweeter output via a replaceable hardwired resistor, the *Reference II* offers plenty of scope for fine tuning to taste, to room and to system, a useful flexibility if handled sensitively. In any case, the system is pretty well balanced overall, returning an in-room far-field averaged response trace within $\pm 6\text{dB}$ from 20Hz right up to 15kHz.

The bass in particular is a big improvement over the *Reference III*, with just a

vestige of midbass richness remaining, and in-room output at 20Hz some 8dB better. However, part of this improvement is down to a significantly lower sensitivity, which is a below average 86dB or thereabouts (though some of that in turn is a function of a less current-hungry impedance). The upper mid is a shade prominent, and there's some unevenness through the presence band.

So much for description and analysis. How did this complex acoustic recipe work out in practice? Quite delightfully in some respects I'm happy to say, though it's very finicky about the components that drive it, and certainly favours midrange presentation above all else.

In fact the mid and treble sound delightfully unboxy, well focused, open and transparent, though you do have to be precisely on the mid axis to obtain the full effect. The startling coherence, sweetness and delicacy here makes an admirably suitable partner for valve amps — like the Lumleys that Reference Imports also distributes.

Driven from my normal (Naim transistorised amps and multi-strand cable) system I found the bass a shade disappointing. It's adequate enough in extension and level, but qualitatively seems to lag a little behind the midband, lacking some authority, drive and timing precision.

However, as John Jeffries demonstrated when he came over to collect the speakers, careful choice of amplification and cabling can do much to glue everything back together properly and give a very satisfying overall result. The speakers were designed to complement valve amplifiers, and in this role the very open and out-of-box midrange really comes into its own, developing images which combine precise focus with impressive depth and spaciousness.

The overall effect is perhaps a shade romantic for my tastes, giving a slightly rose-tinted perspective that presents the music in a relaxing and delicate way, rather than grabbing the attention with urgency and authority. But then high end hi-fi is all about tailoring a system to one's personal preferences and tastes, and here the *Reference II* has much potential. It represents a worthwhile improvement over the *Reference III* in a number of respects, with better balanced bass and far superior midrange analysis. But it's also a rather more sensitive flower, requiring very careful system matching and featuring its fair share of the presentation idiosyncrasies that supply both the pleasures and the frustrations of many such complex and aspirational designs.

Paul Messenger

Close your eyes and see



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ARCAM



Simon Kirke, drummer of supergroups Free and Bad Company talks to Dan Houston about hi-fi at home and on the road.

Live for the music

Sipping mineral water in the quaint confines of his local pub Simon Kirke provides a snapshot of life on the road during an American tour: "I don't go on the tour bus any more, I can't stand watching endless videos. I take my motorcycle and drive to the next gig which is usually between 150 to 200 miles. I'm very into black and white photography, so I take the backroads and stop at the small towns. They've all got something special (to photograph), and I'd like to do a book."

Well that sounds tame for a rock and roller. It seems more like a scene from *Easy Rider* after health department officials have vetted the script, putting in 'worthy artistic appreciation' where before there was 'living out the drug culture's dream'. "You have to learn the dos and don'ts on the road, otherwise it will kill you," he says matter-of-factly.

He speaks from experience and has seen close friends, Paul Kossoff — Free's lead guitarist, and John Bonham — Led Zeppelin's drummer, both fall by the wayside.

His tanned 43 year old frame is as muscular now as when Free were one of the supergroups at the Isle of Wight Festival in 1970. He's cut the long blond hair that used to stick to his face as he pelted out a stadium-size rhythm and he shakes your hand with the strength of Crocodile Dundee.

Being on the road is second nature to him and he finished a 15 month 206 show tour — 10,000 miles on the bike — at the end of last year. That's with Bad Company, the band he originally formed in 1973 with Free's lead singer Paul Rodgers after that group's demise. Bad Company are still in demand, especially in America, though Rodgers' mesmerising voice has been absent for a decade.



The motorcycle boy: Simon Kirke and the Harley that is his on-tour transport.

It all started in the heady days of 1968 when blues rock was still making its mark. That year Andy Fraser founded Free with Kirke, Paul Kossoff and Paul Rodgers, a group which was to provide one of the most enduring not to say endearing sounds of the early Seventies - a kind of

non-headbangers' Zeppelin. There is still a lot of affection for Free and last year's compilation album *All Right Now* went gold. Kirke's drumming and Andy Fraser's bass guitar playing are often cited as a key to the group's success, providing a solid but shifting backdrop to Kossoff's



For live music, the basement houses Simon Kirke's home recording studio and his guitar collection (above). For recorded music, a Yamaha separates system nestles on carved shelves.

guitar playing and Rodgers' vocals. "I think Andy was busy and I was simple," Kirke says modestly, "and Paul Kossoff used to play behind the beat, so Andy used to fill in a lot - that's how it worked."

Having spent so much of the last 20 years touring you might think Simon Kirke wouldn't want to see a drum or hear a note of music while he's at home. But we had come to see his hi-fi, relayed through two rooms of his 18th Century home, where he also has a recording studio.

Stable individual

The house is on the outskirts of London and was built by the Duke of Northumberland as a hunting lodge. The stables are hung with 32 gold and platinum discs charting Free's and more so Bad Company's phenomenal success. (From the days when a 'gold album' had to sell 500,000 copies, unlike the anyone-can-have-one 100,000 copy versions of today.)

When Simon and his wife Lorraine bought the house, they employed the services of designers and builders McCarthy and Hoare to redecorate it as it might have been 250 years ago. Chunky post Reformation antiques and lots of stucco are contrasted with abstract paintings in high-ceilinged rooms hung with chandeliers; you half expect the ghost of the Duke and his equine colleagues to come staggering up from the wine cellar quaff-

ing something appropriate for a venison supper.

But a cellar would be a waste of space for Simon, so he has converted it to a soundproofed studio with his simple Gretsch four-drum kit and Paiste cymbals in the corner. Alongside are a few of his 20 guitars, including a handmade Tony Zemaitis, inlaid with mother of pearl, given to him by Rolling Stone Ronnie Wood, and the acoustic Gibson Hummingbird which he takes everywhere. Wood's paintings, of the Stones and Jimi Hendrix and a lino cut of Keith Richards hang on the plain white walls.

This is where Bad Company get together to rehearse and Simon uses the studio for writing songs, laying down his ideas on a Fostex quarter-inch reel to reel analogue tape recorder or on his portable Casio *DAT II*. He has a Korg *M1*

synthesiser, a rack of effects equipment, cassette deck and CD player, all linked through a 16 channel Megas mixing desk to the two pairs of speakers. These are JBL *431Is* against the far wall and Yamaha *NS20s* on stands overlooking the desk powered by an ancient JBL amplifier and Quad *303s* respectively. The studio equipment was installed by London-based Sound Services.

"I do quite a lot of listening down here as well," he says, "and I've got a sort of analogue corner with all my records. I love to hear the rumble on those — but I tend to listen for the musical memory rather than the acoustic intricacies." Typically he uses both pairs of loudspeakers: "As a drummer I'm a treble and bass person — the midband stifles me. The JBLs are very toppy whereas the Yamahas have more bass, so I mix them together."



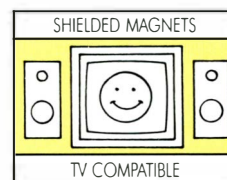
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"It's about 70 per cent soundproofed," he says, "not that it matters so much because mostly we direct inject (the music into the desk). But it's OK for live work, I've had Woody down here and as you know he doesn't like to hold back, but the neighbours haven't complained!"

The studio was the last room to be finished, though Kirke says the basement space was one of the main reasons he bought the house.

On moving in a year ago with their four children, aged between 13 years and 18 months, the Kirkes hired the Listening Rooms to provide a hi-fi system for the big room and the piano room.

Home is where the music is

Kirke says it's paramount for him to have music at home, but there was also the need to disguise the system, which might look out of place among the antiques. Consequently all the speaker wiring is hidden underneath the floor and routed to the speakers in the piano room which is dominated by the black lacquer Bechstein grand on which Kirke's children are learning to play.

In the big room he listens to music relayed through a pair of Bose speakers which are hidden above bookcases and pointed at the ceiling. Below, in one of the bookcases, the Yamaha hardware is stacked up with a CD player, tape deck and tuner as sources. Kirke's love of extended bass and treble is the reason for the graphic equaliser in the system, which he recognises as heresy to lovers of pure sound. The equaliser is used to accentuate the treble and bass from his floorstanding KEF Q90s which are all but hidden by armchairs in the piano room.

"I find those speakers too neutral," he says inadvertently complimenting KEF, "so when I'm listening in that room I always crank the bass and treble to about three o'clock. I know you'll probably get a lot of readers complaining but I like to recreate the sound from where I would hear it, behind the drums. I'm always fiddling with bass and treble. Even when I go into shops I like to change the sound if they're playing music and I always have the loudness button on."

The row of Compact Discs in the bookshelf next to the system shows a broad taste with jazz, soul and rock. There's everything from Eurythmics to The Pogues; Otis Redding, Jimmy Smith, Charlie Parker and Ray Charles. Of his contemporaries he most admires Van Halen, especially the band's leader, guitarist Eddie Van Halen. He also lets slip



Impressive track record. Music awards and gold discs adorn the walls of Simon Kirke's stables.

The System:

Yamaha CDX550 CD player	£200
Yamaha KXW332 cassette deck	£240
Yamaha TX350L tuner	£130
Yamaha 550 Equaliser	£200
Yamaha AX750 amplifier	£400
Bose 301 loudspeakers	£290
KEF Q90 loudspeakers	£650

Total cost including installation £2,485

System provided and installed by:
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Tel: (071) 244 7750.

that he quite likes the KLF: "My kids are amazed. They say 'look out dad's getting hip!'"

Like many other rock drummers Simon Kirke's guru was a jazz drummer. In his case it's Al Jackson who played with Otis Redding and was a session musician for the famed Stax label whose in-house band in the Sixties was Booker T and the MGs (MG being Memphis Group).

There's a photograph of Jackson on the wall in his studio signed 'the Guvnor'. "I never met him," Simon regrets, "I was due to meet him in 1975, then he was shot dead by a burglar. But I heard that Duck Dunn, the bassist who played with him heard Free and liked my playing, which was a real compliment. So I hope maybe Mr Jackson would have thought the same thing."

Kirke is also a fan of the big band style of drumming and cites Buddy Rich as another hero: "He was the king of them all. He was still playing in his 70s."

While he admires the professionalism of such American session musicians, who can be creative while playing straight from the top in the right key, Kirke nevertheless recounts Bad Company's eponymous

first album as taking just three weeks to complete.

"Led Zeppelin, who were also on our label Swansong, hired Headley Grange to make their fourth album and John Bonham got ill so we were sent in to do ours. All the vocals were done on the lawn; I think one of the roadies had an airgun in case any of the birds started singing at the wrong time!

"Mind you, it wasn't as fast as Zeppelin's first album which took two weeks, and how could you ever beat the Beatles who did their first album in 14 hours?"

The album remains one of Kirke's favourites along with Bad Company's second offering, *Straight Shooter* with *Free at Last* and *Heartbreaker* from the Free days: "But that's because they were successful and anything like that in your early career means a lot; you get blasé after a while."

Nowadays writing is a more leisurely business and Kirke tries to work every morning. "But I have to work it around taking the kids to school or picking them up... There's my street credibility completely blown," he laughs.

How does a drummer write songs? "Well I use piano, keyboards and guitar here at home," he qualifies. "I think I know how to play the drums now. I've been doing it for over 30 years, since I was 12. And after a tour I don't really want to see them for a bit, much as I love 'em."

No special effects

Nevertheless he has a daily routine using weights and goes to a gym to stay fit enough to be faithful to that Bad Company and Free sound. He is also disdainful of modern engineering effects which can make a small snare drum sound three feet deep and scoffs: "Any puny drummer can produce a vast sound with the technology around now."

Some technology is welcomed; while he prefers to use the acoustic Gibson for writing songs during a tour, he reckons his 18 month old Casio DAT player is a vast improvement on his old Sony *Walkman Pro* for recording impromptu ideas. "The thing about the Casio is that you can have the microphone anywhere in the room and it picks up sound beautifully, and the Sony used to rumble a bit."

He also travels with hi-fi, using one of the Cambridge Soundworks briefcase systems which incorporate a small amplifier, as well as satellite and subwoofer loudspeakers. "That's a great sound, much better than carrying a *Walkman* around. I use a little six band graphic equaliser with that as well, because I do like to fiddle with gadgets!"

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DTC750	449.99	10 DAT 120 min tapes
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MODEL	PRICE	FREE GIFT GIVEAWAY
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ACT100	199.99	25% discount
DM570	169.99	—
DM600	149.99	15 metres Audio Quest solid core flat cable rec £1.99 mtr
DM610	199.99	Sennheiser HD480II headphones
DM620	299.99	TEAC TX3000 tuner
DM630	599.99	AIWA ADF410 cassette deck
DM640	799.99	Pioneer F449L tuner
SOLIDS	149.99	—
SOLID BASS STATION	349.99	Mission 760i loudspeakers
OVALE	299.99	Sennheiser HD480II headphones

MORDAUNT SHORT

MS3.20	94.99	—
MS3.40	179.99	—
MS310	79.99	—
MS5.10	119.99	15 metres Audio Quest solid core flat cable rec £1.99 mtr
MS5.20	149.99	20 metres Audio Quest solid core flat cable rec £1.99 mtr
MS5.30	199.99	Sennheiser HD480II headphones
MS5.40	299.99	AIWA XT003 tuner
MS5.50	399.99	TEAC CDP200 CD
CLASSIC 20	399.99	Beyer DT990 headphones
CLASSIC 40	599.99	Pioneer A300 amplifier

MISSION

760i	119.99	15 metres Audio Quest solid core flat cable rec £1.99 mtr
761	149.99	15 metres QED 200 flat cable rec £1.99 mtr
761i	169.99	Sennheiser HD450II headphones
762	229.99	Sennheiser HD480II headphones
763	349.99	TEAC V510 cassette deck
764 ex demo	299.99	—
764i	449.99	Beyer DT990 headphones
765i	599.99	AIWA ADF410 cassette deck

WHARFEDALE

410	99.99	—
5052 Mahogany	259.99	AIWA ADF410 cassette deck
515	259.99	AIWA ADF410 cassette deck
517	379.99	Pioneer F449L tuner
DELTA 30.2	99.99	JAMO speaker stands
DIAMOND IV	119.99	JAMO speaker stands

GOODMANS

B.MAX SUBWOOFER	49.99	—
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CASSETTE DECKS

MODEL	PRICE	FREE GIFT GIVEAWAY
AIWA		
ADF410	99.99	12 TDK SA90 cassettes
ADF810	199.99	Sennheiser HD40II headphones

PIONEER

CT676	249.99	Sennheiser HD480 Classic headphones
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SONY

TCK420	99.99	—
TCK520	179.99	Sennheiser HD450II headphones
TCK570	169.99	—
TCK677ES	249.99	Sennheiser HD480 Classic headphones
TCK870ES	349.99	Sennheiser HD520II headphones
TCW370	99.99	—
TCWR770	249.99	Sennheiser HD480II headphones
TCWR870	299.99	Sennheiser HD480 Classic headphones

TEAC

V390	69.99	—
V3000	199.99	Sennheiser HD450II headphones
V5000	299.99	TEAC TX3000 tuner
V510	89.99	—
V7000	399.99	TEAC TX3000 tuner
V530R	169.99	Sennheiser HD450II headphones

TECHNICS

RSBX404	125.99	—
RSBX606	155.99	—
RSBX707	189.99	—
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RSB965	299.99	—
RSTR212	129.99	—
RSTR232	134.99	—
RSTR333	159.99	—
RSTR515	215.99	—
RSTR555	259.99	—

AMPLIFIERS

MODEL	PRICE	FREE GIFT GIVEAWAY
AIWA		
XA008	119.99	—
AURA/B&W		
VA40	109.99	—
PIONEER		
A300	159.99	Sennheiser HD450II headphones
A400	239.99	Sennheiser HD480 Classic headphones
A676	279.99	Sennheiser HD480 Classic headphones
SONY		
TAF170	84.99	—
TAF420	169.99	—
TAF440	199.99	Sennheiser HD450II headphones
TAF540	249.99	Sennheiser HD480II headphones
TAF670ES	399.99	Mission 760i loudspeakers
TAF770ES	599.99	Mission 761 loudspeakers
TA730ES	299.99	—
TA6V670	649.99	Mission 760i loudspeakers
TAE1000ESD	1299.99	2 x pairs of B&W solid loudspeakers
2 x TAN55ES	—	—
Surround kit	—	—

TEAC

AX1000	99.99	—
AX5000	229.99	Sennheiser HD480 Classic headphones

TECHNICS

SUZ220	89.99	—
SUZ320	125.99	—
SUVX500	147.99	—
SUVX600	174.99	—
SUVX700	219.99	—
SUVX800	419.99	—

TURNTABLES

MODEL	PRICE	FREE GIFT GIVEAWAY
TECHNICS		
SLBD20	85.99	—
SLBD22	99.99	—
SLDD33	112.99	—
SLDD33	139.99	—
SL1210 MkII	289.99	—

TUNERS

MODEL	PRICE	FREE GIFT GIVEAWAY
AIWA		
XT003	79.99	—

PIONEER

F449L	149.99	Sennheiser HD480 Classic headphones
F757	279.99	Pioneer A300 amplifier

SONY

STS170	84.99	—
STS370	149.99	QED Pig Gold phono-plug lead
STS570ES	219.99	Sennheiser HD480II headphones
STS770ES	299.99	Sennheiser HD480 Classic headphones

TEAC

TX3000	69.99	—
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TECHNICS

STS610	89.99	—
STG470	119.99	—
STG570	155.99	—
STG70	199.99	—
STG90	279.99	—

CD PLAYERS

MODEL	PRICE	FREE GIFT GIVEAWAY
AIWA		
XC700	179.99	£30.00 worth of CD's of your choice
PIONEER		
PD7700	249.99	Sennheiser HD480 Classic headphones
PD8700	299.99	Mission 760i loudspeakers
PD9700	399.99	Pioneer A300 amplifier

SONY

CDP491	115.99	—
CDP597	139.99	£20 worth of CD's of your choice
CDP497	159.99	£25 worth of CD's of your choice
CDP597	179.99	£30 worth of CD's of your choice
CDP797	199.99	£30 worth of CD's of your choice
CDPX222ES	299.99	Sennheiser HD480 Classic headphones
CDPX339ES	449.99	Sony WMF2078 sports Walkman/radio rec £122.99

TEAC

CDP200	99.99	—
CDP3100	119.99	—
CDP4500	249.99	Sennheiser HD480 Classic headphones
P500	649.99	With D500 together, 14" Sony colour TV
D500	329.99	See P500

TECHNICS

SLPG400	154.99	—
SLPG500	174.99	—
SLPG320	129.99	—
SLPG420	159.99	£15 worth of CD's of your choice
SLPG520	199.99	£20 worth of CD's of your choice
SLPS620	229.99	£30 worth of CD's of your choice
SLPS700	229.99	—
SLPS900	299.99	—

MISSION

DAD5	299.99	Sennheiser HD480 Classic headphones
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SYSTEMS

AMP	CD	SPKRS	PRICE	FREE GIFT GIVEAWAY
AURA A40	TEAC CDP200	Wharfedale Diamond IV	299.99	Speaker cable interconnects
Pioneer A300	Pioneer PD8700	Mission 760i	399.99	Speaker cable interconnects
Pioneer A400	Pioneer PD9700	Mission 760i	499.99	Speaker cable interconnects
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Marantz PM405E	£379.95	£389.95	£409.95	£419.95	£439.95	£459.95	£485.95	£500.95	
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Rotel RA920AX	£289.95	£299.95	£322.95	£333.95	£353.95	£364.95	£390.95	£409.95	
Rotel RA930AX	£316.95	£326.95	£346.95	£355.95	£378.95	£395.95	£413.95	£433.95	
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Sony TAF540E	£362.95	£382.95	£412.95	£424.95	£439.95	£449.95	£469.95	£489.95	
Technics SUVX600K	£346.95	£356.95	£386.95	£399.95	£415.95	£429.95	£449.95	£469.95	
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AMPLIFIERS		CASSETTE DECKS		RECEIVERS		MIDI SYSTEMS		CD PLAYERS		TURNTABLES		SPEAKERS		LOUDSPEAKERS	
Carver TFM25	£599.00	Dual CD100	£149.95	Denon DRA 335	£229.95	Aiwa NSX-D7	REDUCED TO CLEAR	Aiwa XC700	£179.95	Ariston PRO DECK	£159.95	Bose Stocked	POA	Arcam III	£149.99, Now £99.99
Cervin Vega HEB 60	£569.95	Kenwood Stocked	POA	Kenwood KR-V7030	£299.95	Aiwa NSX-D5	REDUCED TO CLEAR	Ariston Maxim 3	£429.95	Ariston Pro Maxim/Rega	£219.95	Boston HD Series Stocked	POA	B&W DM560 Walnut/Black inc. speaker stands	£159.90
Denon PMA 250 MKII	£139.95	Marantz CD 42	£179.95	Marantz SR50L	£239.90	Kenwood Z-D87CD	REDUCED TO CLEAR	Denon DC D660	REDUCED TO CLEAR	Dual CS430	£99.95	B&W DM570 & B&W DM580	POA	KEF C15	£79.95
Denon PMA350	£169.95	Marantz CD52	£199.99	NAD 7225 PE	£249.95	Kenwood M24CD S	REDUCED TO CLEAR	Denon DC D860	REDUCED TO CLEAR	Dual CS503/2	£179.95	Boston A60	Was £159.95, Now £99.95	KEF C15	£79.95
Denon PMA 860	£339.99	Marantz PM50	£229.95	NAD 7240PE	£299.95	Kenwood M45 G	POA	Denon DC D890	REDUCED TO CLEAR	Goodmans GSP600 auto return	£49.95	Tannoy 607	£199.00	KEF C35	£119.95
Denon PMA 1060	£309.99	Marantz PM80	£399.99	NAD 7020i	£329.95	Kenwood M65 G	POA	Denon DCD 1290	£329.99	Rotel RCD955AX	£259.95	Tannoy 609	£269.00	KEF C35	£129.95
Dual CV600	£149.95	Marantz SC80	£479.90	Nakamichi CASS. DECK 1, 1.5 & 2	POA	Kenwood M85 G	POA			Rotel RCD965BX	£319.95	Wharfedale Diamond IV	£119.90		
Dual CV5600	£159.95	Marantz SM80	£499.90	Nakamichi CAS. DECK 1, 1.5 & 2	POA	Kenwood M85 G	POA			Rotel RCD965BX	£319.95				
Kenwood KA1030	£109.95	NAD D3020i	£129.95	Revox B7711 O/real	POA	Kenwood M85 G	POA			Rotel RCD965BX	£319.95				
Kenwood KA3020	£129.95	NAD 3225PE	£199.95	Rotel RD945AX	£149.95	Kenwood M85 G	POA			Rotel RCD965BX	£319.95				
Kenwood KA4040R	£219.95	NAD 3240PE	£199.95	Rotel RD955AX	£199.95	Kenwood M85 G	POA			Rotel RCD965BX	£319.95				
Kenwood KA5020	£209.95	NAD 1000	£179.95	Rotel RD965BX	£169.95	Kenwood M85 G	POA			Rotel RCD965BX	£319.95				
Kenwood KA7020	£299.95	NAD 2100	£289.95	Rotel RA920AX	£169.95	Kenwood M85 G	POA			Rotel RCD965BX	£319.95				
Marantz PM305E	£149.90	NAD 2400	£389.95	Rotel RA930AX	£169.95	Kenwood M85 G	POA			Rotel RCD965BX	£319.95				
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Marantz SC80	£479.90	Rotel RA930AX	£169.95	Rotel RA930AX	£169.95	Kenwood M85 G	POA			Rotel RCD965BX	£319.95				
Marantz SM80	£499.90	Rotel RA930AX	£169.95	Rotel RA930AX	£169.95	Kenwood M85 G	POA			Rotel RCD965BX	£319.95				
NAD D3020i	£129.95	Rotel RA930AX	£169.95	Rotel RA930AX	£169.95	Kenwood M85 G	POA			Rotel RCD965BX	£319.95				
NAD 3225PE	£199.95	Rotel RA930AX	£169.95	Rotel RA930AX	£169.95	Kenwood M85 G	POA			Rotel RCD965BX	£319.95				
NAD 3240PE	£199.95	Rotel RA930AX	£169.95	Rotel RA930AX	£169.95	Kenwood M85 G	POA			Rotel RCD965BX	£319.95				
NAD 1000	£179.95	Rotel RA930AX	£169.95	Rotel RA930AX	£169.95	Kenwood M85 G	POA			Rotel RCD965BX	£319.95				
NAD 2100	£289.95	Rotel RA930AX	£169.95	Rotel RA930AX	£169.95	Kenwood M85 G	POA			Rotel RCD965BX	£319.95				
NAD 2400	£389.95	Rotel RA930AX	£169.95	Rotel RA930AX	£169.95	Kenwood M85 G	POA			Rotel RCD965BX	£319.95				
Pioneer A400	£229.95	Rotel RA930AX	£169.95	Rotel RA930AX	£169.95	Kenwood M85 G	POA			Rotel RCD965BX	£319.95				
Pioneer A300	£159.95	Rotel RA930AX	£169.95	Rotel RA930AX	£169.95	Kenwood M85 G	POA			Rotel RCD965BX	£319.95				
Rotel RA920AX	£129.95	Rotel RA930AX	£169.95	Rotel RA930AX	£169.95	Kenwood M85 G	POA			Rotel RCD965BX	£319.95				
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Rotel RA930AX	£169.95	Rotel RA930AX	£169.95	Rotel RA930AX	£169.95	Kenwood M85 G	POA			Rotel RCD965BX	£319.95				
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Rotel RA930AX	£169.95	Rotel RA930AX	£169.95	Rotel RA930AX	£169.95	Kenwood M85 G	POA			Rotel RCD965BX	£319.95				
Rotel RA930AX	£169.95	Rotel RA930AX	£169.95	Rotel RA930AX	£169.95	Kenwood M85 G	POA			Rotel RCD965BX	£319.95				

Naim's World

Dan Houston travels to Salisbury to meet Julian Vereker, the man behind Naim Audio.

There's a eulogistic fax message in broken English stuck above one of the workbenches in the Naim factory. It proclaims the merits of the Naim *Aro* tonearm and the *IBL* loudspeakers, and was sent in 1989 from Mohamed Ali Trading in Saudi Arabia. The date is auspicious; that was about the time the hi-fi community realised that Naim was not content to be just a specialist manufacturer of amplifiers to go with Glasgow based Linn Products' turntables and *Isobarik* loudspeakers.

In fact the friendly and fruitful Linn-Naim partnership, taking their mutual message around the world for a decade, was all but over by 1989. Linn now made amplifiers and a slighted Naim decided it was also time to branch out and go it alone. Products like the *Aro* unipivot tonearm, *SBL*, *IBL* and *DBL* loudspeakers were produced, and sold in competition alongside Linn's offerings.

In the race to produce a competent CD player, after years of playing King Canute trying to stem the flood of digital media, Naim was first by a few months, producing the two box *CDS* machine in April 1991.

This CD player differs from other two box designs in one important respect. Most drive systems and digital to analogue converters are housed in separate boxes, following the theory that the two functions should be kept apart to reduce interference. But Naim uses amplifier technology and keeps a massive dual power supply in a separate box in a bid to keep everything electronically quiet.

The CD player is the latest in a long line of worthy designs from the Naim workbenches. Visiting the factory in June we found a quiet purposeful atmosphere, with a production line on the ground floor for loudspeakers and another on the



“The whole idea of having a two box player with the DAC in one box and the drive in the other is a tenuous connection, it's like putting an engine in your trailer. So we split the power supply.”

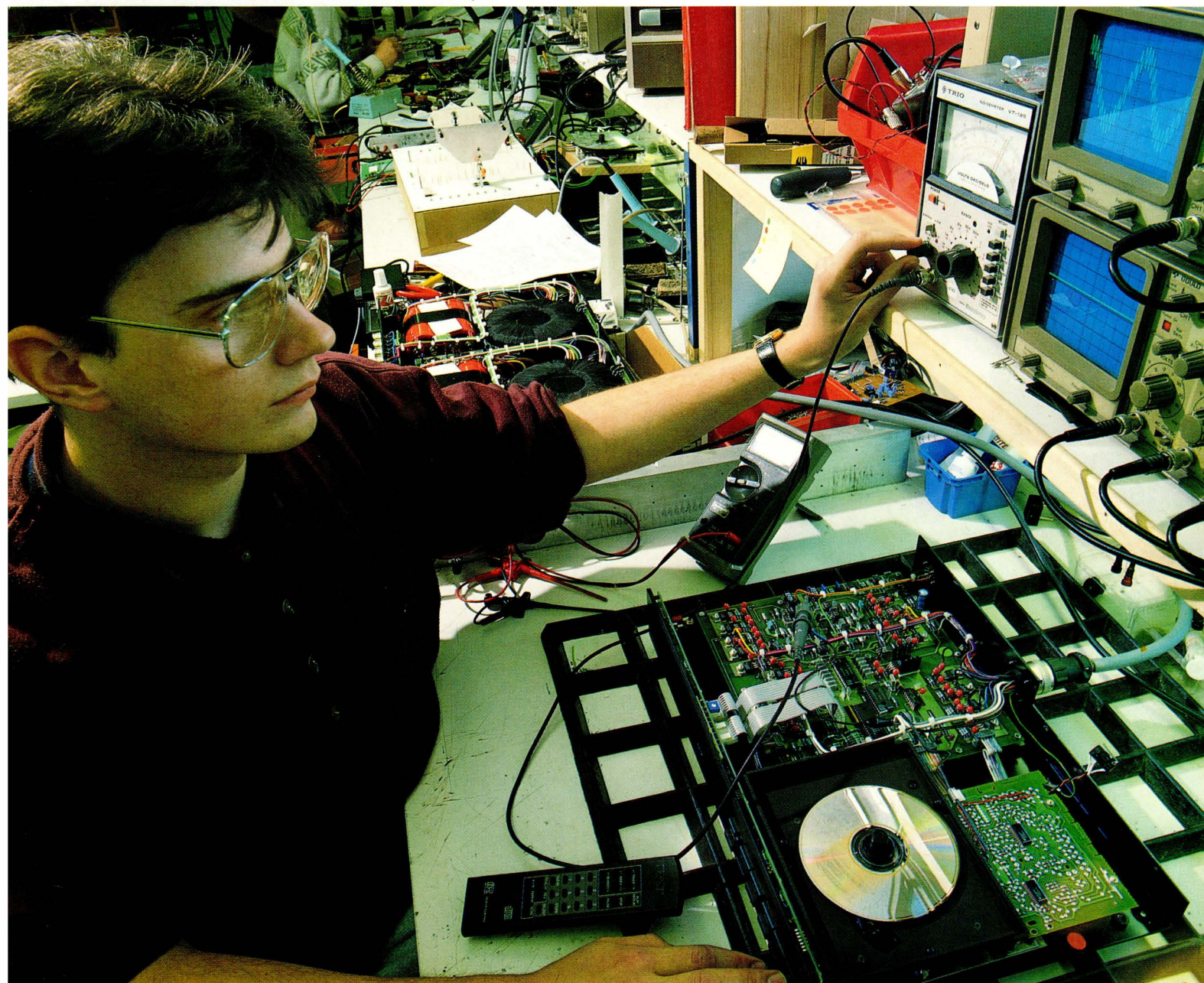
first for electronics. The massive computer driven Ambotech printed circuit board stuffer stood idle over a CD player board, waiting to be finished with soldering by hand before being suspension mounted in its characteristically plain black box. About a third of the factory space is given over to quality control where everything passes a rigorous circuit of oscilloscopes and measuring equipment before being packed. Computer aided design engineers work in a room where they won't tell you what they are up to, and there is also a huge listening room for the final and crucial R&D work — by ear.

The man at the helm is Julian Vereker, a Jaguar driving 47 year old who moved to Salisbury from London in 1967 to take a motor engineering research job with Downton Engineering, used by BMC to develop the Mini engine. He runs Naim as well as a small yacht-building company and a plastics firm, and is the president of the Federation of British Audio.

He founded Naim Audio Visual in 1969 making sound and light machines for discotheques. A keen music fan, he began going to gigs with his musician friends taking along a Chilton tape recorder with his own home-made mixing desk. “But I found that playing it back I couldn't tell the difference between anyone, whereas on stage you knew who was who,” he says. “That's really how I started getting into hi-fi. Music being a language, I felt that you should be able to understand what was being said.”

He tried to trace the faults through all his other equipment components before he realised that it might be the amplifier which made the difference.

“I had been using a Sinclair kit power amplifier, and so I bought a Quad 303 thinking that would fix it, but I thought the sound quality was worse, so I took it



A member of Naim's quality control department tests one of the company's new CD players.

back. I had realised that the amplifier was a crucial part of the system and I was sure I could make something better than the Sinclair kit, which cost just under two pounds in those days.

"It took me a long time to learn enough electronics to make something that worked. But I realised that the amplifier is like a tap on the end of a water tank — the power supply. The power supply is the main part because that is where the energy comes from, and the size of the tap will determine the size of the tank. I was making mixing desks and loudspeakers for people and one of my customers liked the first amplifier I had made for myself. The design used a power supply which was in proportion to the other parts of the amplifier, and struck a balance in that sense."

Sales were slow for the fledgling business and Vereker, having named his first amplifier the Naim 160, was only able to sell a couple of amps in the first two years. Things picked up with the launch of Capi-

tal Radio in 1973, with Naim selling 12 pairs of studio monitor speakers and mono versions of the 160 to the station.

Capital Radio used the systems for more than a decade; there was little reason to change. Naim's reliability and thorough engineering has ensured that the current 250 power amplifiers are little different from the early design.

The professionals

At first Vereker felt that his amplifier would only interest the professional market, and had just one hi-fi dealer, Exon Audio, by 1973. "At that time we had designed an amplifier for a German company which would fit into their active loudspeakers. But we didn't get paid and so we were stuck with a lot of stock. As that was happening I met Ivor Tiefenbrunn of Linn Products who had the LP12 turn-

table and Isobarik loudspeakers.

"I never used a record player because I thought my own recordings on quarter inch tape sounded so much better. We were introduced and Ivor was playing his system with an American pre and power amplifier combination which I thought sounded terrible. Ivor thought a 50 watt amplifier would never drive his loudspeakers but eventually we put my amplifier in his system at about four in the morning. We put on a jazz track from an Acoustic Research test disc and from the first note we agreed the 160 was infinitely better. Ivor rolled on his back like a dying beetle and said, 'Wow that's an amplifier.' He took it away and I went home with his turntable. Naim soon stopped making loudspeakers after that and as they say the next ten years is history."

Vereker describes the cosy informal partnership as immensely helpful to both companies — who sold their products as being synergistic with each other. Both firms were involved in the development



A few good points to remember next time you choose a hi-fi unit.

Point 1. The AX-R742 (that's the amplifier in the foreground if you're not into serial numbers) has the kind of startling features to impress the most enthusiastic hi-fi enthusiast.

Six pre-programmed graphic equalisations plus six more you can create yourself. And for those even more in the know, it can handle both moving magnet and moving coil cartridges.

Point 2. The high-performance single cassette deck (TD-R452) has a new high-tech

direct drive motor for purer sound. Designed to decrease vibration, the deck also includes CD direct, Dolby B/C NR and Dolby HX-Pro.

Point 3. The CD player (XL-Z452) has the unique JVC 1-bit PEM DD which delivers highly accurate sound. It's less prone to mistracking

and read-out error and includes an optical digital output.

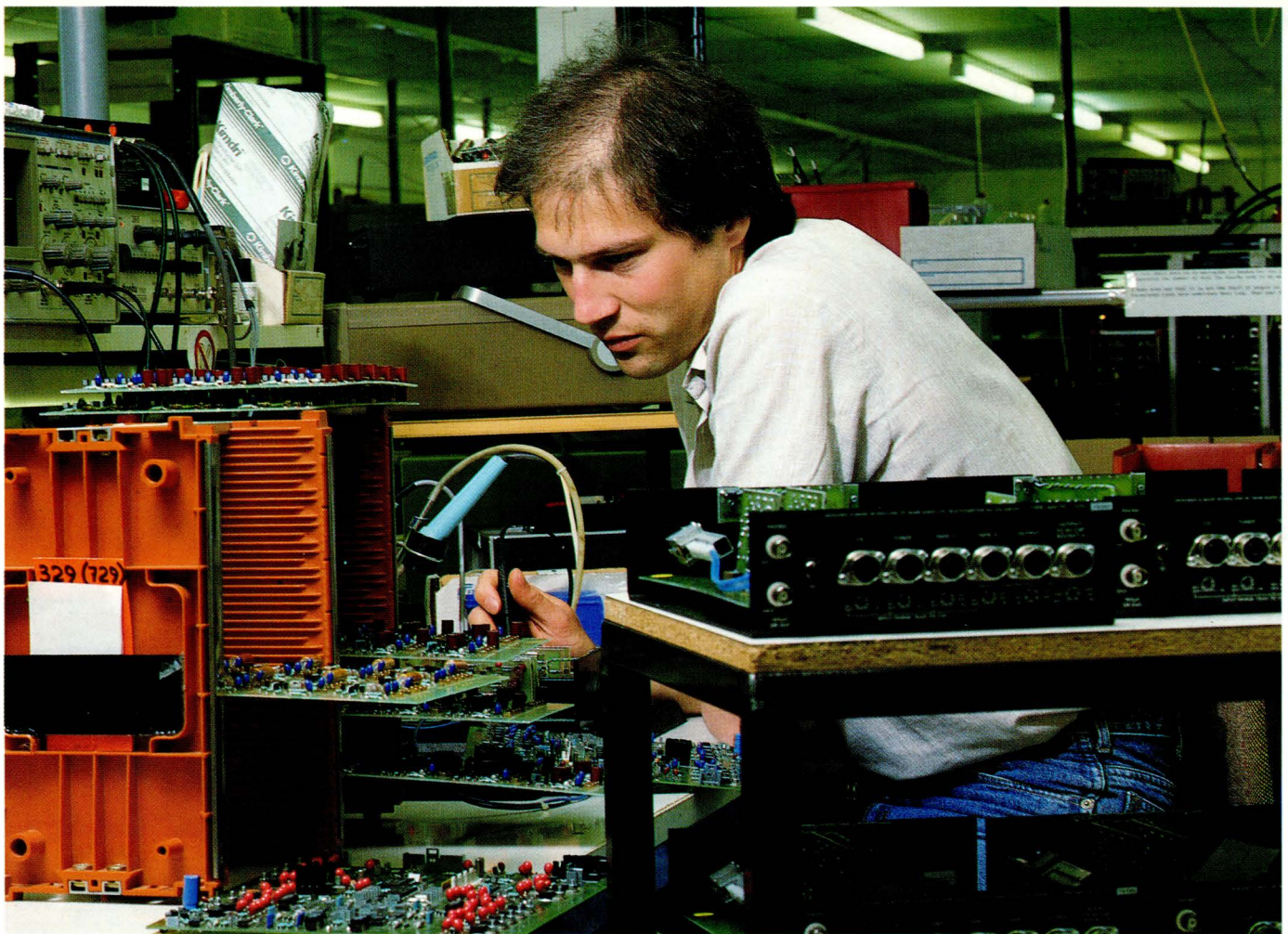
Point 4. The receiver (RX-506) has a built-in graphic equaliser and Dolby Pro Logic Surround for cinema sound experience at home.

Point 5. Each unit has a COMPULINK control system so one remote can control all JVC compatible components.

Point 6. You don't need to understand it all, you do need to listen to it all.

JVC

HI-FI + VIDEO + TV + TAPE



of loudspeaker stands, and persuaded dealers that single speaker demonstration rooms should be used. This hypothesis stated that extra, unused loudspeakers in a room will re-radiate a sound after the first loudspeakers, creating a kind of feedback and confusing the listener albeit with tiny signal levels.

Both Linn and Naim were conscious that they were selling a philosophy rather than just expensive hi-fi equipment. Dealers were asked to the factories to see production and a successful hi-fi family was born. "We were keen to be sold by demonstration against other equipment rather than profit margin," Vereker says, perhaps oblivious of the fact that some extra-loyal dealers had adopted the foot-tapping ceremony while playing Linn-Naim equipment. A dealer's foot tapping, now more widely adopted, is your subtle hint that this equipment has the irresistible boogie factor missing elsewhere.

Making a Naim

Naim went from strength to strength, making the entry level Naim *Nait* integrated amplifier and *Hi-Cap* separate power supplies which became the British audiophile's aspiration. In 1983 the *NAT 01* tuner was developed earning the company high praise with its ability to turn FM broadcasts into a legitimate hi-fi source.

Both Linn and Naim were conscious that they were selling a philosophy rather than just expensive hi-fi equipment. Dealers were asked to the factories to see production and a successful hi-fi family was born.

Living in a box. Naim's circuit boards come under scrutiny before being sealed into black boxes.

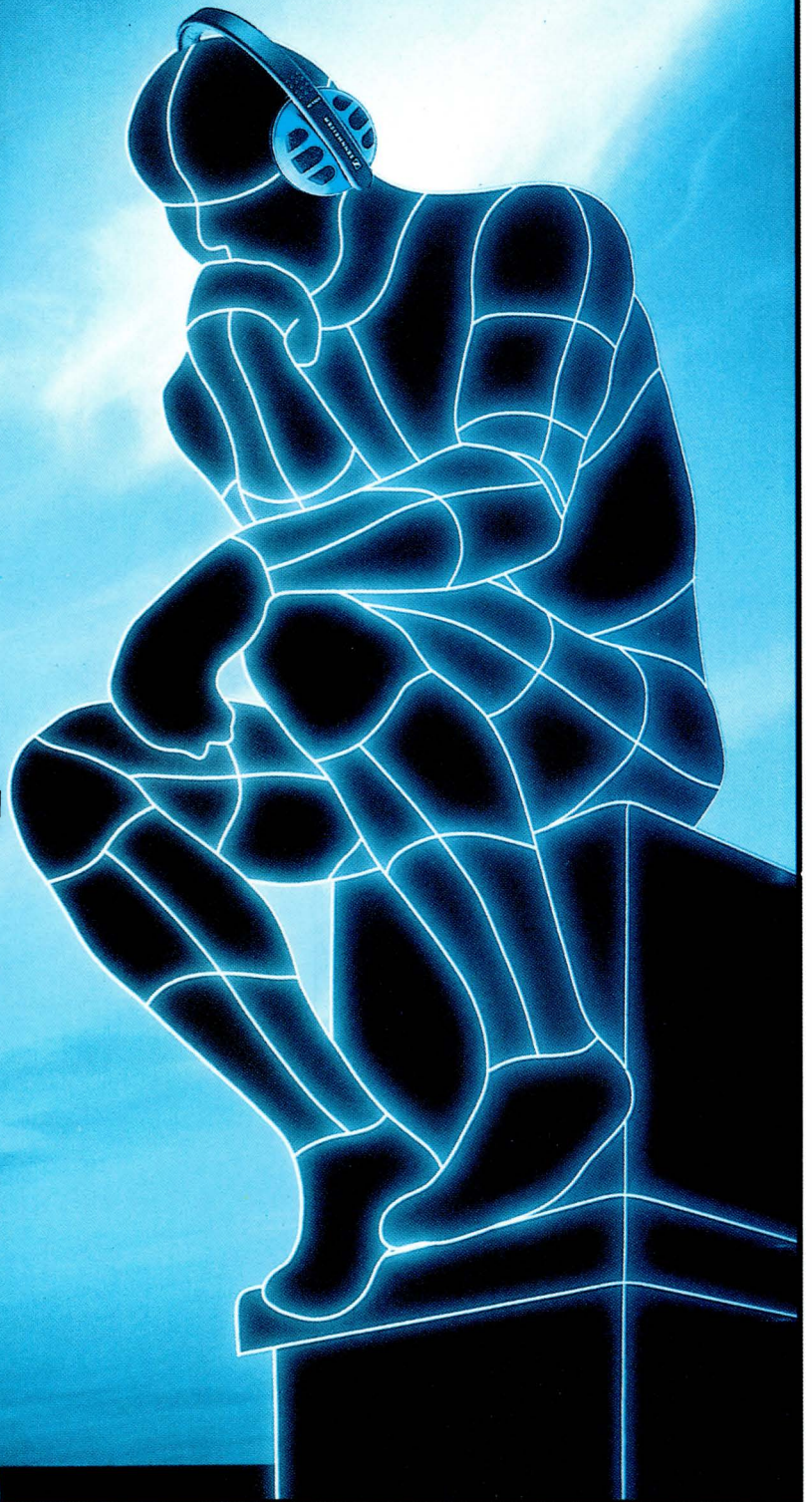
Initially Naim stayed in the analogue audiophile corner with Linn, refusing to give credence to digital audio. But finally Naim decided to apply all its hi-fi know-how to the newly ascendant medium of Compact Disc.

One might suppose that as Linn became more involved with electronics and was keen to sell a complete one name system, Naim's task was clearly defined, with a CD player the obvious source for a complete Naim system, but Vereker says his team had been researching digital audio technology for many years.

"We could hear that it didn't work on our terms but we wanted to find out why," he explained. "Then a computer consultant turned up with a player he'd designed from bits of others. On one New Order disc it sounded clearly better than the vinyl version and so I started to feel it might be possible.

"His idea was that it was important to tackle the design right through from the beginning, which was also our philosophy. We were introduced to Philips by the reviewer and engineer Martin Colloms who had partly designed the Radford CD players. Once we started it occurred to us there were fundamental errors in CD player design. It is said that digital signal,

THE LISTENER



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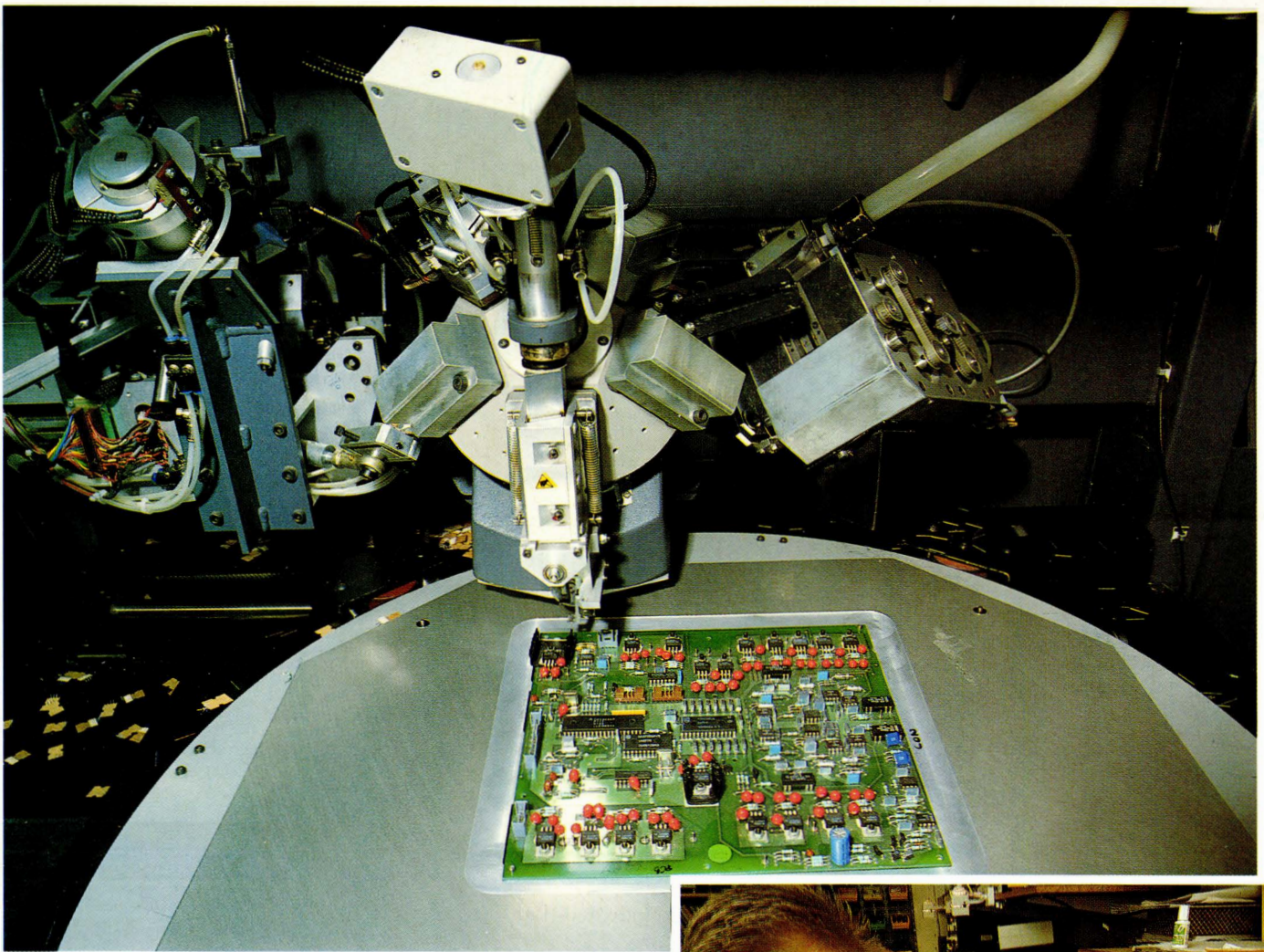
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or the binary 1 and 0 code is either on or off. But that isn't true; different transports have different effects on signal.

"The most important aspect of a data stream is not whether it is on or off but *when* it is on or off. Unlike an analogue signal which is stored in terms of frequency and amplitude, a digital signal is stored in terms of time only. So keeping frequency response flat and working on amplitude was wrong, and talking about jitter meant you'd lost the plot.

"That led us to look at the power supply, and we discovered that it should be much much quieter than with analogue systems."

Using Naim's experience with power supply technology, the CDS was designed keeping the supply physically apart from the signal path boards. "People think there is so much electromagnetic interference going through the air inside hi-fi boxes but mostly components talk to each other via the power supply, that's where you should reduce the interference.

"The whole idea of having a two box player with the DAC in one box and the drive in the other is a tenuous connection, it's like putting an engine in your trailer. So we split the power supply."

Having taken just 12 weeks to design and finish the CDS, Naim took stock before releasing a second integrated CD

Don't move or I'll shoot — the computer driven Ambotech circuit board stuffer hangs poised like Robocop over some unfinished business (above). Glued to the screen — computers also play a vital part in Naim's CAD (Computer Aided Design) programme. An engineer studies circuitry which is displayed in glowing colours (right).

player, the CDI this April. "We did the obvious things on the CDS but during the last year we have found that the power supply is much more important than we suspected at first; if it lets any noise onto the signal it changes the binary code rate, so we've made it 20dB quieter to give it a clean performance down to -130dB where signals are still audible," Vereker says.

Both machines use the older Philips 16 bit four times oversampling chip sets. Naim contends there is no advantage to be gained by using the more modern One Bit DAC 7. Other features of the top-loading players include separate suspension systems for the main printed circuit board and a low inertia drive system. The disc is held in place by a small magnetic

clamp which reduces vibration transfer from the motor.

Naim clearly sees Compact Disc technology as the future and plans to release a CD recording machine next year.

But is digital really better than analogue? I ask this question as we listen to a Patricia Barber CD on Vereker's uncompromising home system. I get a cryptic answer: "There are patently emotional areas where you might say analogue is better than digital, but I think if you ask yourself the basic musical questions then there is no difference. CD's strength is its speed and time keeping so something like a piano sounds better on CD for me." Out of the corner of my eye I see his foot tapping in time.

harman/kardon *HK6150* i n t

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21st Century Fox

It now looks as if the first DCC players will reach the shops on September 1st, with a grand Euro-launch ceremony in London on September 15th, probably at Abbey Road Studios.

This looks like a snub for the Photokina Exhibition which opens in Cologne on September 16th, and for the second time is being offered as Photo-plus-video-plus-hi-fi show to take place on alternate years to the Berlin show.

Philips in the UK has been successfully drumming up interest in DCC, with reviewers getting their hands on decks, at least temporarily. In the USA, decks have been much slower coming through and Philips people fear that the pre-launch buzz planned for DCC is not happening.

The road to success could prove to be a rocky one for Digital Compact Cassette. Barry Fox reports on the latest developments.

To add to Philips' woes, Sony is hoisting a band of journalists to Tokyo in August, to try and generate more confidence in Mini Disc.

The big worry and disappoint

Anyone who has used a modern 386 or 486 machine, with all-singing and dancing software, will know that there is always a nagging feeling that it is capable of playing an unknown quantity of incredible tricks if only we knew the necessary commands.

Video recorders are like PCs. The new breed of Super VHS machines now offer far more programming and editing facilities than most people will ever learn to use. The Grundig Super VHS recorder is a classic example. It would take a full weekend to get through the instruction book and by the end you will have forgotten most of what you read at the beginning.

Hi-fi is now moving into this overkill bracket. How many people can put hand on heart and say they fully exploit all the memory programming functions of their CD player? DAT recorders provide facilities for tape indexing which, if ever DAT had sold widely, the public would never have used.

DCC will offer all manner of advanced text and indexing facilities, for instance to display teletext-style information on artists, recording date and details, lyrics and even personal messages. These will come up either on a TV screen connected to the DCC screen on the front of the deck.

It is unlikely to exploit the feature into the standard as a feature

COMPETITION

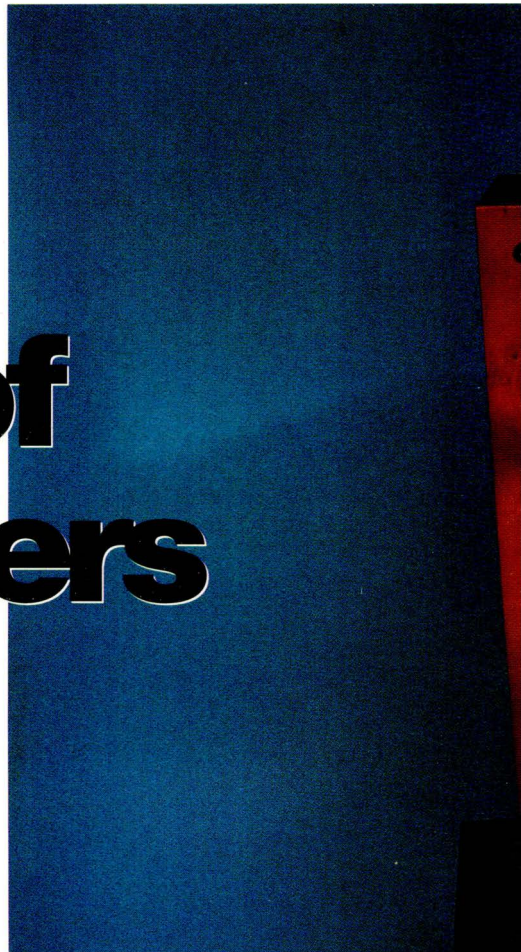
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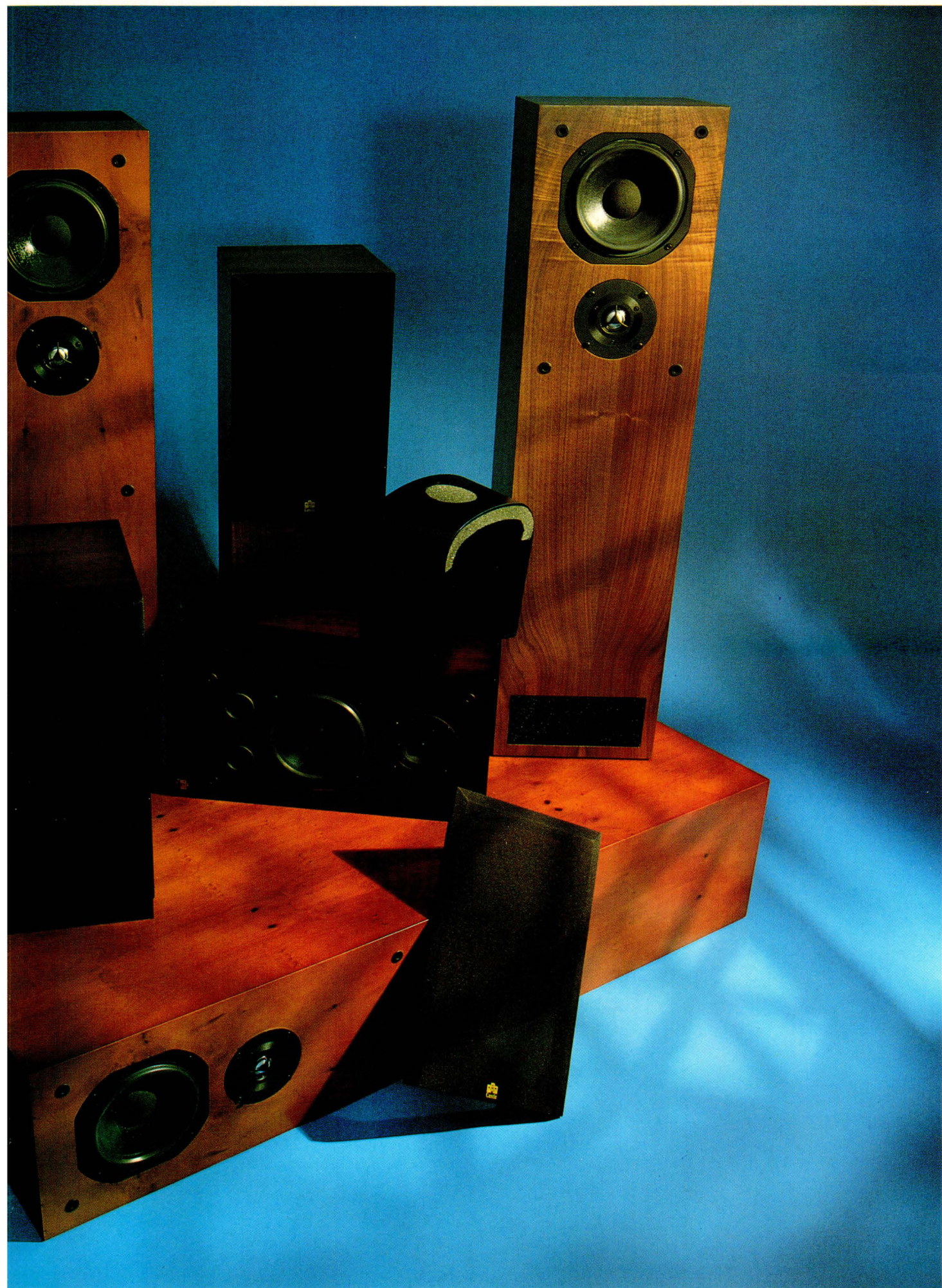
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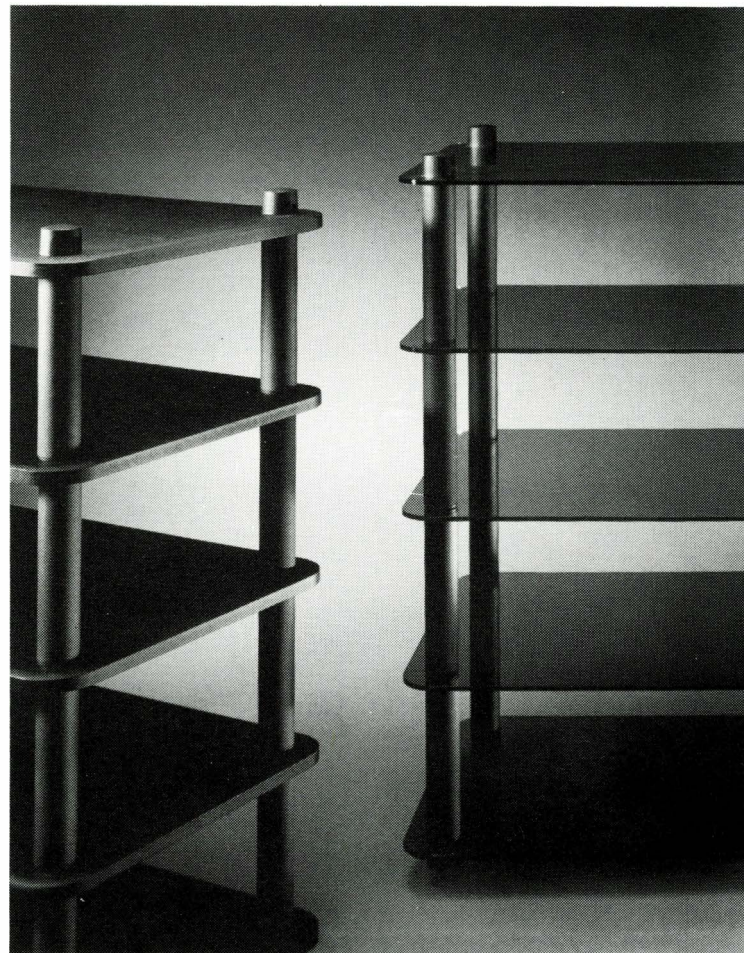




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Readers Write

CHOICE ANSWERS

Searching for the perfect speaker

Following the sudden demise of my ancient amplifier and DG's decision to discontinue vinyl production, I became the proud owner of a Pioneer A400 and a Rotel RCD-965BX. The choice was simple when both were given such rave reviews and experts enthused

over their inclusion in any system which, with a suitable pair of speakers, would . . . but what speakers? I am sure many A400/965BX owners have

been eagerly awaiting any article which might help them to shortlist an upgrade speaker, knowing that a further "Best Buy" would not necessarily be the most compatible option.

The review of the Rotel/Pioneer/Castle combination in the July issue clearly indicates that the Castle Chester speaker should be deleted from any shortlist. However, the article makes no reference as to whether one of the other speakers on review, Arcam/Tannoy/Epos/Audio Note, would be more "in synergy" with the system, despite the "various permutations" comment in the introduction. Thus the article tended to be rather negative, when a postscript to each review saying "also try" would have been more helpful.

Somewhere there is bound to be an optimum speaker, one

which — even allowing for the law of diminishing returns — will complement the Rotel/Pioneer system to its full potential. So forget the usual "What speaker . . . within my budget?", but add the caveat "mainly classical . . . in a room 26 by 14 by feet"; and, for the sake of argument, assume all other things are normal. What then would be the "optimum" speaker to complement the A400/965BX and "guarantee audio nirvana"?

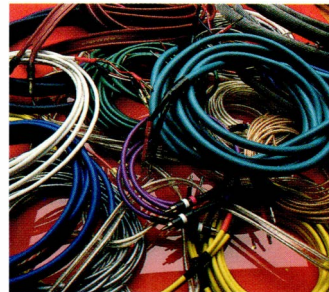
Joe Nutchey, Brighouse, West Yorkshire.

Somewhere there is bound to be an optimum speaker for you Joe, but it probably wouldn't be the same for everyone else. A good point in case is the disparity between the findings of Alvin Gold and Paul Messenger. It is unlikely that Alvin would like the

Chester whatever system it was on the end of, and I would disagree that it should be deleted from the shortlist. And a shortlist is the best thing that can be offered under the circumstances, at least until we can get a panel together to blind test different speakers with this CD player/amp combo.

For the meantime listen to Tannoy's 609 (£250), Arcam's Delta 2 (£340), KEF's 101/2 (£495) and the new Mission 753 (£595) which Alvin feels is a good match.

Another matter to take some care over is cabling, just because the A400 is relatively inexpensive amplifier doesn't mean that it can be expected to give of its best with any old cables. Once you've found some suitable speakers check out our cables supplements for speaker and interconnect cables to fine tune the system.



Cutting cable costs across the pond

I'm taking a trip to the USA and am considering buying some interconnect and speaker cable over there, do you think this would be cost effective?

Back in Blighty I'm thinking of changing CD players from a three year old Sony CDP-M77 to perhaps a Rotel RCD-965BX. Would this be a good replacement and should I be going for minimalist design or carry on with the likes of my Sony with its widgets and lights galore? Do such features affect sound quality in CD players? Chris Canneely, Norwich, Norfolk.

It's quite likely that cables from American companies would be cheaper in the country of origin, the importers, after all, have to make a living when they distribute them over here. Have a look at our two cable supplements (given away with issues 108 and 109) for our Recommendations. But remember that such things can have different effects in different systems, especially speaker cables, and you won't be able to try them first. A better bet would be to buy some CDs, they are considerably cheaper at about \$10.

Do features affect the sound quality of CD players? Not necessarily is the only answer that makes any sense, and probably not enough to be worth losing any sleep over. My natural inclination is to avoid such things but if you use them then worry not. Having said that the 965 is no great shakes on the features front and neither is the new Pioneer PD-801 (Legato Link, £300) that has been making a good impression in these parts lately.

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Vibrant, free flowing, fatigue free sound

The sound of my hi-fi system is muddled in the midband on complex pieces and generally somewhat dull, I feel I'm missing out. It comprises a Technics SL150 turntable with an SME S11 arm and an A&R P77 cartridge, Musical Fidelity B1 amp and Wharfedale Diamond IV loudspeakers on wall brackets.

I'd like to change the lot but really need advice on how to improve matters with £300 now and the same again in six months. I've considered the Ariston Pro, Rega and Systemdek but can't decide

which to go for. I've also thought about changing the speakers to either Cyrus 780s or Rogers LS2a/2s.

I'd like to listen to well timed, vibrant, free flowing, fatigue free sound. P Chamberlain, Worthing, Sussex.

You don't want much then! However, you're looking in the right directions for your upgrades. The garbage in/garbage out theory is still true and if your turntable isn't pulling an accurate signal out of the grooves you're not going

to make the system sing with new speakers. Record player wise you'd be well advised to audition the Systemdek IIX/900 with a Rega arm and Goldring cartridge (about £350 total). Of the budget decks on the market this is the most likely to give you what you are after sound wise.

At the back of the system check out some JPW AP2 (£180) speakers Blu tacked to a pair of weighty stands, or alternatively consider the Heybrook HB1s3 (£250), the Rogers LS2a/2s you mention are nice too.



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Chester

Frequency Response: 44Hz-22kHz · Crossover Frequency: 2.7kHz · Nominal Impedance: 8 ohms · Sensitivity: 90dB for 1 watt input at 1 metre · Amplifier requirements: 30-100 watts · Castek Overload Protection: Up to 300 watts · System type: Quarter Wave Bass Loading · Bass unit: 150mm rubber roll surround · Treble unit: 25mm metal dome · Dimensions: Height 915mm Width 230mm Depth 250mm · Weight: 16.8 Kgs



Winchester

Frequency Response: 35Hz-22kHz · Crossover Frequency: 3kHz · Nominal Impedance: 8 ohms · Sensitivity SPL: 90dB for 1w Input at 1m · Amplifier requirements: 30-150 watts · System Type: Quarter-Wave Bass Loading · Overload Protection: Castek · Crossover: Hard wired multi element 81 wired · Terminals: Suitable for large diameter cable and 4mm plugs · Bass Unit: 2 x 150mm rubber roll surround · Treble Unit: 25mm Metal Dome



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The quantum leap: transistor to tube!

My present system is an Arcam Alpha CD player, Audiolab 8000A amp and Rogers LS6 loudspeakers, but, I am wondering if it could be improved upon with the addition of a valve amplifier.

I know little about this genre of amplification but get the impression that it can be most enjoyable, what do you think?
R F Cockburn, Birmingham.



valve amp will sound significantly more mellow than your Audiolab, are you ready for this sort of change?

The only way to find out is to go and have a listen, and if you like what you hear start saving! The entry level is about £1,000 for an Audio Innovations Series 500 or a Michaelson Audio Odysseus for instance and goes upwards from there. However one alternative that's turned up recently is the AMC CVT integrated tube hybrid (£459), this has a transistor based preamp but pentode tube output, making it quite an interesting compromise.

I think valve amps are excellent things. However, they are expensive and not unfussy about the company they keep systemwise. The Alpha would suit a variety of valve amps but

the LS6s, which aren't all that efficient, will require a decent wattage to get them going. You're looking at a minimum of about 30W per channel. It's also worth bearing in mind that a

Neither interest nor inclination

Could you, I wonder, spare the time to help someone who is a "hi-fi illiterate" to find a simple and uncomplicated means of playing records and tapes to replace my old music centre?

Local retailers tell me that I require a "stacking system" which seems to comprise a crude lash up of black boxes joined by a mass of trailing cables. This appears to be a most inelegantly-engineered solution to my problem.

All the systems I have been shown are ridiculously complex. I have yet to find one with fewer than 45 separate controls and most have in excess of 60. I regret that I have neither the interest nor the inclination to learn their functions, many of which seem to me to be totally superfluous.

Within reason, price is unimportant. Sound quality, equally, is secondary. Flashing

lights, tone controls, sound level indicators and the like I have no use for. Unfortunately it seems that the industry is hell-bent on anything but simplicity.
Michael Roon, Newsome, Huddersfield.

You're right, most midi systems are ridiculously over endowed on the features front. Though in their defence this does seem to be what it takes to get sold in that market, and when you've three or four sources to control it's necessary to have a few buttons to do it with.

But to get on to your requirements, a midi system of some form is the least expensive way to get a wide selection of sources, but if you only want to play tapes and records you'd be better off buying separate components. You will still have the trailing wires problem, it seems to be largely unavoidable

I'm afraid, but you can get more simple components if you buy them in this fashion. Some good bets on the simplicity and sound quality front are amplification such as the Rotel RA-930AX (£160), Marantz PM-30 (£130) and Aura VA-50 (£200). Have a listen to cassette decks such as Pioneer's CT-339 (£150) and Yamaha's KX-250 (£150). The least knob strewn of hi-fi source components is the turntable, here there is just one thing you need to know, do you want the arm to pick up automatically at the end of the record or not? If so then look at the Dual 505.4 (£170), if not the options are a bit more varied and include the Rega Planar 2 (£185), Systemdek 1/900 (£188) and the Thorens TD280 (£189). Finally you'll need some loudspeakers, which shouldn't have any knobs on at all, try Allison AL100s (£120), JPVW Sonatas (£115) and Wharfedale Delta 30.2s (£100).

A head too many

I am looking to replace my present cassette deck, an Aiwa F350. I will be using it with an Aiwa XA008 amplifier and Jamo BX200 loudspeakers, interconnect is Audioquest and the alternative source is a Sony CDP790 CD player.

The Aiwa ADF 910 seems a good bet, but I don't need a three head machine as I don't do much recording. Could my money be better spent?
David Bacon, Margate, Kent.

If you are looking at the ADF 910, which we haven't reviewed yet, then your budget is presumably in the £250 arena. Our favourites at this price point are the JVC TD-V541 (£280), another three head model, and the Marantz SD50 (£230) which is particularly good with prerecorded tapes.

However, assuming that the 910 were to follow in the 410 and 810's footsteps it would indeed be worth short listing.

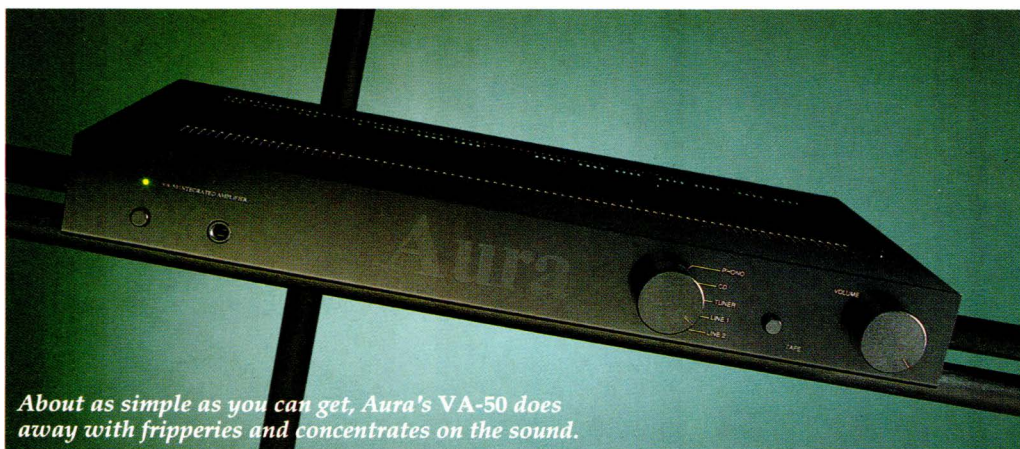
Heavy going

Can you recommend an amplifier and loudspeakers that would work well with an Arcam Alpha CD player?

**At the moment I have a Rotel RA-930AX amp and Rogers LS4a/2 speakers. Most of the time it sounds OK, with soul, blues, Mary Black etc but when things get heavy the sound starts to get a bit confused. I have about £500 to spend, maybe more.
J Whitty, London, E8.**

That's a tricky one. The problem is likely to be rooted in the limited output of the Rotel. There are basically two options for you to consider, either replace the speakers with something more efficient — 90dB/W plus — or trade the amp in for a bigger one.

The cheapest option would be to move up to a Pioneer A400 (£240) or Marantz PM40SE (£240) but it would also be interesting to listen to the Arcam/Rotel combination with something like Audio Note AN-Ks (£499), Castle Chesters (£599) or Tannoy 617s. Which option would work best is hard to tell, so go and set up camp in your local dem room and put some of these suggestions through their paces.



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What do you think about the way things are shaping up in the ever broadening world of audio entertainment? We want to know your views and ideas, so send 'em in and each month we'll award a record token (that should just about cover the price of a CD) to the writer of the most witty or interesting contribution.

Getting into a tangle with tape

In October 1991 I purchased a Technics RSBX404A cassette deck. I had no problems with it, but after a few months it started to chew tapes (TDK D90, SF, SA-X and MAs). The cassette deck was duly replaced. This also developed the same fault. Engineers looked at it three times but could find nothing wrong. They said that TDK tapes are "slippery" and that is why they chew up.

My friend has the same model and his will play any tape on the

market. I was not satisfied so I went back to my dealer. The dealer said it would be no use swapping it again for the same model as it would probably happen again. I paid the difference between the RSBX404A and the RSBX606A (£50). Two weeks later I bought a TDK MA and the new model promptly began to chew it up.

What confuses me is that SA90s have the same SP-AR mechanism. So why will they play when MAs don't? I thought that because the cassette deck had Quartz direct drive, it would play any tape.

P G Castleton, Suffolk.

I've used TDK cassettes for years and I wasn't aware of any tendency for them to be "slippery". Nor am I aware of Technics machines having a particular aversion to this brand of tape. Possibly you have a problem with something in your house (heat or some airborne contaminant) effecting the pinch rollers in your machine, causing these to become slightly stickier than normal.

If you play a lot of pre-recorded tapes these may shed oxide particles on the rollers and have a similar effect. In any case, here's a record token by way of compensation.

Fairly highish fi

I am writing to you for advice regarding hi-fi video recorders. How hi-fi are "hi-fi" video recorders? I realise that the word hi-fi is very abused, and my question is somewhat open ended.

Just to complete the picture I listen to a Denon DCD 300 Compact Disc player, a Nakamichi cassette recorder through an Ion Obelisk and Royd Eden speakers.

In the Directory section at the back of your magazine your mini reviews of hi-fi video recorders is not very encouraging. Also reading the booklets supplied by the manufacturers gives me no indication of the audio quality one would expect from these machines. In fact I strongly suspect that the audio quality is the same from each machine and any extra cost goes towards more facilities for camcorders etc.

I would appreciate any help regarding this aspect of hi-fi. K Williams, Liverpool.

You're right about "hi-fi" being a much abused term. Some might argue that its inappropriate to apply it to any tape medium except reel to reel. However, in the case of a VHS video recorder, "hi-fi" has a specific technical meaning. Simply put, it's the term used to differentiate a stereo machine from a mono only unit and refers to the way the sound is recorded on a deeper layer of the tape than the video.

Generally speaking you can achieve pretty decent sound quality with hi-fi VCRs. Their rotary heads mean that tape speed is quite high. The area where they are not suitably equipped for sound recording is in noise reduction, but being an quieter system this doesn't seem to be a big problem. Don't expect to compete with your Nakamichi, though.

Record
Token
Winner

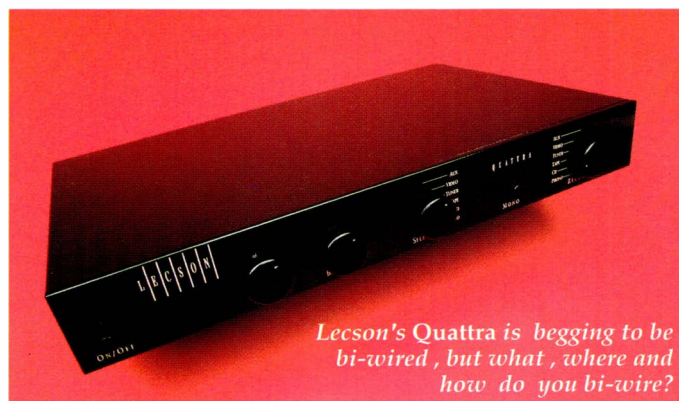
At least someone's happy

May we, through your hal-lowed pages, praise the man behind Buckinghamshire's foremost hi-fi emporium: Mr Steve Handley. This man and his staff epitomise a BADA class dealer.

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If you were to introduce an award for the UK's foremost dealer this shop deserves it. Many thanks, Steve. Rest assured we'll be back shortly. A H Widdowson, Wiltshire.

Just to prove we don't only print letters knocking people. Does anyone else out there have strong feelings, positive or negative, about dealers, components or even records?



Lecson's Quattra is begging to be bi-wired, but what, where and how do you bi-wire?

Back to basics please

I recently re-read Paul Messenger's piece on bi-wiring, bi-amping and the Lecson Quattra (October 1991). I found his brief remarks on bi-wiring very interesting but also very tantalising because I wanted to know more of the why, when and how it is done.

Could we have a one page instructional article each month in which a particular aspect of hi-fi is explained in layman's language, without those damned interminable abbreviations? An example could be the whys and wherefores of bi-wiring but it could also cover, for example, the basics of

how an amplifier works, the difference between Class A and B amps, what is meant by active and passive, and so on. You chaps know these things but there are lots of us out there who do not and who struggle with books such as *Beginner's Guide to Hi-Fi* (a misnomer if ever there was one). It is really no use egg-heads writing such books, as they always seem to start with the assumption that their readers have MScs in Maths and Physics. L Neville, Surrey.

Good idea, we'll look into it.

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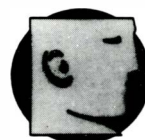
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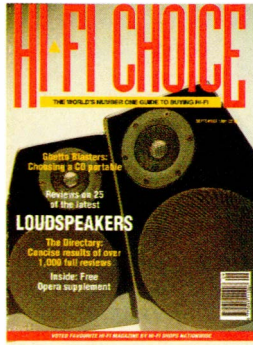


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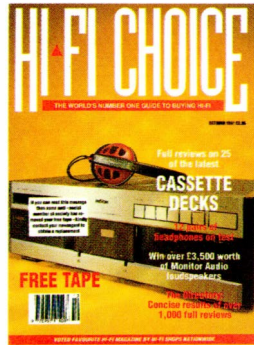
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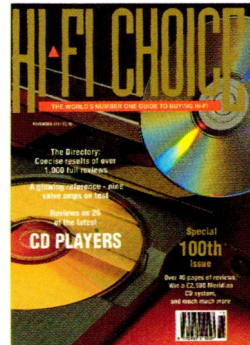
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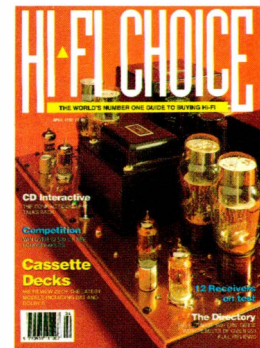
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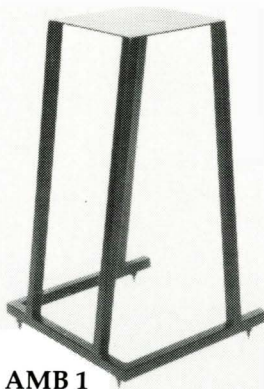
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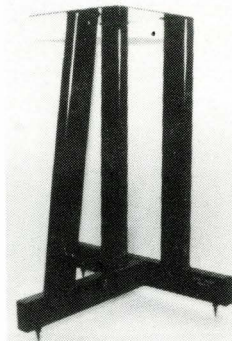
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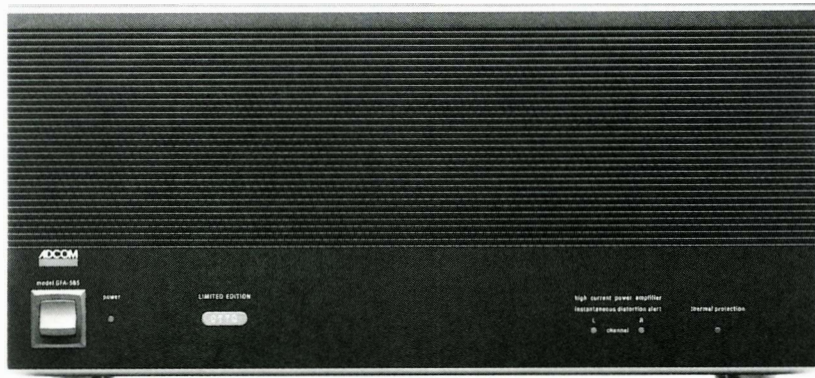
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Choosing and Using . . . Loudspeakers

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

Those buying just loudspeakers will have a pretty good idea of the money they have available, which as ever is the fundamental bottom line of any purchasing decision. But there is — and always has been —

Want to buy some speakers but don't know where to start? Here's some advice from Paul Messenger.

controversy over the proportion of a budget that should be devoted to loudspeakers, vis a vis that spent on the other components.

When setting the loudspeaker budget, it is vital to allow sufficient funds for a decent stand or support, and good quality connecting wire.

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

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

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

The end result comes from a complex interaction between the loudspeaker, its support, its site, the acoustics of the room, and the general characteristics of the driving system. That is rarely entirely predictable. For those intending to spend a fair amount of

money, it is not unreasonable to expect the luxury of a home demonstration, and/or the option to return and change a pair which do not suit after a day or two.

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

Bass extension

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

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

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

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

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

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

AR M1

Acoustic Research, Entel Ltd, Vienna Court, Lammas Road, Godalming, Surrey GU7 1JG. Tel: (0483) 425 702



The *M1* is much the smaller of two new and quite similarly priced AR models included in this review group, each of which is part of a completely distinct new range from this venerable East Coast US manufacturer. It may be small, but it's very much the hi-tech designer model of the two, and at £200 is just the first rung on a six model ladder, described collectively as the *Holographic Imaging Series*.

The eight page colour leaflet is crammed with some of the most baffling babble it's ever been my misfortune to try and unravel. Much is specious and/or irrelevant, but the *M1* is certainly different from the norm in cabinet shape and driver distribution, even though trying to describe the box in words is bound to be rather less effective than a quick glance at the picture at the top of the page.

The enclosed volume is on the large side of miniature or small side of bookshelf, whichever you prefer. The sides and the top and bottom are parallel in the usual way, but both front and back slant backwards very distinctively from base to top, the back by 15 degrees and the front in two stages of 14 and ten degrees, the first step setting the tweeter axis at 14 degrees, the second leaving the bass/mid driver at a 24 degree slant.

There are plenty of precedents for putting the tweeter below the main driver (eg Mission) and for slanting the baffle (eg Naim), but the split angle and dramatically offset 'bottom corner' tweeter placement are, methinks, entirely original.

The cosmetics are quite striking too, the tweeter baffle being a full width plastic moulding with louvred patterning which is continued skeletally across the face of the 19mm rear-mounted metal dome tweeter,

acting as protection, phase compensation and a short horn flare. The closed box is MDF, some 17mm thick for the main baffle, some 12mm for the sides, with all edges well sealed with gunk, and heavy damping fill. A very simple hardwired crossover is tag connected to the drivers.

Rather feeble woodscrews were generally tight, securing the main driver via plastic trim which makes the grille cosmetically optional, yet also provides neat and acoustically unobtrusive fixing for the same. The main driver itself has a 115mm plastic cone with rubber surround, pressed steel frame and modest magnet.

Test report

Sensitivity is somewhat below average and the impedance comfortably (though not too seriously) below 8ohms over much of the range, but bass extension is pretty good for a near miniature, which is some recompense.

Used as intended close against the wall, the overall response is remarkably well balanced from 50Hz up to 2kHz, barring the 400Hz suckout caused by close wall coupling. There's a slight notch through the crossover region, but the real peculiarity is the way the treble output rises significantly thereafter, to 1-2dB above the datum established lower down the band.

Sound quality

Presented twice to the same panel on the same day, the *M1* acquitted itself with some honour, whilst also highlighting some of the problems of listening test consistency, as well as the marked effect a change of stand can make.

The *M1* does have a rather distinctive sonic fingerprint, thanks in no small part to

the decidedly tippy balance, which gives an attractive openness but also a touch of over-bright edginess to the proceedings. The bass lacks real dynamics and authority too, but nevertheless manages to generate a quite convincing sense of acoustic scale, and is in fact pretty well timed, if maybe a little over-damped.

But this speaker's real strength is its delightfully open and unboxy midrange, which conveys vocal expressiveness particularly well, with little coloration and an often beguiling naturalness. Stereo imaging too is notably open and coherent, with a transparency rarely encountered in a wall mount model.

Conclusion

This is certainly a more original and creative loudspeaker design than the normal run of the mill, and the conceptual boldness seems to have been well rewarded, not only in the attractively distinctive appearance, but also in the delightfully open sound quality, which surely has much to do with the unconventional driver disposition.

After careful consideration I feel a Best Buy rating is appropriate, albeit with the strict qualification that there is too much treble output, and its effect may be more or less tolerable depending on the system and sensibilities of the individual.

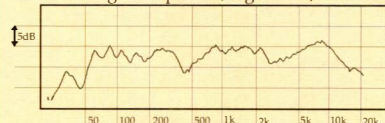
TEST RESULTS

Size (h x w x d)	27x20x26(max)cm
Weight	3.7kg
Recommended amplifier power	20-80W
Recommended placement	close to wall
In room averaged response limits (50Hz-10kHz)	±4dB
Large room/space LF roll-off (-6dB ref midband)	50Hz
Large room/wall LF roll-off (-6dB ref midband)	30Hz
Large room output at 20Hz (ref midband)	-14dB
Estimated midrange sensitivity (ref 2.83V, 1m)	85dB
Impedance characteristic (ease of drive)	a little demanding
Typical price per pair (inc VAT)	£200

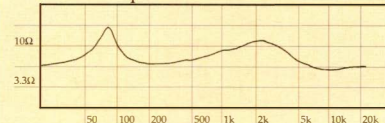
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



Modulus of impedance



AR Pi 3

Acoustic Research, Entel Ltd, Vienna Court, Lammas Road, Godalming, Surrey GU7 1JG. Tel: (0483) 425 702



Marking a complete contrast with the *M Series* whose smallest model is also included in this test, the £220 *Pi3* is the third model up the *Pi Series*, is three times the size of the little *M1*, yet only costs £20 more. Whereas the *M*s are determinedly hi-tech US designed and built, the *Pi*s are UK designs that succeed the popular *Red Box* models, with the emphasis on producing audiophile qualities with exceptional value for money.

Pi3 is, to be frank, a bit of a mug's eye-ful, utilising two apparently identical main drivers either side of the solitary tweeter in a tall, slim, large bookshelf size enclosure. In fact this is neither a two way nor a three way, but what is colloquially known as a two and a half way; both main drivers operate together at low frequencies, but the lower one starts rolling off quite early (though slowly), leaving the upper one to handle most of the upper midrange duties prior to the tweeter taking over.

It's an arrangement that sounds promising in theory, effectively doubling the bass radiating area without compromising the midrange performance of the main driver. But it's easy to overlook the way twinned drivers couple acoustically, and the task of getting such systems to work without ending up with a rather peculiar in-room bass alignment has proved beyond the skills of many experienced designers.

Given that you're getting a big box and three drivers for £220, it's pretty inevitable that the engineering is economy oriented, though at least some of the decisions have been made with sound quality in mind. Since it's one of the uglier looking speakers to don black vinyl and strut its stuff, the fact that the grille frame is properly chamfered at least means you can leave them covered up.

The box (sealed, of course) is particleboard, 12mm for the wrap and 17mm for the front baffle, though rebated drivers leave only about 12mm to bear the brunt of the woodscrews, which were pretty tight, but I wouldn't have dared try and tighten them further.

An oblique panel divides the enclosure into two separate sections to avoid interaction between the main drivers and, as by products, stiffens the carcass and spreads the internal column modes. Both are well stuffed with wadding.

The main units have 120mm doped paper cones with foam surrounds, pressed steel frames and tiny little magnets, while the tweeter is a 19mm soft fabric dome. A quite elaborate PCB network carries out the signal subdivision.

Test report

The room measurements show quite clearly that AR has been no more successful than anyone else in solving the riddle of the two and a half way. Wherever it's placed, there's too much output over the vital lower mid octave 125-250Hz. Wall reinforcement at least helps spread the extra weight over a broader frequency span, which is arguably preferable to leaving it exposed. In contrast, the response above 500Hz is really quite impressively well balanced, albeit with some unevenness, stepping down slightly but integrating well through the crossover region.

Although the sensitivity is a useful (albeit approximately averaged) 88dB, the amplifier load is rather demanding, and the bass extension rather disappointing, with little of any consequence below 50Hz, largely because the working box volume for each driver is not much larger than a standard miniature.

Sound quality

Despite correctly identifying the bass balance problems, several members of the listening panel found genuine charm that provided ample compensation, giving a pretty creditable overall rating, albeit one that's not too easy to sum up.

The sound is a bit heavy and leaden overall it must be said, but there's also pleasant midrange and treble delicacy, thanks to the open and well integrated presence region.

By wall mount standards it's quite open and transparent, if also slightly time-smeared with some generalised coloration, including mild cuppy and nasal effects. Though sweet, the treble does sound just a bit detached and obvious, and the sound doesn't hold together particularly well when driven hard.

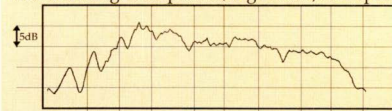
Conclusion

This is quite a good loudspeaker in many ways, and certainly offers pretty good material value for money. But it is also a rather uneven performer, the extra main driver adding mainly to the midbass output, helping the overall loudness capability but not contributing much to the ultimate extension. Good sensitivity is only obtained by means of quite heavy amplifier current demands.

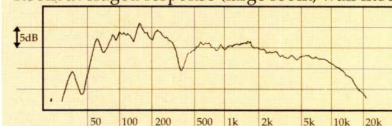
TEST RESULTS

Size (hwxwd)	51.5x21x23cm
Weight	6.5kg
Recommended amplifier power	15-120W
Recommended placement	close to wall
In room averaged response limits (50Hz-10kHz)	±7dB
Large room/space LF roll-off (-6dB ref midband)	50Hz
Large room/wall LF roll-off (-6dB ref midband)	50Hz
Large room output at 20Hz (ref midband)	below -15dB
Estimated midrange sensitivity (ref 2.83V, 1m)	88dB
Impedance characteristic (ease of drive)	current hungry
Typical price per pair (inc VAT)	£220

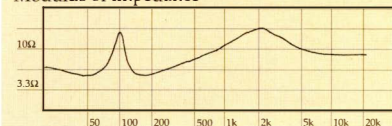
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



Modulus of impedance



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Audio Note AN-J/B

Audio Note UK Ltd, Unit 1, Block C, Hove Business Centre, Fonthill Road, Brighton, East Sussex BN3 6HA. Tel: (0273) 220 511



This is one of the smaller brothers of the gawkily adolescent *AN-E* that was a big success in our last loudspeaker group test (issue 106). It's based on the original Snell *Type J* designed by the late Peter Snell more than a decade ago.

The *AN-E* is made in the UK, but carries the brand name of Japanese audiophile specialist Audio Note, better known for its extravagantly priced silver-wired valve amplifiers. Such are the facts; the politics could take up the rest of the review, but the loudspeaker is what really matters.

The £799 *J/B* is very much a smaller version of the *E*, with similarly old fashioned (but undeniably effective) wide and shallow proportions, scaled down about 40 per cent in size, weight and price. This *J/B* is in fact the cooking version, a silver-wired alternative being available at extra cost.

The large bookshelf size box is ported at the rear and intended for placement on low (50cm) and preferably very high mass stands, a pair of which were loaned for the review. Intended to partner low power valve amps, high sensitivity is a key design criterion, to which end the cabinet uses little damping and is carefully structured to aid and augment the driver output, rather in the manner of the soundbox of an acoustic guitar.

The comparatively wide baffle also has an important function in controlling high frequency distribution.

Although the wrap is finished in a very nice real wood veneer, there's no avoiding the matt black back and front, since the grille is also black, with a sensibly shaped frame. The bolts securing the drivers were not particularly tight, but that's probably irrelevant as they're also glued in place, rendering internal inspection impossible and raising questions about the difficulty of replac-

ing a driver should one become accidentally damaged.

As far as I could tell, the box front and back are 19mm thick and probably MDF, the rear port is quite small, and the interior has a light damping fill. The main driver uses a 150mm paper cone with foam surround and cast chassis, while the tweeter is a 25mm soft fabric dome. Twin terminals permit bi-wiring or bi-amping.

Test report

The measurement set is very impressive indeed, and remarkably similar to the parameters obtained with the larger *AN-E*. Placed clear of wall, the *J*'s averaged in-room response holds within fine ± 5 dB limits across the entire audio band, from 20Hz right up to 17kHz.

Good bass extension (only 3dB less than the *AN-E* at 20Hz) is combined with a fine 90dB sensitivity that's only slightly compromised by an impedance characteristic that stays above 5ohms throughout.

There is some compromise in damping the main driver excursion, however, since the port is tuned to a very low 30Hz, whereas the basic driver/box resonance is around 65Hz. And although the overall in-room balance is very good indeed, the minimal damping is probably a contributing factor in the significant unevenness through the midband and lower treble, 300Hz-4kHz.

Sound quality

The *J/B* was a great success in our blind listening tests, well liked by nearly all for its lively, dynamic and very articulate, detailed and expressive presentation, with just mild censure for the measure of coloration and slight loss of transparency that seems to go hand in hand with lightly damped designs.

Although by concentrating it's possible to sit there identifying various colorations of varying severity, it's actually much easier just to relax and enjoy the fine overall balance — itself a source of transparency of a kind — and the lovely open, unfettered dynamics and grip. One might wish for a little more authority and slam, and depth and solidity is also less than the best, but above all the sound is dynamically believable and more time coherent than most too, all of which makes a real contribution to breaking down the barriers between reproduction and reality.

Conclusion

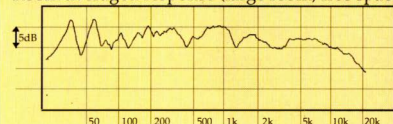
Clearly meriting enthusiastic Recommendation, the *AN-J/B* isn't the prettiest loudspeaker around, but it does do a much more effective job than most at reproducing the dynamics and flow of the musical signal, in spite of some lack of midband smoothness.

The measured performance in terms of bandwidth and sensitivity is quite exceptional, confirming its suitability to low power thermionically driven systems, while the in-room balance is marginally flatter than that obtained with the larger *AN-E*, showing less tendency to midbass fruitiness, even though the subjective impression of scale and midband effortlessness falls just a little short.

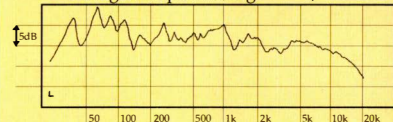
TEST RESULTS

Size (hwxwd)	58.5x33x24.5cm
Weight	14kg
Recommended amplifier power	10-80W
Recommended placement	well clear of walls
In room averaged response limits (50Hz-10kHz)	± 4 dB
Large room/space LF roll-off (-6dB ref midband)	25Hz
Large room/wall LF roll-off (-6dB ref midband)	25Hz
Large room output at 20Hz (ref midband)	-9dB
Estimated midrange sensitivity (ref 2.83V, 1m)	90dB
Impedance characteristic (ease of drive)	slightly demanding
Typical price per pair (inc VAT)	£800

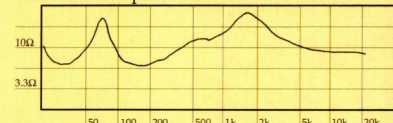
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



Modulus of impedance



Bose 401

Bose UK Ltd, Trinity Trading Estate, Sittingbourne, Kent ME10 2PB.
Tel: (0795) 475 341



Bose has always taken its own entirely individual path, an approach which has been validated by the many years of growth and success that have resulted. The £430 401 examined in this report is very much a case in point; there's a wooden box, a few drive units and a crossover, but that's where its similarity to the majority of speakers included in these tests just about ends.

It's a floorstanding enclosure, but a comparatively compact example of the type, based on what is fundamentally a triangular plan shape. Take a conventional rectangular box with the same width as depth, slice it across the diagonal and open it out; fill in the gaps with panels to provide the prime driver mounting surface (baffle), and set the speakers down so that these wider faces are angled inwards, the axes facing or crossing slightly in front of the listener.

The two narrower panels are therefore normally square with conventional room boundaries, with a secondary main driver pointing outwards directly at the side wall. The manual implies the speaker can be tucked quite close to a wall, though our tests indicate this would be rather unwise.

There are three drive units in all, two small bass/mid units operating in parallel plus one tweeter, all mounted roughly the same height off the ground. There's also a large rear reflex port, which in some senses is really the bass driver of the system. The box sounds very live and resonant when subjected to the knuckle test, and is built from 16mm particleboard, relying entirely on the hexagon shape to provide stiffness, and a dense internal fibre fill for damping.

The appearance is quite smart and interesting, thanks partly to the unorthodox shape but also to the little moulded frame grilles

that hide the drivers, whose removal does no aesthetic favours, but which unfortunately have rather obstructive inside edges acoustically speaking. Reasonable stability is achieved on three little plastic feet.

The drivers are all comparatively low cost items, the two main units having small magnets, 120mm paper cones and pressed steel frames, while the tweeter is a 43mm paper cone device with hard plastic centre section. All were adequately secured using coarse woodscrews. A simple, modest crossover is fed from a tiny terminal block which uses those nasty spring clip terminals beloved of midi system manufacturers. Internal wires are thin, and all connections are made by spiral wire wrapping, and one is left wondering why it costs quite so much money.

Test report

Sensitivity is a usefully high 89dB (as a ballpark average), and bass extension looks pretty effective down to 30Hz, though much of the latter is due to a port which is effectively behaving like a subwoofer beneath the two little lightweight main drivers, whose combined fundamental resonance in the quite large enclosure is a surprisingly high 90Hz. Note also the very low impedance, which will make significant demands upon the amplifier's current delivery capability.

The overall response traces are clearly bass heavy under our listening conditions, though less so when the speaker is pulled well out from the wall. Ironically, the boomy shape is reminiscent of a number of the satellite/subwoofer systems tested recently (issue 104), among which the Bose systems were the flattest and best bass balanced. The mid/treble balance is impressive, apart from some peakiness 1-5kHz.

Sound quality

Despite universal complaints about the fat and heavy bass, the 401 was quite well liked overall in the listening tests, thanks mainly to the good balance and coherence achieved with voices.

Although dynamics are handled well, timing is much less successful, and there's an unwelcome ponderousness alongside the tonal thickening. A rather shouty, hard character and a tendency to thud as well is something of a disincentive to driving the system hard.

The semi-omnidirectional character certainly influences the stereo imagery, mostly for the better in the opinion of the majority, with generous spread and little boxiness. However, the low frequency limitations seem to constrict the overall impression of scale and the ability to create genuine coherence and musical tension.

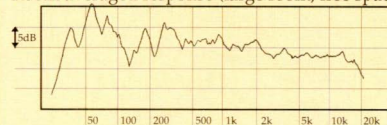
Conclusion

An interesting, creative and subtle design in many ways, the 401 delivers a comfortable and generous sound that's enjoyable up to a point, but which is marred by the rather heavy and sluggish midbass. The end result is certainly much better than the rather prosaic engineering content would lead one to expect, though not sufficiently so to justify the quite substantial price.

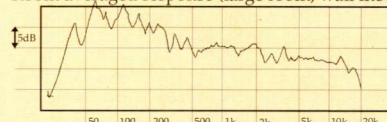
TEST RESULTS

Size (hxdwd)	78.5x30"x28.5"cm
Weight	13.5kg
Recommended amplifier power	15-120W
Recommended placement	well clear of walls
In room averaged response limits (50Hz-10kHz)	±8dB
Large room/space LF roll-off (-6dB ref midband)	28Hz
Large room/wall LF roll-off (-6dB ref midband)	28Hz
Large room output at 20Hz (ref midband)	below -15dB
Estimated midrange sensitivity (ref 2.83V, 1m)	89dB
Impedance characteristic (ease of drive)	heavy current demands
Typical price per pair (inc VAT)	£430

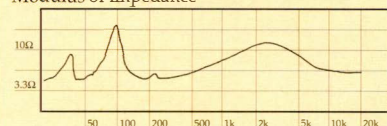
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



Modulus of impedance



Boston Acoustics HD5

Portfolio Marketing, 67 New Road, Little Kingshill, Great Missenden, Bucks HP16 OEU. Tel: (0494) 890 277



After many years of uninterrupted growth, Boston Acoustics has long since moved out of the city from which it took its name, and is now conveniently sited alongside the interstate south. With a home market some five times bigger than the UK, US brands have much less incentive to become as aggressively export oriented as British speaker specialists, and Boston has hitherto grown big and strong without needing to flex its muscles overseas too much.

I've had Boston models in for test before, but the UK distribution has been fairly low key in the past, and the designs unmistakably US-oriented. Now that attitude would seem to be changing. On a recent visit to Massachusetts I was introduced to the Lynwood Project (see *Personal Messages* in issue 108), a most exciting hi-tech speaker design that looks certain to establish the company's international high-end credibility for sometime to come. At the same time, the tiny little £115 HD5 that is the subject of this review is evidently much better tailored to UK than US tastes in both size and price.

Like at least three others included in this report, it's clearly a prime new contender in the vital budget miniature market, which accounts for a substantial proportion of UK hi-fi loudspeaker sales. Even smaller than most, the HD5 is also cutely distinctive, thanks to heavily chamfered wrap edges. Although the plastic frame grille is neatly picture-framed by the cabinet edge, its inside edge looks quite obstructive to the rebated main driver. The speaker sounds better, but somehow looks aesthetically much less complete, with the grille removed.

The box is built up from a combination of a substantial (c17mm) particleboard baffle and back, plus a thinner (c9mm) MDF wrap,

the enclosed sealed airspace being well stuffed with wadding. The 95mm main driver cone is plastic, terminated in a foam surround, mounted in a pressed steel basket and driven from a modest magnet, while the tweeter has a small hard dome with horn flare and phase compensator. Both were held securely by decent woodscrews. The PCB crossover fitted inside the 4mm terminal block is tag connected to the drivers.

Test report

Despite the lowish impedance that hangs around 4ohms for much of the bass and midrange, sensitivity is a couple of decibels below average, though sealed-box loading manages to squeeze very respectable low frequency extension from the minimalist box volume. The system resonance has been kept below 100Hz in spite of the small size of the enclosure.

The response traces show how well the HD5 has been aligned at low frequencies when there's a wall close behind to help fill out the midbass. The broad bass/mid holds within an impressive $\pm 3\text{dB}$ from 50Hz up to 2kHz, above which there's a mild loss of energy through the crossover region. The overall treble level is slightly down, a characteristic that will probably suit partnering budget apparatus very well.

Sound quality

The HD5 generated little real enthusiasm amongst the panellists, which tended to find it pleasantly balanced and relatively uncoloured but dynamically unexciting and a bit slow and lazy with it, observations that accorded well with my subsequent sighted tests. The strength of this speaker is that it doesn't sound nearly as small as it looks, and actually manages to generate a quite

realistic impression of scale. The sound is also notably free of the 'small box' sound that often characterises miniature speakers, and the broad spacious image with a fair measure of transparency can be very inviting.

There's a slight dulling and nasality on voices, and the treble is a shade detached, but the sound overall is pretty well behaved, if a trifle lacklustre and restrained at the same time. Though pleasantly unintrusive, the whole thing is somehow lacking in the authority, dynamics and tension that make up such an important part of the musical experience.

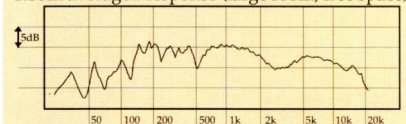
Conclusion

The HD-5 is very nicely styled, very discretely presented and very small to boot, in which context the sound it creates, especially in terms of the generous out-of-the-box stereo image, is altogether rather impressive. It is, however, a bit of a lazy performer too, somehow lacking the dynamic poise and timing coherence of the best in the class, so formal Recommendation seems inappropriate, even though it remains an attractively distinctive and undeniably viable option. The small size and lack of boxy character is especially well suited to generating a surround soundfield in an AV system context.

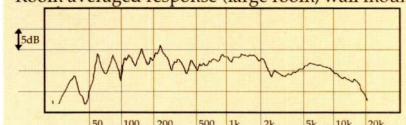
TEST RESULTS

Size (hxwxh)	25x16x18.5cm
Weight	2.5kg
Recommended amplifier power	20-80W
Recommended placement	close to wall
In room averaged response limits	
50Hz-10kHz	$\pm 4\text{dB}$
Large room/space LF roll-off (-6dB ref midband)	55Hz
Large room/wall LF roll-off (-6dB ref midband)	30Hz
Large room output at 20Hz (ref midband)	-15dB
Estimated midrange sensitivity (ref 2.83V, 1m)	86dB
Impedance characteristic (ease of drive)	current hungry
Typical price per pair (inc VAT)	£130

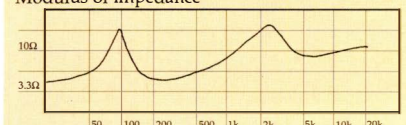
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



Modulus of impedance



Cabasse Bisquine

Cabasse Ltd, Shaw Croft Centre, Dig Street, Ashbourne, Derbyshire DE6 1GF. Tel: (0335) 300 311



Cabasse will be a new name to most UK readers, though familiar enough to those who've visited overseas shows and exhibitions. It's a French loudspeaker specialist that has actually been around for over 30 years. Even more impressive, it has remained a private company owned and run by the Cabasse family for the whole of that time, so it's not a little surprising that this is the first time (to the author's knowledge) that the speakers are being marketed in Britain.

The debut model is the £600 *Bisquine*, a large bookshelf size loudspeaker of considerable substance and a very pretty line in real wood veneer. Presentation has great classicism and class, while a number of engineering details inside and out confirm that there is a distinct Cabasse way of doing things.

From a British perspective the most idiosyncratic must be the input terminals, which consist of a very fat metal screw with a wide groove cut through the centre. Wires of any number or thickness can be placed in the groove and secured by screwing down a metal collar, but because the terminals are recessed, there isn't room to fit the 4mm plug that has become very much the UK standard. Cabasse is considering using a more conventional terminal for Britain, which should at least help keep dealers happy.

A much more important distinguishing feature is a main driver that features an ordinary looking 155mm paper cone, but driven from a magnet of truly gargantuan proportions, mounted on an equally massive cast frame, with a quoted 700W power handling capacity. This is real pro-audio engineering stuff, and clearly provides some justification for an otherwise rather steep pricetag.

The frame of this driver is 15mm thick, and the unit is surface mounted (perhaps affording some time alignment), so the grille has to be set forward by even more, and since it has a solid thick frame with no shaping, this is likely to be bad news for the more conventional cast faceplate tweeter. Said tweeter has a 21mm hard plastic dome with short horn flare. Bolts secure all the drivers, but could have been tighter.

It's a reflex loaded system with a generous port at the front, the enclosure built up from 16mm particleboard, with a light internal damping lining. The PCB crossover uses classy components, such as radiometal-coated chokes, and is tag connected to the drivers.

Test report

That big magnet is one reason for an impressively high 91dB sensitivity rating, all the more so because it's achieved without making enormous demands on the amplifier; although rated at 4ohms, the impedance rarely falls below 6ohms throughout. The port is tuned to a lowish 45Hz, giving decent in-room extension down to 30Hz but a sharp roll-off below that.

The response follows a smooth enough overall trend, but with a distinct upper midrange bias, which a little judicious wall reinforcement may help to disguise. There's sufficient local unevenness to imply a measure of coloration, and a mild crossover notch at a highish 3kHz.

Sound quality

The *Bisquine* generated rather mixed reactions in the listening panel, with the majority favouring the good dynamic coherence and tight clean bass delivery, while others were clearly distracted by the somewhat mid-

forward tonal balance that tends to shift perspectives somewhat.

More extended sighted listening leaves me in no doubt that this speaker has some very real strengths that come through unambiguously once one has taken time to adjust to the cosmetics of the middy balance. It remains a bit shiny and forward, but has gorgeous grip and midband coherence that results in a very dynamic and believable experience, with serious authority and superb stereo in the true Greek meaning of the word (solid), from the midbass right up through to the presence band.

The grille doesn't do the coloration any favours at all, and even after its removal there's enough to prove something of a distraction, but not so much as to spoil the overall enjoyment provided by fine musical involvement.

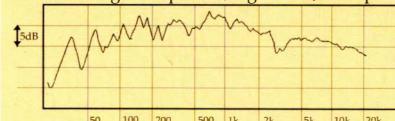
Conclusion

The *Bisquine* may be a shade idiosyncratic, especially in the dramatically over-engineered main driver, but that in turn probably accounts for the impressive coherence and dynamics, as well as justifying the £600 pricetag. Very much a try-before-you-buy option which could be a little too revealing of system shortcomings, it certainly deserves *Choice* Recommendation for fine all round capabilities.

TEST RESULTS

Size (hwxwd)	48x26x30.5cm
Weight	10.5kg
Recommended amplifier power	15-100W
Recommended placement	20-30cm from wall
In room averaged response limits (50Hz-10kHz)	±5dB
Large room/space LF roll-off (-6dB ref midband)	30Hz
Large room/wall LF roll-off (-6dB ref midband)	30Hz
Large room output at 20Hz (ref midband)	-17dB
Estimated midrange sensitivity (ref 2.83V, 1m)	91dB
Impedance characteristic (ease of drive)	a little demanding
Typical price per pair (inc VAT)	£600

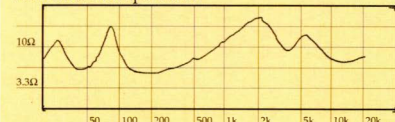
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



Modulus of impedance



Castle York

Castle Acoustics Ltd, Park Mill, Shortbank Road, Skipton, West Yorks
BD23 2TT. Tel: (0756) 795 333



Yorkshire based Castle Acoustics is at least as well known for the quality of its cabinetwork as for the quality of sound that comes out of its loudspeakers, and classy carpentry is clearly one reason why this quite compact loudspeaker costs a not inconsiderable £340.

But there's also rather more to it than simply dressing up a standard two-way bookshelf model in a particularly tasty real wood veneer. The simple task of bringing them in from the van and unpacking them left no doubt that this little loudspeaker is at least half as heavy again as its basic dimensions imply.

Neat driver rebating and the quite delicious red veneer all the way round are two good reasons not to use the thick framed grille, which looked most unpromising on first acquaintance.

A phone call to Castle was soon followed by replacement covers that incorporated special foam inserts around the tweeter diaphragm. This turned out to work rather well at achieving a good treble balance, while Jetsam the cat decided the original grilles made a comfortable cushion.

Considering the inherently good stiffness of the modest panel dimensions, the box itself is substantial indeed, with 19mm MDF front baffle, c17mm sides and a cross-brace to add the icing on the cake.

The inside is lined and lightly filled with foam, a generous hardwired crossover network is fed from bi-wire twin terminal pairs and internal cables are soldered direct to the drivers. The bolts and screws securing the drivers certainly could have been a bit tighter. The main unit is equipped with a pressed frame, a decent magnet and a 110mm plastic cone, and two little ports vent through the front.

Test report

Given the nice and easy impedance and small dimensions, it's not very surprising to find sensitivity a bit below average, and the bass rolling off below 50Hz, which is the maximum port output and some half an octave below the natural box/driver resonance.

The curves in the right hand column show that it would be better to avoid close-to-wall siting, but that the overall response holds within impressively tight limits right across the band. Barring a mild 50Hz peak the bass is particularly even, though the broad midband does show a fairly lumpy character, and the crossover region is mildly depressed.

Sound quality

The results of the listening test were perhaps a shade disappointing, inasmuch as the *York* struggles a bit to justify its premium price.

The listening panel was full of praise for the pace and agility, the informative vocal delivery and an overall coherent solidity, but significant reservations prevailed over a general lack of scale and authority.

The midband and treble are strong, clear and communicative, especially in the way voices are handled. Here the speaker is expressive and detailed, if not without a touch of cuppy and quacky coloration, but this good lead tends to leave the bass behind, not so much in timing terms as in a general lack of drama and dynamics. The end result is quite exciting in its way, with good focus and solidity, but could certainly be warmer, richer and more powerful to advantage.

As it is, one is left enjoying the transparency and delicacy of the mid and treble, but

it's all taking place from a midly detached perspective, lacking the sort of foundation that aids the suspension of disbelief and promotes involvement in the music.

It's worth noting that the foam blanket grille does actually work rather effectively, despite the thickness of the wooden frame. Though it seems a bit of a pity to leave the pretty veneered baffle covered up, the treble is a bit edgy and shiny, almost spitty, without the covers in place. Replacing them helps to smooth things out sufficiently to make the treble less obvious and bring it better into perspective.

Conclusion

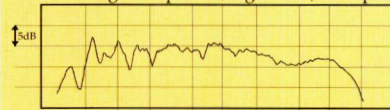
This is a very pleasant and pretty little loudspeaker, with fundamentally good communication skills and an attractive coherence and solidity. But unfortunately the accent remains firmly on the word little, as the sound lacks the sort of freedom, drama and drive at lower frequencies that is necessary to promote the desired suspension of disbelief.

As such, and bearing in mind the not insubstantial pricetag, the *York* falls just a shade short of the standard required for formal Recommendation, especially in the light of the somewhat tighter criteria now attached to that status, but nevertheless remains well worth a listen.

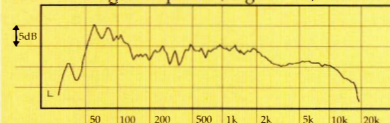
TEST RESULTS

Size (hxwx d)	43x22x26cm
Weight	8.5kg
Recommended amplifier power	20-70W
Recommended placement	clear of walls
In room averaged response limits (50Hz-10kHz)	±4dB
Large room/space LF roll-off (-6dB ref midband)	30Hz
Large room/wall LF roll-off (-6dB ref midband)	30Hz
Large room output at 20Hz (ref midband)	below -15dB
Estimated midrange sensitivity (ref 2.83V, 1m)	86dB
Impedance characteristic (ease of drive)	very good
Typical price per pair (inc VAT)	£340

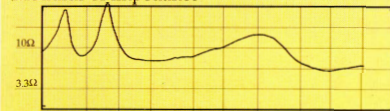
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



Modulus of impedance



Genexxa SE-100

Intertan Uk Ltd, Tandy Centre, Leamore Lane, Walsall
WS2 7PS. Tel: (0922) 710 000



You won't find a Genexxa down at your local hi-fi shop because its a brand created by Tandy, for distribution through its own extensive chain of stores. That fact alone may not confer much in the way of hi-fi credibility, but the £150 *SE-100* is actually sourced from a small specialist UK manufacturer whose products have been reviewed (and sometimes Recommended) in previous *Choice* tests.

Regular readers may recall the Alexander brand, several of whose unusually slim metal-jacket miniatures appeared in these pages a couple of years ago. Obsessive students of loudspeaker design will also observe some common threads between those Alexanders and the Genexxa, threads which grow steadily more visible the closer the scrutiny, even though this newcomer is much more conventionally attired, in an enclosure which at least started out growing on some distant hillside.

It is in fact a rather pretty little speaker, slightly smaller than the stereotypical miniature thanks to a very slim front panel, which in turn makes it significantly less obtrusive than most. An unavoidable consequence, however, is that the main driver must also be small, in this instance using a light paper cone only 80mm in diameter. Continuing the cause-and-effect trail, such a driver is going to struggle a bit to create enough bass, even with the assistance of the small reflex port in this instance — but conversely it is likely to do a better job than most at the top of its working range.

Although the *SE-100* looks a bit more expensive than most of its immediate size competition, this is at least partly justified by the high quality engineering involved. The main driver may be small, but it has a hefty magnet, a proper cast metal frame (rare at

twice the price) and is tightly bolted into threaded inserts in the substantial 17mm MDF front panel. Presentation is very neat, with postformed baffle edges and a rebated tweeter, while the grille is tolerable though maybe better avoided.

A peek inside shows that this is a true enthusiast design, somewhat controversially eschewing any form of internal damping material. The crossover is a minimalist hardwired affair with carefully and well distributed components, if rather feeble looking wires and tagged driver connections.

Test report

Even the extra low frequency output of a reflex port can't do too much to rescue the low sensitivity and limited extension of something with such a small main driver and enclosure, and by the same token power handling and loudness capability are bound to be restricted. At least the very mild impedance characteristic should avoid embarrassing even the least capable amplifier.

The most obvious balance characteristic is the rather prominent upper-mid/presence, across a quite broad band from 700Hz up to 3kHz, above which the treble falls off in a fairly well controlled manner. Keep the *SE 100* away from walls and there's not much bass below 150Hz; wall-loading provides sufficient reinforcement to place the two and a bit octaves 50-250Hz on a par with the upper-mid, but also introduces a c5dB cancellation suckout over the next octave (250-500Hz). Either way there's some compromise, but close-to-the-wall looks the better bet. Within the very respectable overall limits, the response does show significant unevenness, which is a classic symptom of the internal reflection/cancellation consequences of the undamped interior.

Sound quality

The *SE-100* failed to elicit any real enthusiasm from a panel which was starting to get a little impatient with the fundamental limitations of miniature speakers by the time it started to strut its stuff. And since this is one of the lighter of the lightweights, the subsequent ennui was perhaps quite understandable.

Indeed, in several respects this Genexxa seems to make a virtue out of miniaturisation, happily sacrificing any serious attempt to provide weight and welly in the interests of creating a delightfully open and articulate sound with very nice presence intimacy on simple voices, albeit with some tendency to clog and harden with more complex material.

Music has good timing and coherence with fair pace, but dynamics, drive and scale are all a bit lacking.

Conclusion

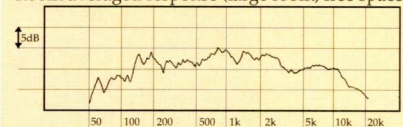
Even though the ingredients provide some justification, the *SE-100* is a shade on the expensive side for formal Recommendation at its anticipated £150.

Paradoxically perhaps for a Tandy product, it's very much an enthusiast device, and is commendably and uncommonly communicative in undemanding applications where serious grunt is not required.

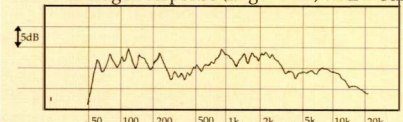
TEST RESULTS

Size (hwxwd)	28x15.5x19cm
Weight	2.5kg
Recommended amplifier power	20-50W
Recommended placement	close to wall
In room averaged response limits (50Hz-10kHz)	±4dB
Large room/space LF roll-off (-6dB ref midband)	60Hz
Large room/wall LF roll-off (-6dB ref midband)	50Hz
Large room output at 20Hz (ref midband)	well below -15dB
Estimated midrange sensitivity (ref 2.83V, 1m)	84dB
Impedance characteristic (ease of drive)	very good
Typical price per pair (inc VAT)	£150

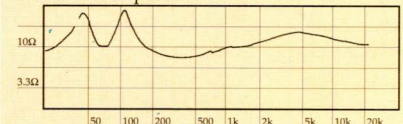
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



Modulus of impedance





Heybrook Prima

Heybrook Hi-Fi Ltd, Estover Close, Estover Industrial Estate, Plymouth PL6 7PL. Tel: (0752) 780 311



The smallest and least expensive Heybrook loudspeaker to date, this little £120 *Prima* takes this west country manufacturer for the first time into direct competition with the larger and longer established brands whose bookshelf miniatures normally dominate the loudspeaker sales charts.

The low price leaves little room to stray from the basic ultra-compact two-way recipe, though both shape and styling maintain Heybrook's attractive, sober suited tradition, the box being a little wider than it is deep, and fitted with two small tube reflex ports at the rear.

Heybrook sees its tiniest as having particular relevance to the emerging A/V market, which is jargon for hooking your Nicam stereo TV (or VCR) up to the hi-fi. Since speaker magnets placed close to a TV set can cause all sorts of mayhem with the colour purity, 'A/V ready' speakers like this *Prima* are rapidly appearing from a number of brands.

In this instance the main driver is 'potted' inside a metal shielding can, though an alternative approach uses an additional cancelling magnet to achieve a similar result. However, while magnetic shielding is a nice bonus, it's far from essential, since any proper installation will place the telly halfway between the speakers and the speakers six feet or so apart, making magnetic screening quite unnecessary.

I use all sorts of speakers round and about a large TV, and only run into problems when moving one past the other or vice versa, which is something loudspeaker reviewers have to do a lot more often than normal users.

Construction and ingredients follow Heybrook's usual high and committed stand-

ards. The vinyl woodgrain wrapped box is built from 15mm particleboard, with light internal damping. All internals including the carefully laid out, simple crossover are hardwired with solid-core cabling, and the drivers are pretty tightly fixed using double-helix woodscrews, which act rather like lock nuts in preventing loosening over time. The main unit has a 95mm heavily doped paper cone and pressed steel frame, while the tweeter purportedly uses a 14mm hard dome behind a complex combination of horn flare and phase compensator. An innocuous enough grille chamfered, thin frame is a cosmetic and sonic option, though probably better avoided.

Test report

Sensitivity is just a shade below average and bass extension limited, though the parameters are actually quite impressive, given the box and main driver size in the context of an impedance which is very easily driven by even the more inept budget amplifier.

Peaking up a little around 1-2kHz, the response traces nevertheless look promisingly smooth and very well integrated through the upper mid and treble. The *Prima* clearly benefits from siting quite close to a wall in order to fill out the midbass, though wherever it ends up, there's no avoiding some loss of energy around 400Hz, and a rather lightweight bass, which in truth starts falling off below 100Hz. This is despite the fact that the port has been tuned to around 60Hz, which is well below the natural drive/box resonance at 95Hz.

Sound quality

Although the the *Prima* is no giant-killer, it nevertheless did respectably enough in two separate presentations, and rather better

overall than its most obvious price competition. Its main strength is the generally good coherence, pace and timing, which helps keep the music flowing along well and creates a measure of the tension often lacking in small speakers.

However, the treble is a little opaque and the rather exposed presence can be a trifle irritating, the combination certainly prejudicing transparency somewhat, while the loss of mid energy is audible as a discontinuity that also inhibits the overall illusion to a degree.

Though nimble and well controlled, the bass is a shade light in weight and punch, restricting the impression of scale and somewhat limiting both dynamics and drive. A worthwhile measure of delicacy results, but rather at the expense of dramatic contrasts.

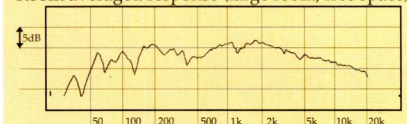
Conclusion

Heybrook's downscaling exercise is clearly a success — not an unqualified one, but it certainly comes out well on the positive side when weighed in the balances. It's not the most lively or transparent of its type, but the innate timing coherence and good overall balance is more than a match for the competition at this most fiercely contested price point, so the *Prima* clearly deserves *Choice* Recommendation.

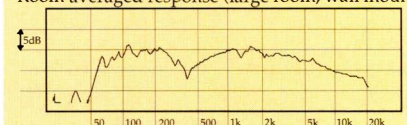
TEST RESULTS

Size (h x w x d)	29x19.5x18cm
Weight	3.2kg
Recommended amplifier power	20-60W
Recommended placement	10cm from wall
In room averaged response limits 50Hz-10kHz	±4dB
Large room/space LF roll-off (-6dB ref midband)	50Hz
Large room/wall LF roll-off (-6dB ref midband)	50Hz
Large room output at 20Hz (ref midband)	below -15dB
Estimated midrange sensitivity (ref 2.83V, 1m)	86dB
Impedance characteristic (ease of drive)	very good
Typical price per pair (inc VAT)	£120

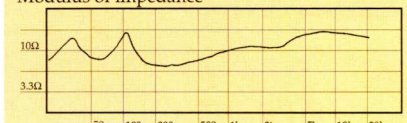
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



Modulus of impedance





Jamo Comet 50

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



Jamo is a Danish loudspeaker brand that has enjoyed considerable success across Europe, but is a relative newcomer to the highly competitive UK scene. The company makes a large number of different models grouped into small distinct ranges that are targeted at specific niches, some appealing to the serious hi-fi user, others to those for whom volume is the prime objective.

The *Cornets* are the budget hi-fi speakers, developed primarily with the UK's budget oriented hi-fi market in mind, with the accent firmly on value for money and never mind the vinyl woodprint. The £150 *50* is the second *Cornet* to come our way, following the appearance of the smaller and cheaper *40* in issue 98. It's a classic bookshelf size two-way with ported enclosure, and as such is clearly good value for money, since many competitors carry a twenty or thirty pound premium.

It's pretty enough in a rather bland and innocuous way, thanks in no small part to the neat postforming all around the front edge, which helps minimise the visual impact.

The same contour is continued in the grille frame, though the inside edge of this a thick and blunt instrument indeed, and certainly better removed from the sensitive vicinity of the drive units.

Cost effective engineering is clearly the watchword, and there's nothing fancy about the ingredients here, though in some senses the sheer simplicity is probably a strength. The main driver has a 120mm doped paper cone, a pressed steel frame and decidedly unimpressive magnet. It's rebated into the front panel and secured (not) via a plastic trim ring with silly coarse-thread machinehead woodscrews, that offer little

tightening torque and bite all too efficiently into and through the inadequate residual unrebated 8mm of the 16mm coarse particleboard baffle.

The wrap is 12mm MDF, and the inside has been left almost entirely undamped, apart from a piece of eggbox foam covering the rear panel. The simple hardwired crossover is tagged to the drivers using low resistance cables. The 26mm soft fabric dome tweeter has a short horn flare and suffered the same fixing inadequacies as the main driver.

Test report

Sensitivity is a solid, average plus 88dB, slightly compromised by a current hungry 4ohm impedance characteristic across the broad midband. The port is sensibly tuned to 50Hz, helping to extend the bass usefully below the natural (85Hz) driver/enclosure resonance, albeit without optimising the excursion damping

Low frequency alignment clearly favours a site well clear of reflecting walls, whereupon the *50* delivers a very well balanced overall in-room response from 30Hz up to around 2kHz.

However, there's quite a bit of local unevenness along the way, and output falls gently but inexorably some 7dB between 900Hz and the mild crossover notch at 3-4kHz, above which the treble recovers somewhat, and consequently looks rather exposed and isolated.

Sound quality

In the listening tests the *50* did significantly better than one has any right to expect from such a budget model, then underlined its challenge still further by repeating the same trick on the following day. As is so often the

case, the result contains a fair measure of truth, without quite telling the whole story.

The good overall bass/mid balance is a major strength, aided significantly by decent pace and timing, which drives the music along in a coherent, enthusiastic and big hearted way. This is accompanied by a fair measure of coloration, which comes across as a general roughness and crudeness that inhibits transparency and masks some of the delicacy and subtlety of timbre and texture.

It's a bit time-smeared, with slight chesty, nasal and spitty colorations. The bass is tonally a bit crude and thumpy, the treble lacks fine detail and sounds shiny, almost chromium played. Applause sounds rather unconvincing, but the speaker goes loud and reasonably deep into the bass without any obvious extra strain, and somehow the whole is rather better than the sum of the parts.

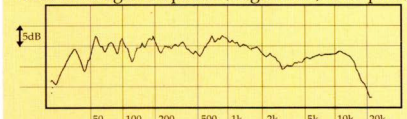
Conclusion

Despite reservations over the build quality, specifically the means of fixing the drivers into the enclosure, the *Cornet 50* offers pretty good material value for £150, and a sound quality that at least manages to convey much of the spirit and flow of the music, even though it does mangle the cosmetics a bit. Recommended.

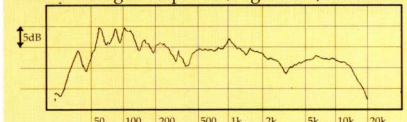
TEST RESULTS

Size (hxwxhd)	42x23x22.5cm
Weight	6kg
Recommended amplifier power	15-80W
Recommended placement	clear of walls
In room averaged response limits (50Hz-10kHz)	±4dB
Large room/space LF roll-off (-6dB ref midband)	30Hz
Large room/wall LF roll-off (-6dB ref midband)	28Hz
Large room output at 20Hz (ref midband)	-13dB
Estimated midrange sensitivity (ref 2.83V, 1m)	87dB
Impedance characteristic (ease of drive)	quite acceptable
Typical price per pair (inc VAT)	£150

Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



Modulus of impedance



Mission 760i

Mission Group, Centralforce Ltd, Stonehill, Huntingdon, Cambs PE18 6ED. Tel: (0480) 52777



It doesn't seem so very long ago that I was enthusiastically welcoming Mission's first serious budget miniature for some time, the redoubtable £100 760. In fact nearly two years has passed, with the 760 sitting at the top of the sales charts for much of that time, so Mission's decision to tweak both the price and performance is probably justified.

Enter the 760i, with a pricetag of £120 and a postscript that presumably implies improvement rather than electronic fuel injection. The extra dosh has at least enabled Mission to fit proper 4mm socket/binding terminals in place of the nasty spring clips of the original, though in other respects ancestor and progeny are superficially hard to tell apart.

There are, however, important underskin changes, notably in the use of a much heftier magnet for the main driver. The cabinet too has been beefed up with a thicker wrap. Those points apart, the mixture is much as before, the healthy sales volumes enjoyed by a major brand like Mission for its leader model amply justifying the substantial investment in plastics mouldings for the baffle and grille.

As a result the grille structure neatly finishes off the front edges of the speaker, while introducing little acoustic impediment — which is just as well, since this model looks decidedly half-finished without the cover on.

The two drivers were tightly secured by coarse woodscrews to the ported plastic front panel. The tweeter has a soft 19mm dome and short horn flare, while the 100mm doped paper cone is indeed now driven from a much larger magnet. 15mm board replaces the 10mm of the original cabinet wrap, providing a significant increase in stiff-

ness, and a well-spaced hardwired crossover (still tagged to the drivers) replaces the earlier PCB affair.

Test report

So, what changes has the new main driver introduced? In a nutshell, it has improved the low frequency alignment quite significantly, but rather at the expense of the crossover transition at the top end of the range.

The (quite demanding) impedance has changed very little, and in fact the sensitivity is down one point thanks to the improved bass control (and 87dB is still just about the best in the class).

Down to the 50Hz effective cutoff the low frequency alignment is also just about the best in the class too, benefitting from the efficiency of reflex porting without sacrificing control in the process. The port is actually tuned to 60Hz, sensible under the circumstances though not ideal for controlling the 95Hz driver/box resonance. The new main driver gives a noticeably smoother and flatter bass and midrange, especially with wall assistance, yet the worry remains the sudden crossover transition at around 2kHz, which involves a downward step of nearly 6dB, instead of the more gradual slope which achieved much the same net result in the original 760.

Sound quality

The 760i received a mixed and rather negative overall reaction in the blind listening tests, much of which follows from the mid/treble balance discontinuity, I suspect. This feature tends to suppress fine detail and create a slightly 'shut in' and box-bound impression, especially when changing over from a more overtly neutral balance.



The sound certainly is a bit thick and chesty, with quite audible upper-mid/presence colorations. But extended hands-on listening sessions also revealed some very real strengths on the positive side of the ledger.

Best of all are the confident lively dynamics, which drive the music along with good pace and timing, and manage to convey much more low frequency subtlety and texture than a box this small has any right to attempt.

Conclusion

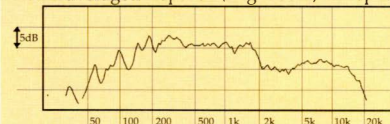
Mission's new 760i is a very difficult speaker to sum up. One can clearly see where the extra £20 over its predecessor has been spent, and for the most part that expenditure would seem to have been well worthwhile.

Certainly the bass and midrange are significantly better than before, delivering a more even balance and displaying an altogether tighter grip on the music. The fact that the 760i really does set a standard for the rest of this group of loudspeakers in this respect is perhaps sufficient grounds to award it formal Recommendation, though the now more obvious 'shut in' effect created at the transition between the drivers must remain grounds for caution and qualification.

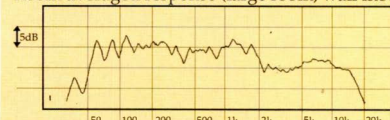
TEST RESULTS

Size (hwxwd)	29.5x18x20cm
Weight	3.5kg
Recommended amplifier power	15-70W
Recommended placement	stands close to wall
In room averaged response limits (50Hz-10kHz)	±4dB
Large room/space LF roll-off (-6dB ref midband)	55Hz
Large room/wall LF roll-off (-6dB ref midband)	48Hz
Large room output at 20Hz (ref midband)	well below -15dB
Estimated midrange sensitivity (ref 2.83V, 1m)	87dB
Impedance characteristic (ease of drive)	a little demanding
Typical price per pair (inc VAT)	£120

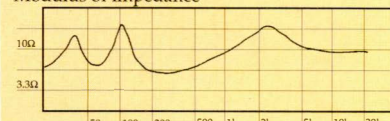
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



Modulus of impedance



Mission 765i

Mission Group, Centralforce Ltd, Stonehill, Huntingdon, Cambs PE18 6ED. Tel: (0480) 52777



Top of Mission's 'standard' value-for-money oriented range of loudspeakers, the 765i is a genuinely big floostanding model that could well be expected to cost significantly more than the £700 asking price on grounds of size and weight alone.

Standing over a metre tall on its own four little spikes, generous front-to-back depth ensures decent stability even with the drivers fitted in the top half of the cabinet, and of course there's no need to spend extra on support furniture.

Such a large and substantial enclosure is traditionally associated with multi-driver, multi-way systems, so it comes as a bit of a surprise to discover that this is a two-way, albeit with twinned main drivers operating in parallel, both loaded by the single large twin-ported enclosure. It's an arrangement that would seem to make a lot of sense, combining crossover simplicity with main drivers that are individually small enough to work well up near the crossover point and fit on a

relatively narrow baffle, yet big enough together to give plenty of welly to match the big box. That said, it's also an arrangement with certain practical difficulties: there's the problem of mating together a line source midrange with a point source treble; and big reflex-ported boxes do place a premium on control.

Despite the acreage of black vinyl woodprint, it still looks quite classy and modern — quite assertive with the grille removed, and much more restrained with it in place. Said grille has a heavy frame, but is sensibly shaped.

The box itself is the sort of beefy, heavy-weight construction that only a manufacturer with very advanced in-house cabinet making facilities would be likely to attempt, at any rate for a mainstream model such as this. The baffle is 25mm MDF, routed back 5mm to flush-mount the drivers; the sides are 20mm thick, and lined with both bituminous damping pads and absorbent foam, all stiffened by no less than three O-shaped braces.

The cast frames of all the drivers were tightly bolted down. The main units use clear 145mm polypropylene cones and fair size magnets, while the tweeter — set a little high off the ground perhaps — has a 25mm fabric dome tweeter with wide elliptical horn flare. Decent gauge wire tag connects the drivers to a rather feeble looking bi-wire crossover.

Test report

The basic performance parameters in terms of sensitivity and bass extension look very positive, though the figures are rather flattered by an impedance characteristic which makes quite heavy current demands upon the driving amplifier.

Good bass extension is ensured by tuning the ports to a lowish 33Hz, though this is not optimum for controlling the main driver resonances. Provided care is taken to keep the speaker well clear of room walls, the in-room response stays within ± 5 dB limits across the much of the audio band, which is very impressive for such a large unit. Less so is the rather early high frequency roll-off, and rather obvious local unevenness through the main midband.

Sound quality

Despite general recognition of the good bass extension with its worthwhile contribution of weight and scale, the 765i failed to generate much enthusiasm among the panellists, with several listeners complaining of ponderous timing and a lack of genuine dynamics and/or transparency.

Alongside the fine extension, the bass is impressively even and pretty well controlled. But it does lack serious authority and grip, and doesn't really succeed in driving

the music along in a convincing and coherent fashion: "seems to be behind the beat — like a good drummer, or a bad loudspeaker", according to one panellist; or as another put it: "percussion isn't".

There's a good impression of headroom and a nice midband openness when driving the system gently, and coloration stays under pretty good control, with just a slightly pinched and mildly nasal congestion on voices. However, start to make more demands and the sound seems to harden up and become more shouty. High sensitivity promises high loudness capability, but in practice the exploration is not a comfortable one.

Conclusion

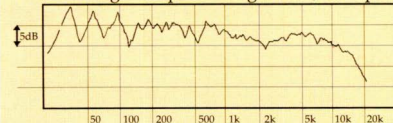
The 765i would seem to have a lot going for it, combining a really big beefy box with a sensibly (fairly) simple driver array to give lots of performance at a very realistic price. Indeed, on a pounds (sterling) per kilogramme basis it actually works out better value for money than the baby 760i featured on the previous page.

Yet despite good value for money and a decent measured performance, the end result is not all that satisfying sonically, due to some lack of agility and indifferent dynamic contrasts.

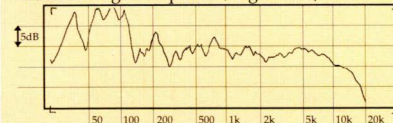
TEST RESULTS

Size (h x w x d)	102x25x33cm
Weight	21.5kg
Recommended amplifier power	15-150W
Recommended placement	well clear of walls
In room averaged response limits (50Hz-10kHz)	± 5 dB
Large room/space LF roll-off (-6dB ref midband)	22Hz
Large room/wall LF roll-off (-6dB ref midband)	22Hz
Large room output at 20Hz (ref midband)	-8dB
Estimated midrange sensitivity (ref 2.83V, 1m)	91dB
Impedance characteristic (ease of drive)	current hungry
Typical price per pair (inc VAT)	£700

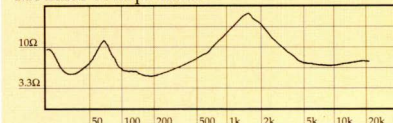
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



Modulus of impedance



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Near Victoria Station

Monitor Audio MA700 Gold

Monitor Audio Ltd, 34 Clifton Road, Cambridge CB1 4ZW.
Tel: (0223) 242 898



Monitor Audio has always been particularly strong in the middle sector of the marketplace, for loudspeakers with luxury standards of finish, yet compact enough to slip easily into the domestic environment.

The *MA700 Gold* is a classic example. The smallest in a range of five *MA Gold* models, most of which have hitherto evaded Choice scrutiny, it's no larger than the stereotypical bookshelf loudspeaker. Nor is it any more complicated either, yet it costs a pretty substantial £400, the justification being superior engineering and finishing standards, for both drive units and enclosure.

For starters, there's a very nice real wood veneer on five of the faces, but it does seem a pity that the back (rather than the effectively invisible base) suffers the indignity of a textured laminate finish, especially as this model works best when sited well clear of walls.

The configuration is a pretty standard two-way driver lineup, the bass/mid driver loaded by a compact rear-ported enclosure. The main unit has a classy cast frame, generous magnet and a 120mm plastic cone, while treble duties are handled by a 25mm gold anodised metal dome tweeter, protected underneath a mesh cover. Both are bolted pretty tightly in place, and the main driver is also effectively wedged in place by the very snug fit between frame and baffle rebate. A slim chamfered grille is available as an option, and will do little serious acoustic harm, though it does seem a bit of a pity to cover up the very pretty baffle veneer and neatly rebated flush-mount drivers.

A simple and quite modest soldered/tagged crossover is hardwired to the drivers, using decent gauge cable to the bass unit, and fed from good quality bi-wire termi-

nals. The box itself is built up from very substantial 19mm MDF throughout, the sides are damped by bituminous pads and the enclosure itself by a thin foam lining all around.

Test report

Lowish sensitivity and limited bass extension restrict the performance envelope, but are at least partly explained by the very mild and undemanding load presented to the amplifier. Measured in-room, the bass cuts off pretty smartly below 50Hz, partly because the port resonance is tuned to a highish 65Hz. This isn't going to improve the bass extension too much, but it does aid control over the natural driver/box resonance at 80Hz, which will enhance power handling.

Clearly too midbass heavy when placed close to a wall, the balance improves markedly when the speaker is moved out into the room, holding within close limits 50Hz-2kHz before stepping down a couple of decibels for the treble. That said, the broad midband does have a rather lumpy and uneven character, which is likely to result in some coloration and inhibit transparency somewhat.

Sound quality

Despite clean and clear vocal delivery that was accorded due praise, the *700 Gold* left most listeners over two separate sessions complaining of sluggishness and indifferent timing. Things improved somewhat when changing from *HBS1* open frame stands to higher (and rather more expensive) Slate Audio types, but this was still insufficient to overcome an innately plodding nature that robbed the music of bounce and life.

The sound is well mannered and not fatiguing, which could prove a worthwhile

antidote to an aggressive source, but the lack of true coherence and the degree of time-smear keeps the illusion a long way short of reality, and ultimately makes for an uninvolved experience with some masking of fine detail.

The net result is pleasant enough in a background easy listening way, with few cosmetic deficiencies to provide unwelcome distraction.

Apart from a somewhat disengaged bass with some thumpy tendencies, the sound is open and unboxy and stereo images are well formed. But the lack of drive, authority and dynamics leads to a lack of musical tension that is less than satisfying in the long term, and attempting to drive the system hard only tends to make this all the more obvious.

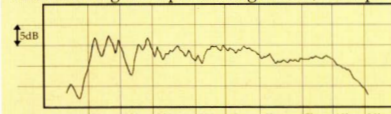
Conclusion

Very pretty presentation in the Monitor Audio tradition goes some way towards justifying the quite high price of this fundamentally conventional two-way bookshelf speaker. The overall balance has been well engineered for free space siting on highish stands, though bass extension is somewhat limited, and this is perhaps one factor in a sound quality that lacks scale and authority despite the well behaved and relaxing mid and treble presentation.

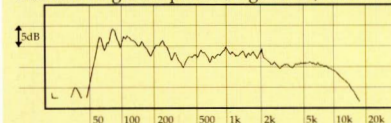
TEST RESULTS

Size (hwxwd)	35x21.5x25cm
Weight	8kg
Recommended amplifier power	20-80W
Recommended placement	well clear of walls
In room averaged response limits (50Hz-10kHz)	±5dB
Large room/space LF roll-off (-6dB ref midband)	50Hz
Large room/wall LF roll-off (-6dB ref midband)	50Hz
Large room output at 20Hz (ref midband)	below -15dB
Estimated midrange sensitivity (ref 2.83V, 1m)	85dB
Impedance characteristic (ease of drive)	very good
Typical price per pair (inc VAT)	£400

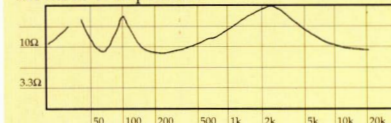
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



Modulus of impedance



Mordaunt-Short MS 5.10

Mordaunt-Short, Unit A1, Hazelton Industrial Park, Hordean, Hants, PO8 9JU. Tel: (0705) 597 722



Having fallen in love with the little 3.10 when I tested it nearly three years ago (issue 78), I've been eagerly looking forward to trying its 5.10 successor ever since it was announced late last year. In fact this new model is something like 20 per cent more expensive and a shade larger than its ancestor, so it's not really a direct replacement at all, and although the 3.10 was temporarily phased out, it is now back in the range, providing an interesting reference point for assessing this newcomer (especially since I hung on to those original samples).

The fact that the 3.10 has been reintroduced is just one symptom of the rather shaky start the 5.10 suffered, which also involved a minor design modification early on in its career, and is probably the reason why this important newcomer didn't come in for our last group test.

Mordaunt-Short is a market leader in sales volumes, and the 3 Series was a pioneer in introducing structural plastics, so it's not surprising to find this approach extended still further here by using various plastics moulding techniques for both the front and back panels, the main driver frame and the cone itself. Indeed, the c12mm particleboard wrap, finished in black or mahogany woodprint vinyl, is the only traditional material in evidence.

Cosmetics are smartly contemporary if unashamedly synthetic, the post-formed plastic baffle remaining always visible and quite complex three piece disc-shaped inserts individually covering the recessed drivers themselves, and physically integrating the acoustic output with the baffle proper. Grille removal is not an option, either aesthetically or from a performance perspective.

Like all the new 5 Series models, the 5.10 is 'A/V ready', inasmuch as the generous main driver magnet operates inside a metal pot that reduces the magnetic field leakage which can interfere with television colour purity (should you be foolish enough to want to place a speaker right next to the TV rather than a foot or two away either side).

Front and back are clamped together against the wrap by four metal tie bars, and light damping partly fills the rear-port loaded enclosure. A simple PCB crossover with Positec overload protection is tag connected to the drivers. Tightly bolted into threaded baffle inserts, the main unit is fitted with a 93mm plastic cone with thin, soft surround and a fixed protruberant phase compensating polepiece extension, while a 20mm metal dome with protective compensator handles high frequencies.

Test report

The basic parameters of the 5.10 are very similar to those of its predecessor, specifically a rather below average sensitivity that is largely explained by the very easy to drive impedance. There's a smidgeon more bass extension, but still nothing much worth mentioning below 50Hz. However, whereas the 3 demanded full wall reinforcement, the 5 will probably sound best if brought a little further out into the room.

Where the 5.10 does show a dramatic improvement is in the overall smoothness of response. There's remarkably little variation at all over the whole band, and the trends that are evident remain gradual rather than abrupt, with little local unevenness — just a slight but broad prominence centred on 800Hz, and a little too much around 60Hz. The crossover region is impressively seamless.

Sound quality

The 5.10 received rather mixed reactions in the listening tests. Despite appreciation of the good, even overall balance, there was persistent criticism directed against a lack of pace in the bass, and some complaint of hardness and treble detachment.

And despite my high prior expectations, sighted listening only led to disappointment, with a sound that does nothing obviously or particularly badly, yet somehow leaves one dissatisfied and uninterested, lacking cohesion and dynamic tension.

Direct comparison to the 3.10 confirmed that the new model sounds much smoother and less coloured, but is also somehow blander and less involving, especially at low frequencies. The 5.10 is not a speaker that intrudes in any unwelcome way, but the apparent lack of true timing coherence is a somehow more insidious failing which robs the sound of vital life and enthusiasm.

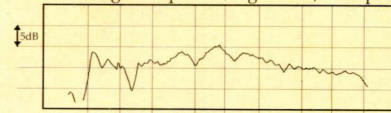
Conclusion

Both the measured performance and much of the fine engineering detail of this miniature are very impressive, so it's all the more puzzling that the sound quality was rather disappointing, to these ears at least. Even so, smart presentation, smooth self-effacement and the promise of long term reliability remain important points in its favour.

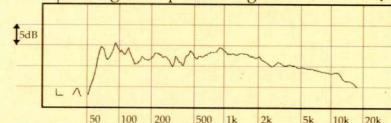
TEST RESULTS

Size (h x w x d)	30.5 x 18.5 x 21.5 cm
Weight	4 kg
Recommended amplifier power	20-60 W
Recommended placement	20-30 cm from wall
In room averaged response limits (50Hz-10kHz)	±4 dB
Large room/space LF roll-off (-6dB ref midband)	50 Hz
Large room/wall LF roll-off (-6dB ref midband)	50 Hz
Large room output at 20Hz (ref midband)	below -15 dB
Estimated midrange sensitivity (ref 2.83V, 1m)	85 dB
Impedance characteristic (ease of drive)	very good
Typical price per pair (inc VAT)	£120

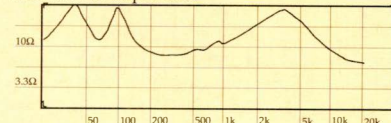
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



Modulus of impedance



Mordaunt-Short MS 5.40

Mordaunt-Short, Unit A1, Hazelton Industrial Park, Horndean, Hants PO8 9JU. Teel: (0705) 597 722



Fourth model up the 5 Series hierarchy, the 5.40 has plenty in common with its kindred, all of which share a common theme in styling and presentation, and make unusually widespread use of advanced plastics moulding techniques for much of the essential structure.

It's quite large for the £300 pricetag, though not quite large enough to take up residence directly onto the floor. Instead a stand is needed that's much lower than those normally available for bookshelf speakers. So despite some misgivings about the apparent lack of rigidity of an adjustable plastic pillar held under tension, M-S's own variable height tripod was pressed into service, set at 22cm.

If the size is a bit oddball, so is the way it's all put together, since this is really two separate bookshelf size speakers combined in the same carcass. The sides are presumably contiguous beneath the vinyl woodgrain wrap ('mahogany' on our samples), but you get two moulded fronts (one with and one without tweeter), and two similarly plastic backs, each with its own port, plus a wooden central divide to keep them apart.

Since both boxes are roughly standard bookshelf size, the prospects for boomy midbass look high, while the additional fact that both main drivers operate together right up to the crossover frequency could prove a further source of difficulty, requiring the integration of a line and a point source. Less obvious at first sight, yet crucial in minimising these potential problems is the fact that two enclosures are slightly different sizes, so their resonances don't quite coincide, and the main drivers are much smaller than the circular insert grilles lead one to expect.

In fact the main drivers use 110mm plastic cones, baskets and protruberant

polepieces, driven from hefty magnets and quite tightly bolted to metal inserts in their plastic baffles. The tweeter is a 25mm metal dome, protected behind the grille cloth by its own mesh. The grille assemblies should be left in place, since they incorporate plastic inserts to smooth the acoustic integration of drivers and baffle.

Test report

For such a sizeable speaker, the basic sensitivity/bandwidth parameters look somewhat disappointing: 85dB is a rating more usually associated with a miniature (like the 5.10) than a near-floorstander, while the bass is less than an octave more extended. One reason is that the main drivers have 16ohm voice coils, ensuring a very easy 8ohm load when driven in parallel. Note also that the LF resonances are relatively well damped, thanks to the slight difference in the two enclosure sizes, and also that the (highish) port resonance is close to the (lowish) driver/box frequency, which is useful from the point of view of controlling the drivers.

The best bass response is found well clear of walls, though even here the midbass is too strong and this region as a whole is a bit lumpy. However, the balance above 150Hz is excellently flat and, barring a slight 650Hz notch and mild 2-4kHz crossover depression, impressively smooth with it.

Sound quality

The 5.40 proved quite a hit with the listening panel, drawing consistent praise for the natural quality of voices in particular, the accuracy and realism of tonal colours, and the relaxed and informative imaging.

It's not the most exciting sound around, and the bottom end could do with a bit more

resolution, pace and drive, but it remains unfailingly comfortable to listen to and very easy on the ears, even when the source may be compromised, and has an unusual cleanliness and clarity, with fundamentally good timing too.

There remains a certain 'cardboard cut-out' quality, implying some lack of substance and solidity, and the treble could be crisper and more detailed, there's delicacy on simpler material, for example, but applause tends to congest and clog a bit. Coloration is very well controlled: the slight chesty time-smear and a touch of nasality somehow doesn't inhibit a degree of intimacy between source and listener

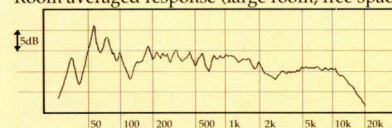
Conclusion

Undoubtedly good looking and relatively inexpensive for a quite large loudspeaker, the M-S 5.40 may be a bit of an oddity in certain aspects of its design and configuration, but there's considerable subtlety in the execution thereof. The end result is a speaker that cleverly avoids many (though not all) of the problems that plague the larger budget speaker, and in consequence sounds very nice indeed. It's not the last word in musical pace and excitement, and doesn't go particularly loud or deep, but it does have an agility and natural clarity that is informative as well as inherently sweet. Recommended.

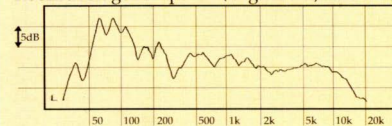
TEST RESULTS

Size (h×w×d)	64x21.5x26.5cm
Weight	13kg
Recommended amplifier power	20-120W
Recommended placement	low stands well clear of walls
In room averaged response limits (50Hz-10kHz)	
	±7dB
Large room/space LF roll-off (-6dB ref midband)	30Hz
Large room/wall LF roll-off (-6dB ref midband)	28Hz
Large room output at 20Hz (ref midband)	below -15dB
Estimated midrange sensitivity (ref 2.83V, 1m)	85dB
Impedance characteristic (ease of drive)	very good
Typical price per pair (inc VAT)	£300

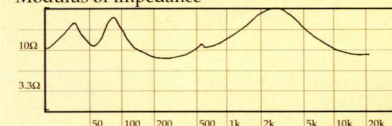
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)

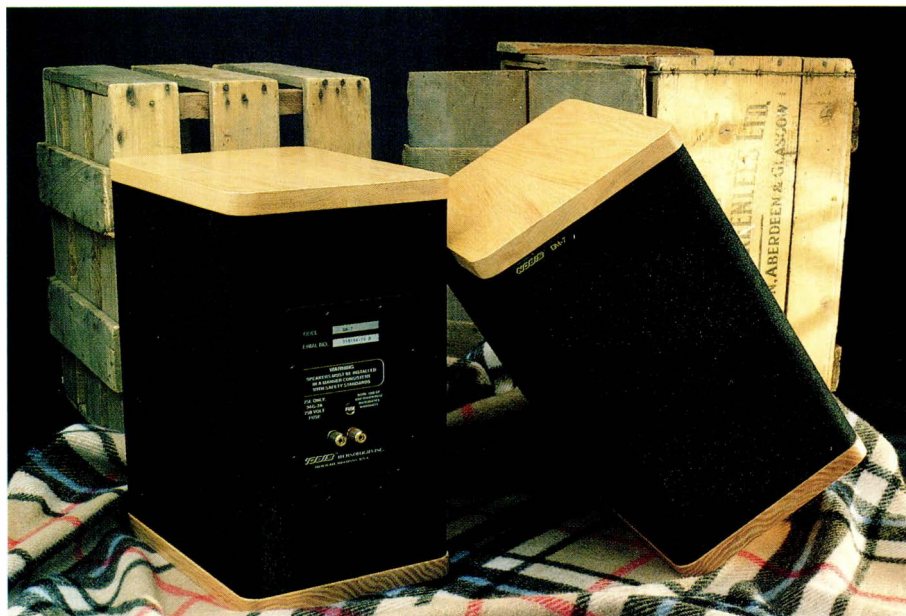


Modulus of impedance



Nobis DM7

Studio Acoustics, 12 Burnley Road, Newton Abbot, Devon PQ12 1YD.
Tel: (0626) 67060



I know nothing of Nobis, save that it is an American loudspeaker brand designed and built in Milwaukee, Wisconsin, and is currently shipping its first consignments to a new UK distributor. Several paragraphs of glorious babble in a colourful leaflet ramble on about Milwaukee combining Old-world craftsmanship with New-world industrial design, which may well be true; I always thought what made Milwaukee famous was what passes (all too rapidly) for beer over in the US of A, not to mention a particularly nauseating and very recent serial killer case.

Whatever, it's a neat, medium bookshelf size speaker that's very much in the US tradition of design and build, with chunky hardwood endcaps above and below a black stockingmask stretched around front, back and sides. It is in fact the least expensive of four Nobis models being imported, though at £560, less might be the more accurate qualification. The company also manufactures a valve amplifier, which will undoubtedly aid its audiophile credibility rating (rather better than the brochure, methinks).

It appears to be a conventional enough two-way sealed box system, and a pretty solidly built one at that, judging by the total weight of 9kg, though I couldn't get past the stocking to make a proper internal examination. Secured by woodscrews, the plastic cone main driver has a pressed steel frame and decent size magnet, with what looks like a magnetic shielding pot. The tweeter has very small magnet, a small plastic diaphragm with phase compensator, and looks like a very low cost item. A very simple crossover uses generous components, and the whole thing is hardwired, save for the fuse fitted alongside the gold plated terminals. The box appears to be 19mm MDF, and is well stuffed with eggbox foam. It

certainly all looks like good quality engineering, but I can't really see how it justifies a £560 pricetag.

Test report

On our far field averaged measurement, sensitivity is comfortably below average, and some 4dB lower than the figure quoted in the specifications. The impedance is on the low side too, though not exceptionally so, and fair compensation is provided by a low frequency extension that is exceptional for the box size, thanks to the sealed box loading and quite low (60Hz) driver/box resonance.

The overall in-room response holds within acceptable ± 5 dB limits across the band when the speaker is clear of walls, though a little midbass reinforcement via wall loading should be acceptable. However, the ups and downs through the upper mid and treble — prominent at 1kHz and again 5-12kHz but rather suckout out at 2.5kHz — is bound to impose a distinct character on the sound.

Sound quality

Despite some inconsistency and dissent, the DM7 acquitted itself rather well in the listening tests, going a fair way towards justifying its elevated price by delivering a sound that most found exciting and involving, with good dynamic tracking and fine pace and timing.

Reservations centred on the rather hyped upper mid, and the shiny and a little too explitssit treble character, that tends to exaggerate detail on first acquaintance but which can prove a little fatiguing in the longer term. Compound that with a measure of pinched nasality on voices and a bass which is somewhat lacking in warmth and richness, and the speaker is clearly far from

neutral or smooth.

But it makes up for that with impressive scale and drive from one so small, and the almost relentless pace can deliver an unusually convincing rendition of complex percussion. Though a little OTT, the treble is both sweet and detailed, and the system is quite solid and coherent. The balance may take a bit of getting used to, but the DM7 does have real charm and a very open quality, which is definitely inclined to get the feet tapping and the brain interested, generating real authority through sheer speed and coherence.

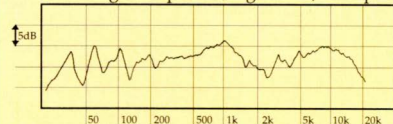
Conclusion

This American speaker is quite difficult to sum up. The room response shows significant and fundamental departures from neutrality that must be regarded as basic inaccuracies, requiring the deduction of several brownie points. Then there's the overall build and engineering content, which is certainly good quality, but must also be considered hard pressed to justify a £560 UK pricetag. But there's no denying there's a lot of fun to be had in simply sitting down and enjoying the music it makes, and the verve and excitement it delivers. On balance it's a shade too expensive for formal commendation, but remains an interesting and valid alternative in a number of respects.

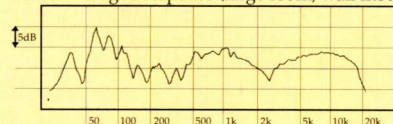
TEST RESULTS

Size (hxwxwd)	38x21.5x28.5cm
Weight	9kg
Recommended amplifier power	20-80W
Recommended placement	30-60cm from wall
In room averaged response limits (50Hz-10kHz)	± 5 dB
Large room/space LF roll-off (-6dB ref midband)	25Hz
Large room/wall LF roll-off (-6dB ref midband)	25Hz
Large room output at 20Hz (ref midband)	-10dB
Estimated midrange sensitivity (ref 2.83V, 1m)	85dB
Impedance characteristic (ease of drive)	quite demanding
Typical price per pair (inc VAT)	£560

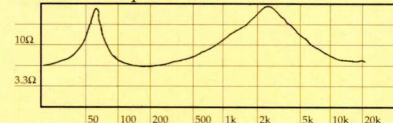
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



Modulus of impedance



Professional Monitor Co LB1

Professional Monitor Company, 27 The Avenue, Highams Park, London E4 9LB. Tel: (081) 531 5308



A new name to both the author and readers, I daresay, the Professional Monitor Company does have some justification for its rather grandiose name, since the engineers involved have recently designed and installed new high level monitors for BBC Radio 1's main studios.

Said engineers do indeed have a BBC background, which must be as good a qualification as any for getting involved in monitor loudspeaker design, though the first model aimed at the domestic hi-fi listener, the £1,000 *LB1*, has little to do with high level rock monitoring. It is rather a small but beautifully finished transmission line design, intended for high stand, free space operation.

Professional credibility is further established by the use of Neutrik *Speakon* terminal connections. These are very much what the studios are using these days, and consist of a single chunky moulded plug that carries four high current connections (permitting bi-wire or bi-amp options), and is twist-locked firmly into place. The appropriate plugs are supplied for dealer or user to make up the leads.

The enclosure design is actually a *Daline* variation on the transmission line theme, the use of a decoupling cavity between driver and line being the basis of a popular constructional feature published about 15 years ago in *Hi-Fi News* (written by a Mr Fris, if my memory serves me well, which it often doesn't).

The proportions are tall, slim, quite deep and not quite cuboid since a slice has been taken off the top rear to act as a reflector in directing driver rear radiation down towards the line. The drivers are right at the top, loaded immediately by the cavity, which in turn feeds into a twice folded line that exits

at the base of the front. Tall Foundation *Designer* stands were supplied for the review, which work well from the point of view of in-room bass balance, but do place the tweeter rather high off the ground and far out into the room, restricting the listening area somewhat.

The box is beautifully finished in real wood veneer on all but the grey laminate back and slice, and is built from 12mm MDF. The sides are considerably stiffened by the internal partitioning, and all panels are heavily damped by bituminous pads, plus eggbox foam acoustic absorbent.

Rebated drivers enhance appearance with the grille removed, though the latter is not too obstructive acoustically.

The main unit is a Dynaudio device with small plastic cone, very large high power voice coil, cast frame, big (shielded) magnet and vented polepiece. The six fixing bolts might have been tighter. Treble duties are handled by a large (29mm) fabric dome tweeter. Heavy cables are tag connected from a classy PCB crossover.

Test report

Despite a determinedly current hungry impedance characteristic, sensitivity is a shade below average, and the bass rolls off quite rapidly below the 50Hz tuning of the box/line.

The exuberance of the 50Hz output and attendant possibilities of boomy bass make it essential to site the *LB1* as far from walls and floor as possible, whereupon the speaker delivers a very even overall in-room balance above 150Hz and good average energy balance down to 30Hz. A slightly laid back character will be defined by the gentle downtilt between 800Hz and 2kHz, and the relatively early ultimate rolloff of the large

tweeter, but the trace is certainly much smoother and better controlled than most.

Sound quality

The *LB1* was very well received overall by the listening panel, with little serious dissent and praise for the fine neutrality, good detail and clarity, convincing dynamic contrasts and decent pace and timing, a combination of virtues that is very unusual.

The scale is a little constrained, and the balance a shade laid back and retiring, but highly convincing stereo images are generated across a wide listening area. The bass is a bit lumpy and could have more extension, but remains quite unfettered and informative even at fairly high levels, which the speaker handled with aplomb right up to amplifier clipping, leaving me a little frustrated at the lowish sensitivity.

Conclusion

This is an intriguing loudspeaker in many ways. The performance envelope is rather restricted, and from that perspective it's not particularly good value for money. But the fine acoustic and network control through the vital midband and treble in particular results in a beguiling transparency, vindicating the maker's claim to provide serious monitoring performance, and qualifying the *LB1* for formal Recommendation.

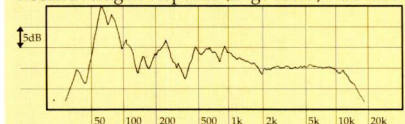
TEST RESULTS

Size (h x w x d)	53.5x18x26cm
Weight	9kg
Recommended amplifier power	20-120W
Recommended placement	high stands well clear of walls
In room averaged response limits (50Hz-10kHz)	±7dB
Large room/space LF roll-off (-6dB ref midband)	33Hz
Large room/wall LF roll-off (-6dB ref midband)	33Hz
Large room output at 20Hz (ref midband)	below -15dB
Estimated midrange sensitivity (ref 2.83V, 1m)	86dB
Impedance characteristic (ease of drive)	current hungry
Typical price per pair (inc VAT)	£1,000

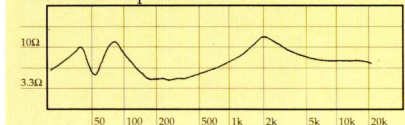
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



Modulus of impedance



Rega ELA

Rega Research Ltd, 119 Park Street, Westcliff on Sea, Essex SS0 7PD. Tel: (0702) 333 071



Best known for its *Planar* turntables and *RB* series tonearms, Southend based Rega Research has spent the past several years gradually designing and putting into production the components for a complete hi-fi system (of the analogue persuasion of course).

A much more radical and recent policy change is to cooperate with the press in supplying equipment for review, giving me at last the opportunity to get to grips with the £405 *ELA*, a speaker which has impressed me when I've heard it more than once these past several years.

There are some close similarities to the Royd *Apex* reviewed and Recommended way back in issue 78, which is down to the fact that Rega did much of the early work on the cabinet while Royd developed the main driver. However, though the outline configuration is the same, the two models have never been identical, and the passage of time with separate ongoing development continues to make them ever more distinct.

It's a very slim and compact floorstander, which actually consists of a transmission

line/column as the loading for a very tiny and rather unusual main driver. The operational differences and similarities of transmission lines, columns and reflexes has long been the subject of debate, TL proponents claiming that the tuned line augments bass and damps the main driver fundamental resonance, while leading away the higher frequency rear radiation from the back of the cone and absorbing it in the line.

In the *ELA*'s case the line consists of a single fold from behind the driver, down to floor level (where the cross-sectional area is maximum), and then up to behind the driver again (separated by an internal partition of course), with the line's port termination at the top rear. The whole thing is built from substantial 19mm particleboard/MDF, the central internal partition providing considerable stiffening for the sides. A fitted metal tripod frame with proper locknut spikes extends slightly beyond the cabinet to provide a firm foundation with good footprint, added to which the baffle slants backwards, to enhance both the appearance and the mechanical stability.

The baffle area around the drivers has irregular grooving for acoustic reasons, and a very neat little wire frame grille hides the drivers without creating acoustic impediment. Eight tight woodscrews fix the cast-frame main driver firmly in place. This unusual driver has a hefty magnet driving a tiny little 19mm voice coil and similarly small undamped 90mm paper cone, the better to maintain output at the top of its working range.

A 19mm soft fabric dome tweeter with short horn handles the highest frequencies, and a decent hardwired crossover is isolated in its own little compartment, with heavy wiring to the drivers. In all, there's a lot of quality engineering and material value for the price.

Test report

Considering the very easy amplifier load (more than 10ohms across most of the range) and small main driver, the c86dB average sensitivity rating and c30Hz in-room bass extension is pretty good going. The port resonance almost coincides with the in-box driver resonance, providing optimum excursion control and power handling.

The response is rather lumpy, especially at the bottom end, and optimum siting will require experimentation. Ignoring the rear wall reflection cancellations (130Hz away from wall, 250Hz close against, whose significance is ambiguous to say the least) the in-room balance is pretty good overall, if rather uneven and prominent in the upper midband, and again in the upper treble.

Sound quality

The *ELA* gave rather inconsistent and equivocal listening test results, reflecting the diffi-

culty some panellists found with the quite pronounced character of this loudspeaker, and the degree to which this distracted from less immediately obvious — but arguably rather more important — positive virtues.

The balance is rather lean, and some nasal and spitty colorations are evident, giving a somewhat untidy presentation and edge-of-seat experience. But beneath this slightly rough exterior the speaker is very communicative, with excellent timing, lively agility, and fine dynamics and coherence, especially through the midband. The bass could have more control and authority, but the net result remains impressively exciting and involving, provided it is fed from a good enough source. Under our conditions optimum results were achieved by siting the speakers some 20-30cm ahead of the rear wall.

Conclusion

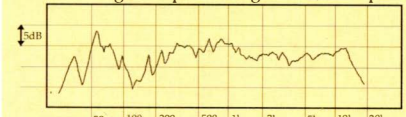
Sonically somewhat idiosyncratic, the *ELA*'s neat, compact package incorporates much interesting engineering in a very discrete floorstanding package. Provided care is taken to achieve a good system match, bearing in mind its revealing and slightly untidy nature, this speaker is capable of delivering very satisfying results for a relatively modest price, so clearly deserves Recommendation.



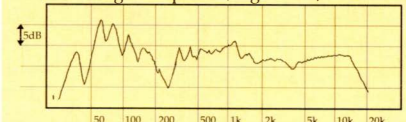
TEST RESULTS

Size (hwxwd)	84.5x20"x30"cm
Weight	13kg
Recommended amplifier power	20-60W
Recommended placement	10-30cm from wall
In room averaged response limits (50Hz-10kHz)	±7dB
Large room/space LF roll-off (-6dB ref midband)	30Hz
Large room/wall LF roll-off (-6dB ref midband)	30Hz
Large room output at 20Hz (ref midband)	below -15dB
Estimated midrange sensitivity (ref 2.83V, 1m)	86dB
Impedance characteristic (ease of drive)	exceptionally easy
Typical price per pair (inc VAT)	£405

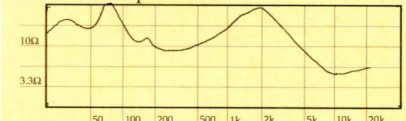
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



Modulus of impedance



Rogers LS4a/2

Swisstone Electronics Ltd, 310 Commonsides East, Mitcham, Surrey. Tel: (081) 640 2172



Much of Rogers' reputation derives from the respect accorded the BBC monitor loudspeaker designs which it has been manufacturing under license for the past couple of decades. These products are expensive and consequently produced in comparatively small numbers, so Rogers also makes its own *LS* series of speakers, based on very much the same sort of philosophy, but much more cost effectively engineered in order to sell at the sort of prices domestic users are more prepared to pay.

The £300 *LS4a/2* is one rung up the Rogers ladder from the little *2a/2* that was accorded Best Buy status in our last loudspeaker review project (issue 106), and it represents quite a large gap in both price and size.

Although there's a close superficial similarity between the two, appearances can be deceptive and in fact the differences are quite significant, the *4a/2* operating in sealed box mode whereas the *2a/2* is ported, for example.

A more useful point of comparison is the original *LS4a*, reviewed back in issue 78 and showing that cosmetic updating and monetary inflation represent the lion's share of the changes between then and now. There are many other detail differences of course, but the basics — a large bookshelf size sealed box, loading a 153mm polypropylene cone main driver, mounted alongside a 19mm metal dome tweeter on a tough MDF baffle — remain much as before.

The new styling is more contemporary though still restrained, although the clear/white plastic cone still looks odd if left exposed. The fact that the grille is a sensible device, thin and flared, is therefore very relevant. One point common to all current

Rogers models is a perfectly horrid smell, very reminiscent of cat's pee, which is apparently due to glue used at the cabinet works, and which does tend to linger on for quite a while, though presumably it will eventually finally disperse.

The box itself has a c16mm MDF baffle and 15mm particleboard wrap, stiffened by an O-ring brace and quite lightly damped with a foam lining. Tight woodscrews hold the drivers firmly in place, the main unit having a pressed frame and meaty magnet, and slightly rebated into the baffle. A bi-wire PCB crossover uses good quality components, hardwired to the drivers.

Test report

Sensitivity is a shade down on its predecessor, largely due to the flatter bass alignment and significantly better extension (an extra 4dB at 20Hz in room), even though the fundamental driver/box resonance remains at c75Hz, and the load is just as easy to drive.

The room curves indicate that this is fundamentally a free space design, but will benefit from just a little wall assistance to warm up the midbass. The response is quite flat and even through the midrange and up to 1.5kHz, but thereafter there's a quite significant crossover notch, amounting to a 6dB loss over the next octave, with a 5dB recovery thereafter. The *4a* showed a broadly similar effect, though the initial fall was more gradual.

Sound quality

The *LS4a/2* did respectably enough in the formal listening tests, with praise from the panel for the relaxed, balanced and even midband and the good out-of-box imaging, but also some complaint at the dulled pres-

ence and a rather thickened and constricted bass.

Cultured, cultivated with a well controlled and classy midband, the sound has some scale and hangs together well when driven hard. But it does somehow lack resolution in the low bass, is a bit thickened slightly higher up the range, and could do with a bit more grip, drive and dynamic agility.

As the response traces tend to predict, the treble is also slightly detached and obvious, while the presence is a touch shut in and nasal.

Conclusion

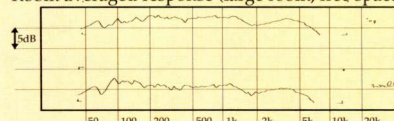
There's a certain feeling of *deja vu* about this model, so similar is it to its predecessor in so many ways. The bass extension is now somewhat improved, and the alignment makes a better room match at low frequencies too. But the presence/crossover suckout is now rather more abrupt and severe than before, indicating that the gains made on the low frequency roundabout may have been lost on the integration swings.

The Rogers *LS4a/2* remains an attractive and viable contender, only really forgoing formal *Choice Recommendation* through the tighter criteria adopted for this edition but doesn't really match the competitiveness of its baby brother in an overall market context.

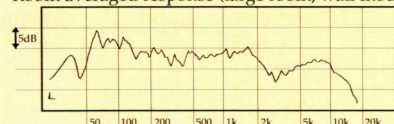
TEST RESULTS

Size (hwxwd)	43x25.5x25.5cm
Weight	7.5kg
Recommended amplifier power	20-80W
Recommended placement	clear of walls
In room averaged response limits (50Hz-10kHz)	±4dB
Large room/space LF roll-off (-6dB ref midband)	25Hz
Large room/wall LF roll-off (-6dB ref midband)	25Hz
Large room output at 20Hz (ref midband)	-9dB
Estimated midrange sensitivity (ref 2.83V, 1m)	86dB
Impedance characteristic (ease of drive)	very good
Typical price per pair (inc VAT)	£300

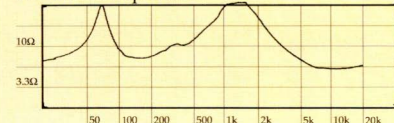
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



Modulus of impedance

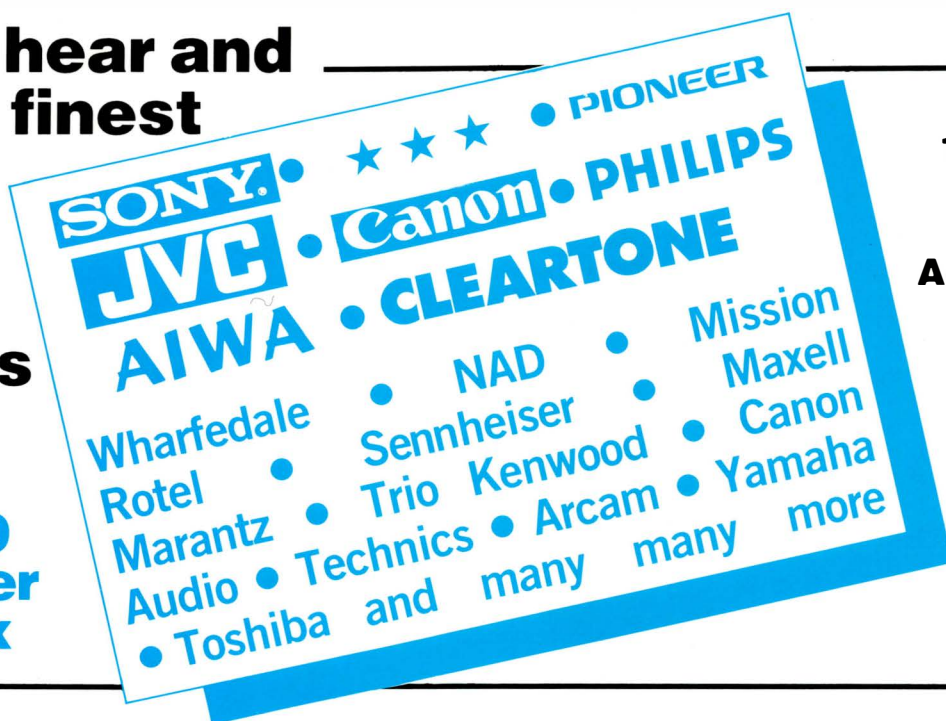


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Shahinian Arc

Pear Audio Ltd, 15 Shawhill Road, Shawlands, Glasgow
G41 3RW. Tel: (041) 636 0090



This is a most unorthodox and idiosyncratic loudspeaker, entirely unlike all the others assembled for this series of tests. The £1,062 Arc is the least expensive brainchild of New Yorker Dick Shahinian, one of the genuine original characters of the hi-fi industry, whose unconventional approach to speaker design is born of a passion for music reproduction combined with a healthy disrespect for the results that other designers achieve by adopting a more traditional approach.

It's most obvious distinction is that the drive units fire more upwards towards the ceiling than forwards towards the listener, the actual angle being a mere 30 degrees from the horizontal. The omnidirectional approach has always been the subject of controversy, especially in the UK, and there's no doubt that results do tend to be rather less predictable and more room-dependent. But omnis do tend to have a freedom from boxiness that many will regard as well worth the price of a little extra coloration and some loss of stereo precision.

Arc is an exceedingly chunky and squat floorstander that needs to be sited as far as possible from reflecting walls, which in turn must compromise its suitability to small rooms somewhat. The lovely veneered box and stylish baffle profile conceals a full three-way driver system, aided and abetted by what appears to be a fourth drive unit on the back, but which is in fact a mass-loaded ABR passive radiator (in effect a classy and flexible variation on the reflex loading theme). The bass driver proper has a 150mm plastic cone, cast chassis, wide soft surround and big magnet, a 35mm soft dome ensures wide midrange distribution, and the tweeter is another soft dome device, 25mm in diameter. All screws were properly tight, but all

drivers are set back in a quite deep rebate. The grille has a thin frame, and is aesthetically obligatory, and the whole thing sits on four little doorstep feet.

Classy gold terminals tucked into the base (making channel identification a bit tricky) feed a hefty fused crossover all hardwired with thick cables to the drivers. The box is built up from 19mm MDF, stiffened by a crossbrace and lightly damped with carefully teased wool.

Test report

The unevenness of the overall response makes an averaged sensitivity figure very much an approximation, a below average 85dB representing the broad midrange, but sounding louder because of the boosts at low and high frequencies. The impedance is fine across most of the range, but then drops to a lunatic 2ohms or thereabouts at 15kHz, which is bound to make life tricky for the driving amplifier.

Arguably best balanced when well clear of walls, the response shows a distinct three-humped character, rather heavy in the midbass, broadly but smoothly prominent across the main midband, sucked out a bit in the presence region, and then rising to a level 2dB above the midrange in the upper treble. Smooth it may be; neutral it's not.

Sound quality

The contrast in balance and presentation from the norm caused all manner of confusion and disorientation in the listening tests, besides negating attempts at proper level matching. "Impossible to sum up"; "Interesting but not right" were just two comments representing the difficulty in balancing very real strengths with no less obvious weaknesses.

Subsequent hands on experiments showed how sensitive the speaker can be to subtle changes in positioning, and that it wasn't being helped much by the exposed cross-beams of the listening room. Although it sounds a bit heavy in the bass, the music is still very well timed with good scale and tension and an impressive smoothness, coherence, clarity and dynamism, once one has adjusted to the rather distant mid balance and recessed presence.

That said, the treble remains determinedly OTT, very sweet but very obvious with it. Stereo too is odd, very out-of-the-box but poorly focused and rather vague, though by no means unpleasant. One key plus is that the Arc proved very revealing and transparent to system set-up, which in turn makes careful choice of partnering equipment like amplifiers and connecting cables essential.

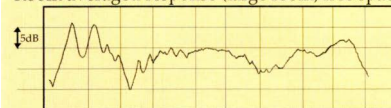
Conclusion

Strangely balanced and distinctly bright, placing a premium on amplifier quality too, the Arc is really rather too oddball for formal Recommendation. It's an intriguing loudspeaker in many ways, with a seductive smoothness and lack of boxiness that is sure to have a powerful appeal to those who find more conventional loudspeakers inherently dissatisfying. Peculiar, yes, but well worth a listen.

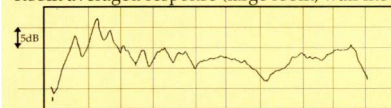
TEST RESULTS

Size (h x w x d)	59-69x35x25cm
Weight	15kg
Recommended amplifier power	20-150W
Recommended placement	well clear of walls
In room averaged response limits (50Hz-10kHz)	±8dB
Large room/space LF roll-off (-6dB ref midband)	24Hz
Large room/wall LF roll-off (-6dB ref midband)	24Hz
Large room output at 20Hz (ref midband)	-10dB
Estimated midrange sensitivity (ref 2.83V, 1m)	85dB
Impedance characteristic (ease of drive)	the pits
Typical price per pair (inc VAT)	£1,062

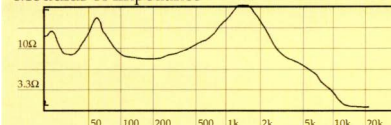
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



Modulus of impedance



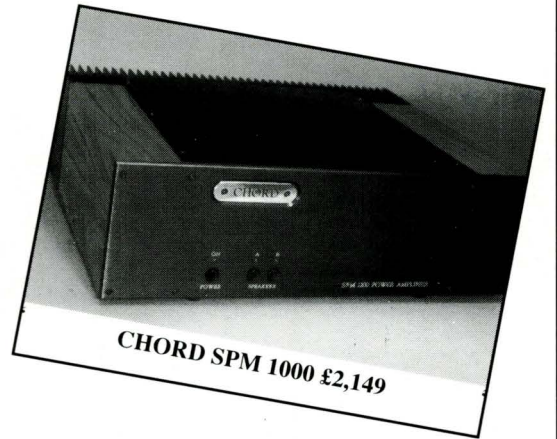
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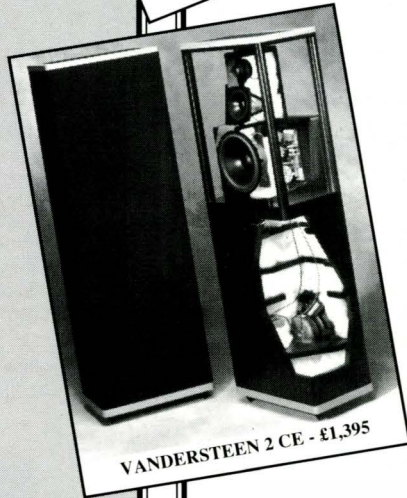
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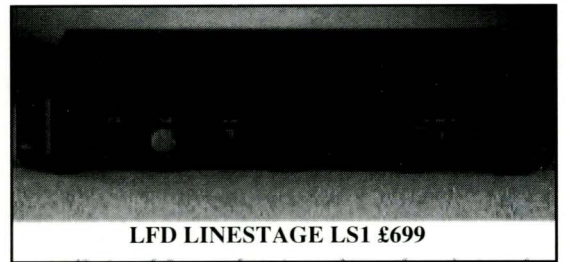
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Tannoy 611

Tannoy Ltd, Rosehall Industrial Estate, Coatbridge, Strathclyde, Scotland ML5 4TF. Tel: (0236) 420 199



This is the fourth of Tannoy's seven strong range of Sixes to come under the *Choice* microscope, and sits on the sixth rung of the hierarchy, one step above the 609 that achieved a Best Buy rating in issue 92. All the models have much in common with each other, and much that distinguishes them from the herd, the most obvious feature being the hexagonal plan cabinet which gives the range its name.

Another key feature of the model is that it uses the latest (domestic hi-fi) version of Tannoy's timeless dual-concentric (DC) driver, whereby a horn-loaded tweeter is mounted on the back of the main driver magnet and fires through the latter's voice coil, using a horn in place of the polepiece. Such an arrangement makes the tweeter rather directional, but greatly facilitates creating a seamless crossover.

It's quite a big step up from the large bookshelf size £250 609 to the small floor-standing £400 611, a step which also involves the addition of an extra bass driver and the replacement of a ported enclosure by a sealed box system. An equally relevant point of reference is the successful *DC2000* that was the 611's immediate predecessor.

One advantage of floorstanding speakers is you don't have to find extra money for a stand, and Tannoy supplies this model with some genuinely chunky spikes, albeit with a limited 175mm footprint, plus the option of filling a section in the moulded plastic base with lead shot and/or sand to aid damping and stability (which was not tried).

The hexagon shape is formed by wrapping chunky 19mm particleboard about the vertical axis, and finishing off with moulded plastic endcaps, the top surface decorated by a mottled laminate. Advantages of the hexagon include improved natural stiffness

from the shape, less frequency-concentrated internal horizontal standing waves, and less distribution discontinuity at the baffle edge. A hefty MDF brace runs up through the centre connecting and stiffening the endcaps and also coupling to the main driver magnets via a chunk of lossy gunk, while the inside is pretty well stuffed with wadding, especially down at the base.

The main drivers have 150mm injection-moulded plastic cones, pressed frames and massive magnets, held by well tight woodscrews. Twin bi-wire terminals incorporate a neat captive link for normal two-wire connection, and the crossover appears to be hardwired with good quality components, tag linked to the drivers.

Test report

Quite closely reflecting the findings for the the *DC2000*, the 611 has exceptionally high sensitivity alongside very respectable bass extension, but slightly spoils things with a truly mean impedance that drops to 3ohms for much of the bass and midrange, and will consequently demand plenty of current from the driving amplifier.

Clearly ill-suited to close-to-wall siting (the good lateral dispersion resulting in more than usually serious midband reflections), the smoothness of the overall response trend in free space looks very encouraging, if a bit mid-dominant. Output starts to drop slowly but surely towards high frequencies, significantly perhaps starting to do so from a comparatively low 700Hz. There's also some unevenness in the region 700Hz-3kHz.

Sound quality

Somewhat paradoxically in view of the good results obtained with both the 609 and *DC2000*, the 611 failed to distinguish itself

in the listening tests, and positively irritated one of our panellists. There is much that is good in terms of the even overall balance and decent bass extension, but the sound remains somehow dull and shut in, lacking in detail and delicacy.

There's plenty of weight and drive with rock material, but rhythms somehow get muddled and lack precision and timing. Despite trying hard, and showing good overall consistency when driven hard, the whole thing seems to lack overall coherence and solidity as well as dynamic grip, leading to what is ultimately a rather synthetic and contrived experience.

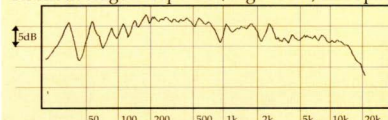
Conclusion

By all the historical precedents of previous and adjacent models in the range, the 611 ought to have been another winner for Tannoy. The measurement set is impressive despite the demanding load placed on the amplifier, and there's plenty of solid engineering to justify the pricetag. Perhaps it sits just a little too close to the floor for its own good, or perhaps it's a judgement on my own lack of consistency (it's certainly food for thought), but the final verdict must depend on the listening experience, and here the 611 proved rather disappointing, inasmuch as it failed to distinguish itself in the manner of its stablemates.

TEST RESULTS

Size (hwxwd)	72x32"x24cm
Weight	13kg
Recommended amplifier power	15-120W
Recommended placement	clear of walls
In room averaged response limits (50Hz-10kHz)	±4dB
Large room/space LF roll-off (-6dB ref midband)	25Hz
Large room/wall LF roll-off (-6dB ref midband)	25Hz
Large room output at 20Hz (ref midband)	-10dB
Estimated midrange sensitivity (ref 2.83V, 1m)	92dB
Impedance characteristic (ease of drive)	very demanding
Typical price per pair (inc VAT)	£400

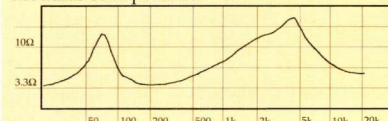
Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



Modulus of impedance



Wharfedale 517

Wharfedale Loudspeakers Ltd, Sandreas Way, Crossgates, Leeds LS15 8AL. Tel: (0532) 601 222



As noted in the *515* review included in our last loudspeakers project (issue 106), following the considerable commercial success of the *505.2*, Wharfedale has become something of a specialist in large bookshelf size speakers, and now has three models between £200 and £260. The £400 *517* that is the subject of this report represents very much an upscaling, roughly 50 per cent bigger, heavier and more expensive than that group of models.

You would have to be pretty confident of your DIY prowess to entrust your bookshelves to support these hefty 14kg boxes. Much more sensible is to use a proper stand (the Heybrook *HBS1* makes a pretty good fit), and place them at least a foot and maybe two out into the room.

It's a large and substantially constructed sealed box (albeit with some network modification of the normal characteristic), finished in real wood veneer on all faces bar the back (which seems so silly — why not texture the base and veneer the back?). Post-formed vertical edges provide some decorative relief for the baffle, while horizontal plastic insert strips along the top and bottom edges create discrete location slots for the slim moulded grille.

The front baffle is hefty 25mm MDF, the sides are 20mm thick, and an O-ring brace provides further stiffening between the two drivers. The inside of the enclosure has been enthusiastically stuffed — maybe too enthusiastically stuffed — with absorbent wadding.

Showing considerable building block similarity to the *515*, the main driver looks very impressive, with the big magnet and cast frame secured by six well tight (though coarse pitch) woodscrews, all driving a 145mm textured plastic cone with wide soft

surround. The tweeter is a version of Wharfedale's radical new ceramic dome technology, dimpled and 24mm in diameter. Thin wire is hardwired to the drivers and a quite complex crossover network, fed from bi-wire terminals.

Test report

The similarities to the *515* are unmistakable, with the advantage going to this larger model, especially in low frequency alignment. That said, sensitivity is unusually low for a speaker as big as this, even though ultimate bass extension is respectable enough and the amplifier load very mild.

The larger enclosure has smoothed out the in-room bass alignment significantly, both reducing the degree of upper bass suckout as well as the c50Hz peak. The end result is a little too lean when well clear of walls, with a distinct upper mid forwardness, which placement 20-30cm away from the wall should help to balance out. The broad upper mid plateau followed by a 5dB suckout through the crossover remain obvious characteristics to set against a trace which is otherwise impressively smooth and even throughout.

Sound quality

The *517* did pretty well in the blind listening tests, so much so that the rather disappointing findings during subsequent hands-on auditioning came as something of a surprise. One possible explanation is that its blind test performance was flattered by following something quite a lot smaller in order of presentation, and so benefitting significantly from the much improved impression of scale.

Certainly it does combine good scale with an attractively open and unboxy pres-

entation, but the sound is also a little shiny and chromium plated in the treble, and somehow lacking in overall dynamic/transient impact and coherence. The bottom end is tightly controlled, providing good warmth without promoting chestiness, but also restricting the freedom of dynamic flow, and reducing the grip and tension.

Colorations are pretty well controlled, though some nasality and timesmear are audible, especially on voices. Stereo images are well formed and quite precise, but the speaker really needs a bit more grip and tension to make it musically involving and interesting.

Conclusion

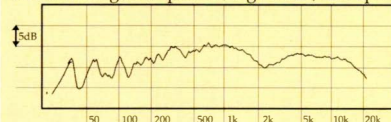
By all that's logical, the *517* ought to represent a worthwhile improvement over the very similar but cheaper *515*, the much larger (and no less well engineered) enclosure giving the main driver worthwhile extra breathing space to deliver significantly smoother bass alignment.

That these improvements do not seem to be reflected in a similar enhancement in sound quality remains somewhat puzzling. My own (lack of) consistency is one possible explanation; alternatively, the greater smoothness of this larger model might tend to make the lack of convincing time coherence that much more noticeable.

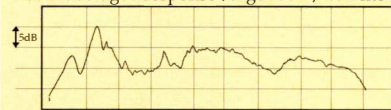
TEST RESULTS

Size (hwxwd)	53x26.5x34cm
Weight	14kg
Recommended amplifier power	20-100W
Recommended placement	20-40cm from wall
In room averaged response limits (50Hz-10kHz)	±5dB
Large room/space LF roll-off (-6dB ref midband)	25Hz
Large room/wall LF roll-off (-6dB ref midband)	28Hz
Large room output at 20Hz (ref midband)	-12dB
Estimated midrange sensitivity (ref 2.83V, 1m)	86dB
Impedance characteristic (ease of drive)	very good
Typical price per pair (inc VAT)	£400

Room averaged response (large room, free space)



Room averaged response (large room, wall mount)



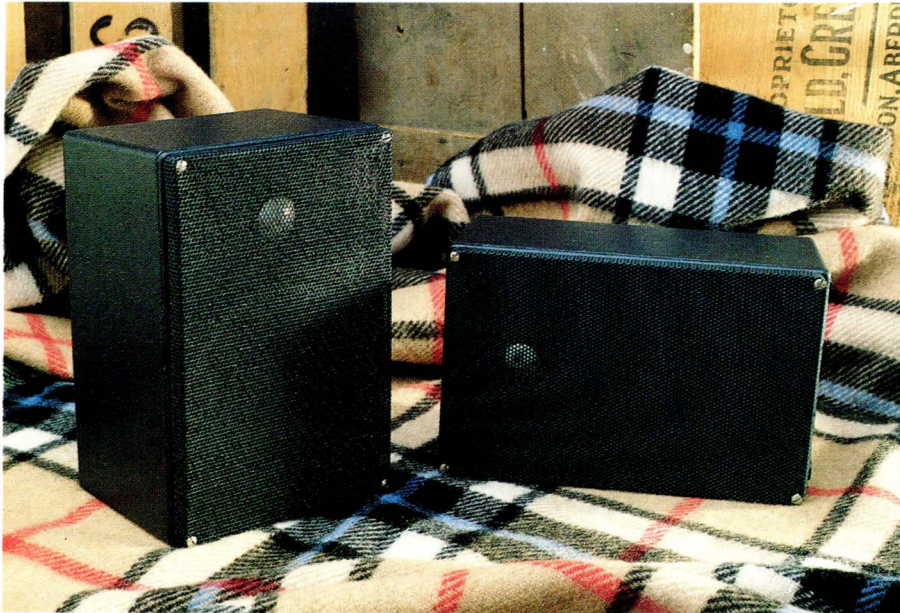
Modulus of impedance





ZYP A1

Presence Audio, Woodside, Spronketts Lane, Bolney, Haywards Heath, West Sussex RH17 5SA. Tel: (0444) 85611



A brand new name on the hi-fi scene, the diminutive little ZYP A1 is probably the smallest speaker yet to undergo the rigours of a *Choice* group loudspeaker review. Indeed, my first reaction on unpacking the carton was to wonder whether the A1 had been dispatched either as a mistake or a joke. Surely something this small didn't stand an earthly of getting through the blind listening tests... Surely?

This ZYP really belongs amongst the sub-miniature micro-speakers that (until now at any rate) I'd have preferred to deal with separately as a small group (eg issue 74), in order to make due allowance for the inevitable lack of bass, welly, power handling and suchlike.

As a number of manufacturers have found, such devices can have a life of their own, but are equally likely to be packaged with boom-box subwoofers as the satellites of the three box systems that seem to be in vogue at present, witness the nearly as tiny Allison *MS 200* reviewed alone in issue 106, and in combo in issue 104.

Though the brand is new, the A1 is made for distributor Presence Audio by a very experienced OE (original equipment) manufacturer which supplies several leading brands. The box is rugged though not magnetically shielding cast aluminium, quite shallow and tapering slightly towards the back, while the front panel is only just big enough to accommodate the two drivers. Our pre-production samples had a curious mottled finish, but satin black or white are promised for production. A perforated metal grille is neatly screwed in place, and chunky terminals stick out quite a long way at the back.

The main driver has a 90mm doped paper cone, wide surround, pressed steel frame

and surprisingly massive magnet, and is glued as well as tightly bolted in place to ensure good sealing. The 25mm metal dome tweeter also has a hefty magnet and is fixed from behind the baffle, using four not very tight screws which surely should be roundhead not countersunk types. The box is lined with a rubberlike damping material, and the inside lightly filled with longhair wool, while a generous crossover is mounted beside the main driver magnet. A £30 wall bracket is planned, and an A/V variant with flux-cancelling magnet is also on the cards, albeit at extra cost.

Test report

Despite the quite demanding 4ohm impedance, sensitivity is still significantly below average, but one consequence — aided and abetted by wall reinforcement and the sealed-box loading — is bass extension that's really rather impressive under the circumstances, registering at least some worthwhile sub-50Hz output which is more than most miniatures manage. The downside of that particular equation is that power handling is inevitably somewhat excursion-limited, though that's perhaps an acceptable price to pay.

The A1 is very well balanced overall from 150Hz up to around 10kHz, and placing it against a wall fills in the 50-150Hz region just about adequately. However, the good overall balance is interrupted by significant unevenness which is likely to result in quite audible coloration, and since this unevenness is largely constant at the wall or in free space, it is clearly endemic to the speaker.

Sound quality

At the end of a hard day's listening, the panel was more than a little shocked when the

curtain was lowered to reveal these tiny little speakers. Though they'd got a bit distressed during a heavy rock track, little else had betrayed their tiny dimensions, and the overall reaction was very positive.

Nor was this a freak result of the blind tests; subsequent listening only served to confirm the ZYP's very real strengths. Certainly it could do with more weight, warmth and scale at the bottom end, and the upper midband and presence is quite coloured, which prevents true transparency in the vocal region, but good timing and fine dynamics are ample recompense.

It's this innate coherence and an impressive solidity and liveliness that sets this design apart — and well ahead — of the more conventionally attired and less expensive miniatures.

It's significantly more expressive and informative than the norm, even though the mid tends to clog up a bit, masking detail due to a measure of quack, hardness and nasality when working hard.

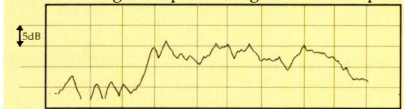
Conclusion

Flawed but great fun, the little ZYP delivers dynamics and scale that belie its near invisibility, and more than fair recompense for a measure of coloration and some lack of welly and loudness capability. Warmly Recommended.

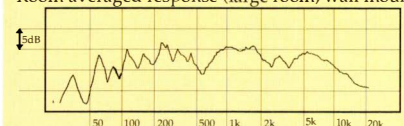
TEST RESULTS

Size (h x w x d)	22.5x14.5x13cm
Weight	3kg
Recommended amplifier power	20-50W
Recommended placement	close against wall
In room averaged response limits (50Hz-10kHz)	±4dB
Large room/space LF roll-off (-6dB ref midband)	150Hz
Large room/wall LF roll-off (-6dB ref midband)	30Hz
Large room output at 20Hz (ref midband)	below -15dBdB
Estimated midrange sensitivity (ref 2.83V, 1m)	85dB
Impedance characteristic (ease of drive)	quite demanding
Typical price per pair (inc VAT)	£199

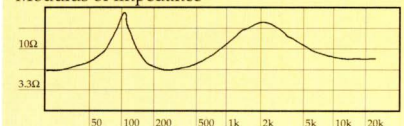
Room averaged response (large room, free space)

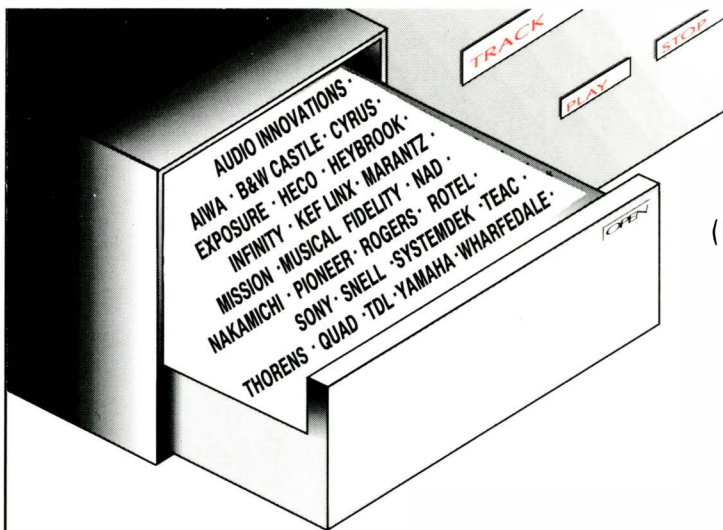


Room averaged response (large room, wall mount)



Modulus of impedance





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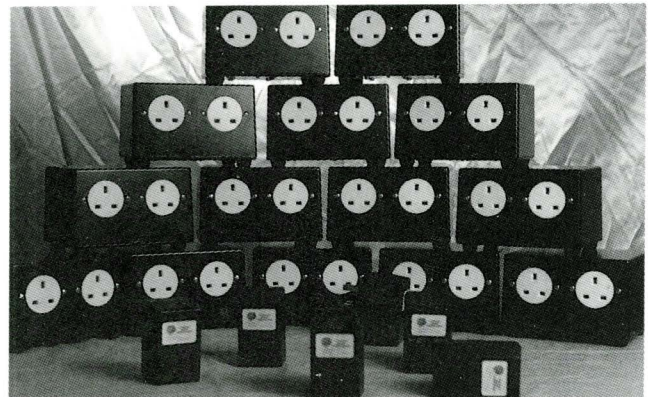
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Tech Talk

The 'blind' tests on this occasion lasted three days with five listeners, making up around 30 separate presentations of about half an hour each. Split evenly between vinyl and Compact Disc, the programme covers as broad a range of music as possible.

Care is taken to try and 'normalise' the relative volume of each loudspeaker, though differences in frequency balance, bass extension and room drive unavoidably get in the way. An operator places the loudspeakers carefully and securely. Grilles are deliberately left on at this stage.

Paul Messenger explains how the listening tests were performed, and outlines what the findings reveal about the products.

The main drive system comprises Naim amplification (NAC52 and NAP135), backed up by Audio Note AN-7 and *Ongaku* valve amps. Vinyl disc sources included Linn *Sondek/Lingo* and various Voyd turntables with Naim ARO and Audio Note tonearms, Linn *Troika*, Audio Note IO and Lyra *Clavis* cartridges for vinyl disc, and Naim CDS and Meridian 200/203 CD players, all mounted on Mana tables.

Bookshelf models were mainly used on Linn *Kan*, Foundation *Designer*, Heybrook *HBSI* and Slate Audio stands, with others brought in for hands-on work. Most of the work was done with a single run of heavy multi-strand Naim NACA5 cable, backed up by Audio Note *Silver* and others as appropriate.

My thanks go to Jason Kennedy for all his hard work as operator on the blind listening tests, and also to panelists: Paul Mills (Tannoy), Neil Truckle (Mordaunt-Short), David Inman, Richard Dunn (NVA), Peter Qvortrup (Audio by Design/Audio Note), Andrew Cartmel (*Hi-Fi Choice*), Brian Smith (Presence Audio), Brian Devlin (Bose UK), Dave Wiley, Russell Kauffman, Mark Homer (Canon Audio).

Measurements

Every loudspeaker has its own distinct frequency balance. This 'fingerprint' says much about the way a specific model will sound, though it isn't the only factor that discriminates between the good, the bad and the indifferent.

Without decrying the value of anechoic work, there's no doubt that far field room averaged response measurement is much closer to the real world situation, gives much better correlation with listening test findings, and is particularly relevant to comparative group testing.

A single isolated in-room frequency response of any specific loudspeaker is of limited value, but averaging a number of measurements taken at a number of points in the listening area provides a good indication of the subjective frequency balance. Further, comparison of a number of loudspeakers allows some of the effects of the room to be taken into account. The test programme is based on two sepa-

rate sets of room measurements, one taken with the speaker placed close against a rear wall (but more than a metre from side walls), the other a metre out into the room; intermediate positions produce more or less intermediate results.

A conventional pen recorder/mike set-up (Neutrik) is used to carry out sequential sinewave sweeps (high pen and paper speeds) for a succession of microphone positions.

A perfectly flat straight line is not a realistic target. Low frequencies are inevitably heavily modified by the main room modes - most notably the c10dB boost at 30Hz (or 10dB suckout at 42Hz if you prefer), and by the main early reflection modes. Room reflections also create interference well up into the midband, especially when the speaker is close to the wall.

Nevertheless, comparison with listening findings and established references do suggest that the ideal balance should be as flat and smooth as possible. Gentle variations are preferable to sharp discontinuities, and prominences tend to be more irritating than dips, while a gentle high frequency roll-off usually sounds perfectly acceptable.

Sensitivity differences have as much to do with impedance variations as with conversion efficiencies, which is one reason why the impedance has also been plotted and presented. Halve the impedance value and a speaker will suck twice the current and therefore twice the power for the same amplifier volume setting. By adopting four ohms rather than eight ohms impedance, 'current hungry' designs therefore 'pinch' 3dB of extra sensitivity.

Few amplifiers have the capability to deliver this extra 3dB in full, most settling for 1.5-2dB, so an apparent sensitivity advantage may well be largely negated in practice.

The listening room

The speaker and microphone sites parallel the listening tests, giving a measuring distance of three to four metres. The room itself is a sturdily built, sparsely furnished 4.3x5.5x2.6m, with wooden floor.

One consequence of the room-based testing is that the low frequency extension is defined as much by the room as the loudspeaker. Low frequency roll-off is traditionally expressed as the -6dB (sometimes -3dB) point referred to the sensitivity. Such a technique can be applied with room measurements, but the results tend to be strongly modified (even modulated) by the main room modes.

Probably more useful is to specify the relative level of 20Hz ref the midband sensitivity. However, this has the drawback that a good percentage of speakers don't go down much below 50Hz, never mind 20Hz. Until I can figure out a better approach, I am quoting the -6dB points for both free space and wall mount conditions, plus the 20Hz level.

The *Directory* 'bass from' entries carried out using room measurement techniques therefore refer to the best position -6dB point for the speakers, and cannot be compared directly with earlier 'anechoic' entries, though each has its own internal consistency.

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Ken Kessler,
Hi-Fi News & Record Review, April '92

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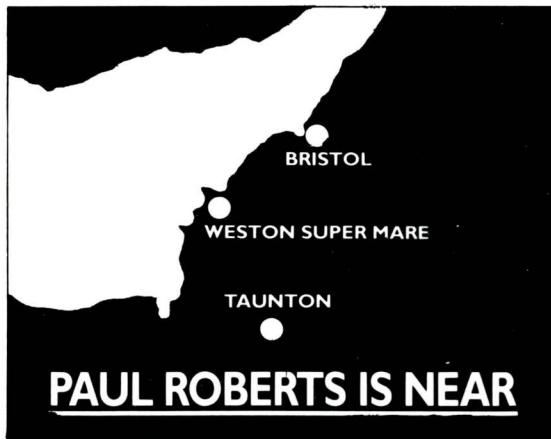
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Conclusions, Best Buys & Recommendations

Finalising the list of Best Buys and Recommendations is always one of the toughest parts of these projects. There are many zealots, believing themselves to be following — indeed creating — the one true path, but while such a stance has much to do with creating vital self-confidence, it doesn't square up with the extraordinary range of variety that coexists in the marketplace.

The comparative assessment of CD players, for example, is relatively straightforward, requiring simply(?) that the amplifier and speakers have sufficient resolution on every possible parameter to ensure the strengths and limitations of the players are clearly revealed.

Paul Messenger summarises the results of this month's loudspeaker reviews, and separates the best from the rest.

At the other end of the chain, the loudspeaker is a very different proposition. The slave rather than initiator of the driving signal, it's entirely dependant on the signal it is fed from sources, amps and cables, on the stand on which it sits, and the room with which it interacts.

With that in mind, I've been inclined to give the borderline models the benefit of the doubt.

Another fundamental difference between loudspeakers and the other hi-fi components is diversity. The £120 miniature shoebox has become the market stereotype which dominates sales, but it's both possible and valid to spend ten or even a hundred times as much, for something ten or a hundred times the size.

For many customers today, size matters rather more than price, so although a good big'un will always beat a good littl'un, it's often more relevant to compare models of similar size than those of similar price. And because so much about room interaction remains a matter for debate, speaker placement and directivity variations introduce variables that widen the range of choice, yet remain fundamentally a matter of taste and circumstances. So don't regard a Recommended flash across the corner of a review as an essential ingredient in making up your shortlist. It's hopefully a useful starting point, but should never be regarded as a substitute for using your own ears in the selection process.

Best Buys

I may like being generous with the Recommended flash, but I'm exceedingly parsimonious in handing out Best Buys. From this group the accolade goes to the £199 *AR MI*, a striking variation on the miniature theme that gives an unusually open, unboxy sound when set close to a wall. Limitations include some lack of speed and dynamic prowess, and a rather

bright balance to check before you buy, but it's certainly one of the most interesting new models for a while.

Recommended

I was a shade disappointed by the latest crop of mainstream £120 miniatures, so none made the BB ranks. However, both the Heybrook *Prima* and Mission *760i* join the Recommended ranks, the former for its good overall timing and coherence despite a rather middy balance, the latter for its fine bass alignment and dynamics, despite a slightly 'shut in' balance.

The traditional value for money 'bookshelf size' sector is represented by the £150 Jamo *Cornet 50*, which doesn't create the subtlest or tidiest sound around, but has good timing and plenty of volume on tap.

The little £199 Zyp *A1*'s main claim to fame is its extraordinarily small dimensions, but this little metal box model creates a surprisingly generous sound with quite believable dynamics when sited close to a wall, even though the midband has a fair amount of coloration.

The Mordaunt-Short *5.40* is a lot of loudspeaker for £299, though it does need a low stand to get it a foot or so clear of the floor. It's an unexpected design in several respects, without the sensitivity or bass extension appearances lead one to expect. But the package is unusually undemanding and easy on the ears, with relaxed delicacy and natural perspectives.

One of the most compact floorstanders around, the £405 Rega *ELA* couldn't represent much more of a contrast in character, being essentially lively, dramatic and coherent, yet also a little uneven and untidy. Certainly good value for money, care should be taken to ensure this speaker doesn't reveal all too clearly the inadequacies of a budget system.

A long established French manufacturer making its UK debut, the attractive large bookshelf size Cabasse *Bisquine* costs a substantial £600, and features one of the most substantial main drivers seen in a domestic hi-fi speaker. The result is high sensitivity and fine dynamic grip, alongside a rather mid-forward overall balance.

A clear favourite in the listening tests, the £800 British built Audio Note *AN-J/B* has a surprising amount in common with the French entry, combining similarly high sensitivity with a flatter overall balance and better in-room bass extension to give a more neutral and natural transparency, though not without a measure of coloration.

Representing a quite different underlying philosophy, the Professional Monitor Company's £1,000 *LBI* is an altogether smoother proposition that has its own quite different appeal, achieving a delicate classic neutrality at some expense in sensitivity and bass extension.

Back in the June issue we gave you our first impressions of Philips new medium, the digital compact cassette (DCC). This month we've got our hands on an early production sample which has been down at Paul Miller's being put through its paces in front of the Hi-Fi Choice blind listening panel as well as undergoing a thorough work-out in the lab.



Behind the

This is not the first time that Philips' Digital Compact Cassette recorder has graced the pages of *Choice*. In fact it was splashed all over the front cover of issue 107. Yet only now, some three months later, have we been permitted to live with a production (ish) sample of the *DCC-900* and explore its potential — explore DCC with the most comprehensive laboratory and listening tests carried out this side of Eindhoven.

Our regular crew of listeners, including Alan Ainslee (Technics), Mike Martindale (Arcam), Terry Murphy (Yamaha), Guy Sargeant (Audio by Design) and Andy Whittle (Rogers) were assembled in smart order for several days of blind listening before the mast. Even

Andy 'the Cap'n' Benham disembarked the ship's bridge for a rare visit ashore.

We approached our auditioning from two angles. Firstly the £500 *DCC-900* was compared with competing formats, including a like-priced Nakamichi 1.5 cassette deck and Sony *DTC-750* DAT recorder. Rotel's *RCD-965BX* flew the flag for CD. This accomplished we then concentrated on the ultimate performance of CD vs DCC, using both an Arcam *D170.3* CD transport and *DCC-900* player via a common 75ohm digital output, Audioquest *Video Z* 75ohm cable and a Deltec *PDM2* DAC.

The contenders were pitched against one another using identical

samples of music cassette, CD and DCC software but without our panel knowing which source was currently in play. Additionally, the playing order was randomised between each selection of music. DAT was drafted in once we reverted to our own recordings. As usual, an ideal listening level was established by our panel and then fixed across all four sources for the remainder of that day.

Tuning the tape

The digital players were used as supplied but I spent a little extra time with Nakamichi's 1.5 in the lab, fine-tuning its performance with selected batches of TDK *SA-X* pseudochrome tape. Ultimately, I was able to obtain a flat response (+/- 1dB) up to 20kHz and achieve a 65dB+



Philips DCC900, the world's first DCC recorder and on sale in a shop near you from September.

dynamic range without Dolby noise reduction. A rather better performance, as we were to discover, than commonly encountered with the humble cassette.

It's only logical

As an aside, I have to say that the infernal logic, or lack of it, enjoyed by the DCC-900 turned simple exercises like track cueing, re-numbering and track identification into something of a nightmare. We are assured that any remaining wrinkles in the DCC-900's control programming will be ironed out by the time boxes hit the shops. Inconvenient, certainly, but these bugs

exert no influence over the player's subjective performance.

Pre-recorded material

We kicked-off with pre-recorded samples of Dire Straits' ever-popular *On Every Street* and REM's *Out of Time*. The CD (correctly identified as selection 1 and 4 in the random playlist) sounded very crisp and dry but was also rather dead. Meanwhile the DCC version prompted a very mixed reaction. Initially everyone agreed that string tones were oddly muted while surrounding ambient detail was flattened, accentuating the lack of stereo depth suffered by CD. Nevertheless some listeners actually preferred the DCC rendition for its perceived accuracy: 'metal percussion sounds more, er, metallic' I was informed.

Others opted for CD thanks to its spacious acoustic and lack of smearing through the treble.

However it was left to the Nakamichi 1.5 (with its uncommonly stable transport and over-optimised record/replay performance) to furnish the most agreeable version of these rock tracks. Compact Cassette was less like hard work, the listeners said, suggesting that 'although the edge of each note was not as accurately resolved, the decay (of strings) was all the more realistic'. Instrumental positioning was also superior though the entire performance was bathed in hiss.

By contrast this same music cassette was markedly less convincing when replayed via the DCC-900 in its 'backwards compatibility' mode. Here were revealed the worst aspects of analogue cassette: hiss and an uncertainty of pitch. An uninspiring performance from what is a digital machine through and through.

Reverting to pre-recorded samples of Holst's *The Planets* (Chicago Symphony Orchestra) ended in a straight fight between CD and DCC. Without knowing which was which, our listeners thought the CD version was 'very consistent at moderate levels but tends to lose control during orchestral climaxes'. DCC was a little 'blended' in comparison, there was not the sense of dynamic contrast or instrumental decay but this in itself prevented the busiest sequences from getting out of hand. The powerful hall ambience was lost on DCC, for example, while certain stereo images—a trumpet in particular—tended to shift position depending on what else was playing. The cellos, suggested one listener, simply up and moved camp. On CD brass took on an unwelcome sense of urgency. With DCC the brass was better integrated. Everything was slightly compressed, slightly vague, but by not trying too hard it never became aggressive.

What planet are we on?

Then again, opting for the far gentler *Neptune* wrought a different conclusion from our listeners. Now the DCC version prompted them to sit further forward, almost as if they were squinting at a slightly out-of-focus picture. It required that much more concentration before the music snapped into focus. There was nothing offensive about the sound, it was sweet

and gentle but lacked CD's sense of bite. Via CD our listeners were not obliged to concentrate quite so intently for the music now shimmered with subtle detail, flowing and articulate with a fabulous sense of focus.

By this stage a certain program-dependency was beginning to emerge, our reaction to the DCC software resting as much on the style of the music as anything else. Our experience with home-grown recordings only served to confirm this notion.

Home grown recordings

Christy Moore was our first stop, a popular artist who regularly crops up in our CD player and amp tests. In this instance the DCC/analogue tape/DAT/CD/DCC playing order was quickly identified by our 'blind' listeners who were attracted to differences in the subtle detailing of each format. Subtle details like the sound of

Christy Moore's fingernails hitting the guitar's soundbox that were only really obvious via CD but were glossed over via both DAT and DCC. The latter bleached the music of its natural warmth and sense of 'fun', it was too eager, too lispy and hurried. Analogue cassette was certainly warmer, measured and natural in balance but it also lacked the crispness and definition of CD. DAT provided a swimmy sort of sound, one that was more interesting than DCC but was also rather grainy and unfocused.

Rickie Lee Jones provided a change of style and pace but DCC still failed to shine especially brightly. Unaware of the CD/DCC/cassette/DAT running-order, our panel suggested that number two (DCC) had less impact and was rather muted compared to number one (CD). Yet its resolution of timbral detail was preferred, Rickie Lee's voice was both more fragile and restrained while the piano was

brought closer into the mix. CD sounded gentler, quieter and more secure than either DAT or DCC but it was left to our analogue contingent to bring the most natural decay to bass notes. The Nakamichi's very free and fluid bass plus its ability to draw oodles of emotion from her voice won the day for the humble analogue cassette. DAT, by contrast, enjoyed a wide and ambient soundstaging but its bass was weak, just as its treble was both untidy and harsh.

Turning to Prokofiev's *Classical Symphony* and a new CD/cassette/DAT/DCC/cassette running order, produced a win for both analogue tape and CD. The latter was described as crisp and lively. The positioning of individual instruments could have been better and it had a tendency to 'shout' at times but the powerful, weighty bass succeeded in carrying the music across. Tape, via our souped-up Nakamichi, was also endowed with a

Welcome to the machine

At the heart of Digital Compact Cassette lies the PASC data reduction system. Obviously you don't need to understand the maths to appreciate the sound of DCC, but for those of you who want to delve into the depths of PASC what follows is a definitive guide.

PASC, or Precision Adaptive Sub-band Coding, is founded upon two psycho-acoustical principles. Firstly that we only hear sounds that persist above a certain level, a level that varies with frequency and is known as the Absolute Threshold of Hearing. Secondly that loud sounds tend to obscure (or mask) adjacent but quieter sounds. Yet the two principles are entwined because the phenomenon of masking will itself alter our Threshold of Hearing on a note-by-note basis.

Dynamic changes in both the frequency domain (giving rise to spectral masking) and the time domain (temporal masking) continually limit what we are actually able to perceive. And it's what we hear, rather than what's obscured, that PASC aims to capture.

Chips with everything

Let's take a trip through the mathematics of PASC and discover, in some detail, just how this ingenious system manages to do away with some 75 per cent of the digital data required by CD and DAT. Assume, for the sake of argument, that our DCC-900 is fed from a 16-bit digital output, even if, in practice, Philips' choice of ADIC/ADOC (a Mitsubishi M51581) will accept a full range of 16 to 24-bit samples.

Next stop on our tour is Philips' SAA2001. This is a sub-band digital filter (also known as a Quadrature Mirror Filter) which crunches our serial 16-bit input into 32 parallel channels, each of which has a much reduced sampling

rate of $F_s/32$. At this point in the scheme parallel processing allows reduction of the sample rate without reducing the overall rate of information.

In line with theory the bandwidth or frequency range of each channel can be no more than half the sampling frequency, ie $F_s/64$. Let's take the digital output of a DAT player as an example. This covers a 24kHz bandwidth, is sampled at 48kHz and quantised to 16 bit accuracy. But what emerges from our sub-band filter are 32, 16-bit channels, each sampled at 1.5kHz and each covering a tiny 750Hz bandwidth.

Now this filter employs a 512-sample 'window' that sifts through 32 samples for every complete calculation loop. One loop provides a succession of 32 evenly-spaced sub-bands, the first covering 0-750Hz, the second from 750-1500Hz and so on up to the 32nd sub-band which concentrates on the area between 23.25kHz and 24kHz. Similarly, if the original signal were taken from a CD player (sampled at 44.1kHz) then each of the 32 sub-bands would occupy 44100/64 or 689.0625Hz.

Twelve loops later and we have the basis of what will eventually become a PASC Frame - a total of 384 samples or 12 samples per sub-band. At this stage the data is still represented using a conventional 16-bit fixed-point notation. That is every 16-bit 'word' occupies 16-bits of space regardless of whether it's a small word like 000000000110101 or a full-scale word like 1110100010011100.

Ground zero

The next stage gets rid of those redundant zeros. The 32 parallel channels are passed into Philips' SAA2021 sub-band coder which, in tandem with the SAA2011 Adaptive Allocation chip, forms the PASC-encoder, the heart of the machine. It's

here that each of the parallel 32 sub-bands is partitioned into 12 serial samples prior to scaling or what is termed 'normalisation'. This is achieved by comparing the absolute (real-life) peak value of each 12-sample sub-band with a pre-written table of scale factors. Dividing this peak value by the next higher scale factor enables every one of the 12 samples to be normalised into a far narrower +1/-1 amplitude scale.

A scale factor is carried over as side-channel information along with the PASC frames, enabling each sub-band to be scaled-up upon decoding. In PASC form the information is represented using a floating-point notation where this scale factor acts as the exponent, describing the dynamic range of each sub-band in each successive PASC frame. Similarly, every normalised sample will eventually become the mantissa of the final PASC sample.

Meanwhile because a six-bit code is used in the scaling table, a theoretical maximum of 64 (2^6) scaling steps are available. And with a 2dB increment between each step this affords a maximum scaling range of 124dB (Philips only uses 63 steps).

At home on the range

In practice this huge dynamic range is shifted to cover +6dBFS to -118dBFS (dB Full Scale) because a combination of peak-level signals within a single sub-band may exceed the 0dBFS ceiling of the original signal. Just think of the +6dBFS headroom as a PASC safety net.

Now we've normalised each of the 32 sub-bands in every PASC frame. Meanwhile Philips' support chip, the SAA2011, has already allocated the minimum number of bits necessary to re-quantise each of the 12 samples in every sub-band. This calculation occurs once per PASC

'By this stage a certain program-dependency was beginning to emerge, our reaction to the Digital Compact Cassette software resting as much on the style of the music as anything else. Our experience with home-grown recordings only served to confirm this notion.'

strong and compelling bass. It was the least 'nasal-sounding' but was simply very firm, confident and sharply focused.

Unfortunately there are few cassette decks, at any price, that would match this standard of wobble-free music. Yet again, DAT provided us with a slightly stringy, coarse and splashy sound that lacked the weight and dynamics of either CD or DCC. Speaking of which, our listeners admonished the DCC version for 'a loss of timbre and airiness' but, for all this trimming of detail and transparency, they thought it far from unpleasant. Its subtle

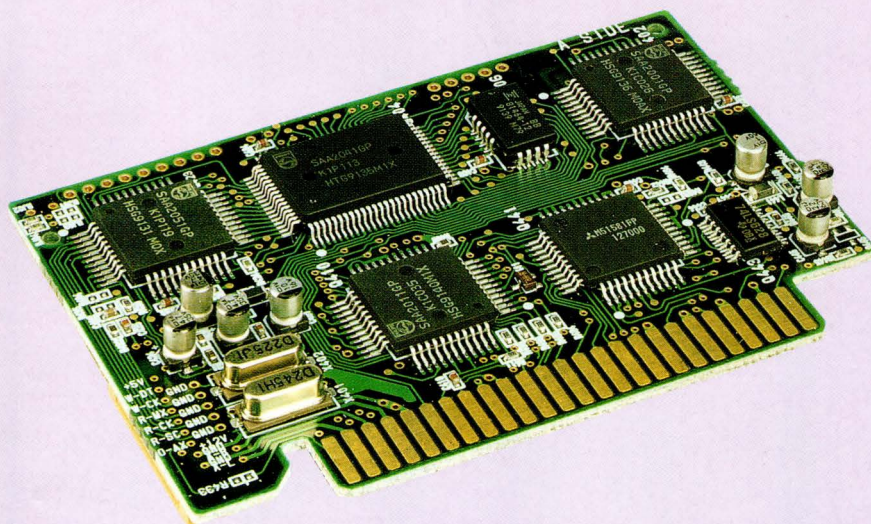
blending simply encouraged a more coherent and comfortable performance.

So, on the whole, our listeners were able to distinguish between the four formats even if no clear ranking-order emerged. So were we listening to the 'sound of PASC' or were the DAC and analogue electronics simply muddying the potential of the new medium?

Comparing digital sources

The same recording of Prokofiev's *Classical Symphony* was now compared via a common 75ohm digital feed into a PDM2

outboard DAC. After three 'sighted' passes from which our listeners were to acquaint themselves with the CD version, they were then subject to a CD/DCC/DCC/CD sequence under blind conditions. In the event they were unable to reliably pair the respective CD and DCC segments. Only one listener answered correctly, suggesting that the CD version was perhaps slightly more 'etched' than its DCC counterpart. Nevertheless, he concluded, with this mass of instruments it was very difficult to isolate meaningful differences.



The heart of Philips DCC 900, the Precision Adaptive Sub-band Coding (PASC) module showing the SAA2001 sub-band digital filter and SAA2021 sub-band encoder.

frame and concurrently with the scaling process, though the quantisation itself is performed only after the samples have been normalised.

And it works rather like this. Firstly the composite (peak) level of the 12 samples in each sub-band is used to calculate the effective masking power of every sub-band in that PASC frame. To this is merged the Threshold of Hearing to generate a unique (unique-ish) Masking Threshold for that PASC frame.

As a result it is possible that one sub-band may mask another or that local masking might occur within a single sub-band. Either way, any sub-band whose collective power now falls below this Masking Threshold is discarded. This simply increases the 'bit-pool' available to describe those sub-bands whose output lies above

the Masking Threshold.

These valid sub-bands are allocated a word-length anywhere from 2 to 15-bits depending on the power of that sub-band relative to the Masking Threshold in its range. For example, if the total output of a sub-band exceeds the local Masking Threshold by 45dB then all 12 samples in that sub-band are allocated eight-bits from which each mantissa is derived.

The minimum number of bits are used for each sub-band in each PASC frame, always ensuring that quantisation noise (caused by the limited resolution) falls below the Masking Threshold for that frame. This is the Adaptive part of PASC, responding in a flexible manner to the variable Masking and resolution of each successive frame.

A question of scale

The Allocation Information for each frame is fed both to the quantiser (which generates the 12 mantissas for the block of samples in every valid sub-band) and also to the PASC format encoder. For each block of 12 sub-band samples the PASC encoder sends over one six-bit exponent (scale factor) and the 12 mantissas, which can be between two and 15 bits long. This is PASC's floating word-length, floating-point notation. The Allocation Information is transmitted alongside as a four-bit code. This tells the PASC decoder (upon replay) just how many bits are required for the mantissa of each sub-band within the frame. If a sample block (sub-band) is empty then it's flagged accordingly, expanding the bit-pool for work elsewhere in the PASC frame.

So there are two basic mechanisms at work in PASC: only encode what is audible and code with maximum accuracy that which is chosen. Non-linear adaptive coding means that more bits are fed to the more important signals and vice-versa.

However the sums get messy when it has to deal with a 44.1kHz sampled input. The (serial) PASC signal is composed of PASC frames and every frame contains information on 12 sample blocks for each of its 32 sub-bands. So each frame contains 384 sub-band samples per channel, giving a frame rate of 125Hz (or one frame every 8msec) for 48kHz samples and 83 $\frac{1}{3}$ Hz (every 12msec) for 32kHz samples.

However, in 44.1kHz mode the frame rate works out at an impractical 114.84375Hz so consecutive PASC frames are manipulated on a running basis with extra 1 and 0 bits, similar to the merging bits used in CD's channel code. Either way, some PASC frames turn out slightly longer or shorter than others but the 'average' frame rate always settles at 114.84375Hz.

Then on to something a trifle simpler with Tanita Tikaram's *Twist In My Sobriety*. Now our listeners were marginally more confident, 50 per cent of them correctly identifying the DCC/CD/CD/DCC playing order. On this occasion DCC was thought to suffer a 'generally sat-on quality', cymbals lacking the crispness and clarity they had via CD. DCC was less realistic, they agreed, the performance lacking the shimmer heard via CD just as Tikaram's voice lost some of its expressive character.

Nevertheless Christy Moore, whose voice is pitched a number of octaves lower, prompted a more favourable outcome for DCC. Here everyone recognised the DCC/CD/DCC/CD running order, applauding the CD version for its accurate portrayal of natural sibilance and what they described as 'vocal dynamics'. DCC betrayed a midband colouration that tended to suppress the finer points of his voice. This said, our panel were initially appreciative of the smoother but faintly coloured rendition of his voice, 'as if he had a bigger chest' they ventured.

Listening more closely, however, revealed that the tiny bells announcing this track were lost to DCC, drowned by the powerful resonance of the harp. Yet with our CD copy it was possible to hear these subtle bells decay naturally behind those vibrant strings.

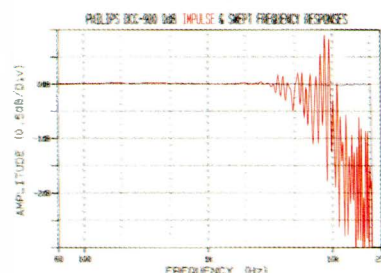
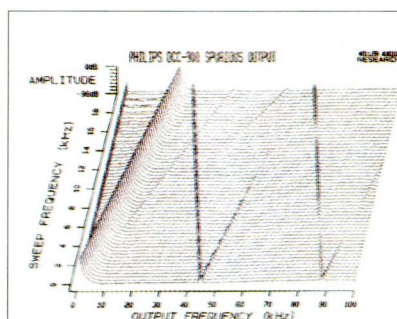
Then we reverted to two further selections of music, Sadao Watanabe's homage to Charlie Parker and the Mosaic recording for guitar, flute and panpipes. The CD/CD/DCC/DCC playing-order was tricky to identify on the jazz track yet, if any consensus could be drawn, the DCC version was actually preferred for its 'livelier, more expressive, fuller and resonant quality'! The solo trumpet had sounded just a trifle too hard via CD.

Two pairs

Undaunted, our listeners then correctly linked the pairs from the CD/DCC/CD/DCC playback of our Mosaic track. And on this occasion they unanimously plumped for DCC. CD made the guitar sound bolder, they suggested, but the pipes were smoother.

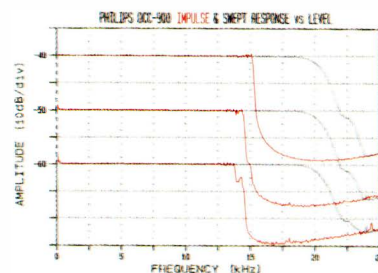
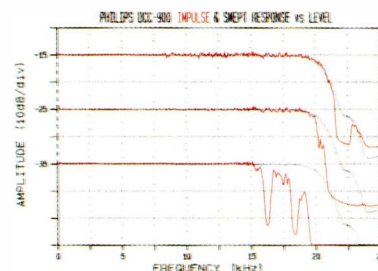
Interestingly, they thought the overall performance sounded louder than DCC even if the intermittent pauses had appeared quieter or 'darker'. Nevertheless DCC's interpretation was considered to be both sharper and 'snappier' with a richer 'harmonic structure' to the panflute. Ironically enough, this is the exact opposite of what is really happening!

So that's what our ears told us was happening, but what about the process



DCC-Player: Philips DCC-900

	20Hz	1kHz	20kHz
Channel Balance	0.07dB	0.07dB	0.08dB
Channel Separation	103.2dB	95.6dB	80.9dB
THD vs Level, 0dB	-102.4dB	-91.1dB	-70.3dB
	-30dB	-85.6dB	-79.8dB
	-60dB	-50.8dB	-46.9dB
	-80dB	-27.2dB	-30.0dB
	-90dB	-16.2dB	-20.6dB
Dithered, -98dB			-16.1dB
Dithered, -100dB			-15.9dB
Dithered, -102dB			-9.4dB
Dithered, -105dB			-5.3dB
Dithered, -110dB			-3.4dB
Resolution @ -60dB		+0.08dB	-0.03dB
		-80dB	+1.12dB
		-90dB	+3.08dB
		-100dB	+3.60dB
Peak Output Level, Left		1.739V	
	Right	1.725V	
Relative Output Level			-1.25dB
Output Impedance			917ohm
Radio Frequency Spurious		16mV up to 113MHz	
1Hz Noise Modulation			-0.75dB*
CCIR IMD, 0dB			-91.1dB
Suppression of stop-band IMD			61.8dB
De-emphasis Accuracy, 1kHz			-0.01dB
	5kHz		+0.02dB
	16kHz		+0.15dB
S/N (A-wtd, re 1kHz), w emp, 0LSB			106.0dB
	w/o emp, 0LSB		101.6dB
	w/o emp, 1LSB		101.6dB
Digital Input/Output			Coax/Optical
Crystal Clock Accuracy			-182.5ppm
Serial Number			Some hope!
Typical Retail Price			£500



Family of frequency response curves showing PASC at work on impulse (red) and swept (black) signals.

itself, and perhaps more importantly, what can be gleaned by subjecting this early production sample to a thorough going over in the lab?

Those of you hankering for a comprehensive overview of DCC, down to the size of Philips' cross-head chassis bolts, will have to wait until the official Choice/DCC supplement is published next month. For now we shall concern ourselves with the real world implementation of PASC coding - the digital heart of DCC and the recipe behind its surprisingly faithful sound quality. For the fullest picture, simply cross-reference this practical guide with my partnering article on the theory of PASC.

PASC or Precision Adaptive Subband Coding is the technique used to reduce the high bit-rate (or density of digital information) of linear PCM sources like CD and DAT down to the sort of size that can be accommodated on the chrome tape used by DCC.

The target is 384 thousand audio bits per second per channel, some 27 per cent of the 1.4112 million bits/sec used by CD

and exactly 25 per cent of the 1.536 million bits/sec consumed by DAT when recorded at the standard 48kHz sampling frequency.

Yet this economic use of incoming 16-bit data is barely reflected in any conventional CD or DAT-style lab test. Cast an eye over the standard test table and 3D plot which regular readers should remember from recent CD player issues. In practice these results could have come from any of Marantz's CD-42/52/72 CD players (see Issue 107).

Why? Because the trends of distortion vs level, 62dB stopband rejection and familiar 3D plot are all characteristic of the electronics that come after PASC encoding and decoding! Familiar components that include NPC's SM5840 oversampling filter and Philips' SAA7350 BS DAC.

Differences? Well there is clearly some disturbance in the noise floor (top left hand corner of the 3D plot) while its low-level linearity is a trifle askew with +3dB errors beyond -90dB. However the A-wtd S/N ratio exceeds the modest 92dB predicted by Philips. In fact it really does

seem that though the system's resolution hovers between 15 and 16 bits, its practical dynamic range (with emphasis) could hide some 18 bits.

Living in the PASC

So is the PASC system really that transparent? Of course not! Conventional tests tell us very little about the nature and performance of DCC because the PASC algorithms are based on subjective psycho-acoustical principals rather than straightforward measured criteria.

Our first clue to the nature of PASC comes from its impulse response. Transposing a series of impulses from time to frequency domains stresses the player in a more realistic fashion because it is forced to process information in all 32 sub-bands simultaneously. By contrast a swept tone moves from one sub-band to the next with maximum resolution being afforded to successive sub-bands in successive 8.7msec PASC frames (assuming a 44.1kHz sampled input). Hence the 'ideal' black trace seen on the 0dB response graph.

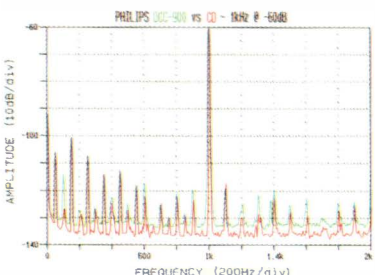
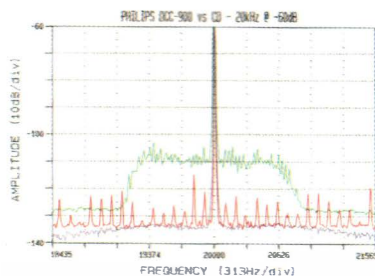
Meanwhile the resolution of the 0dB impulse (red trace) quickly deteriorates beyond 3.4kHz or sub-band five. Broad peak-level signals, like this impulse, are a special case because the reserves of the bit-pool are quickly plundered by the lower frequency sub-bands, which take priority. So the resolution of higher frequency sub-bands, which are not significantly masked under peak-level conditions, inevitably suffers. Hence the erratic nature of the red trace.

At lower levels the PASC encoder falls back on its pre-programmed Threshold of Hearing curve to aid in the masking of extreme high frequency sub-bands. This, and the influence of Critical Masking, is illustrated by the family of response curves. PASC employs linearly-spaced sub-bands rather than coding within what are known as the Critical Bands of human hearing. These Critical Bands, from which our ears base their own 'calculations', occupy 100Hz steps to 500Hz and advance every 3rd-octave thereafter. So more PASC sub-bands fit into single Critical Bands at higher frequencies where Critical Masking ensures that whole sequences of sub-bands are made redundant.

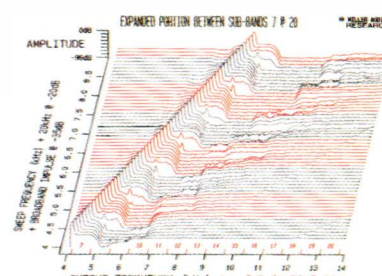
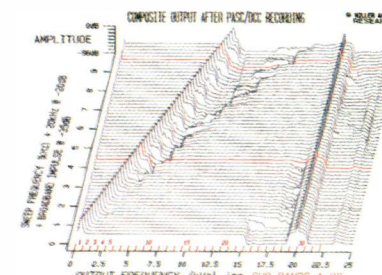
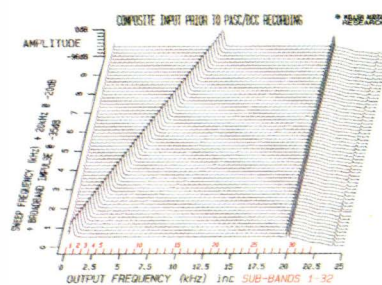
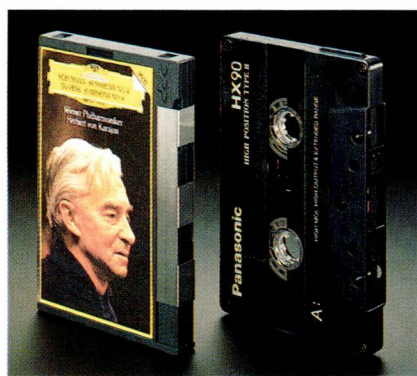
Back to our response family. Here we see that if the Adaptive Allocation chip and PASC encoder are presented with a swept input that moves slowly from sub-band to sub-band, it maintains a constant and predictable output almost regardless of level (black traces).

Acting on impulse

By contrast the broad spectral energy of



1kHz and 20kHz signals recorded at -60dB, revealing the underlying masking threshold (green), the digital output quality of the DCC-900 (pre-PASC, red) and the ideal result (black).



A combination of swept, fixed and impulsive inputs revealing local and critical masking plus adaptive allocation in action.

the impulse prompts the PASC encoder to mask those sub-bands that fall at very high frequencies. And the quieter the impulse the less sensitive we are deemed to be to those high (treble) frequencies. At the -15dB level all sub-bands from one to 30 are allocated bits yet, by -60dB, there is an abrupt cut-off beyond sub-band 20 (13.78kHz).

Philips' experimental data simply indicates that we cannot hear frequencies in excess of 13.8kHz under these conditions, so why bother coding what you cannot hear?

Nevertheless between -30dB and -38dB there's an element of uncertainty in the allocation of bits to sub-bands beyond sub-band 22 (15.16kHz). Even under steady-state conditions the output above 15kHz fluctuates quite wildly, producing the 'averaged' trend plotted at -35dB. Below -38dB the PASC-encoder is stable once more.

At this point it is important to appreciate that the PASC encoder is assessing what the input signal 'sounds like' rather than what it 'looks like'. After all, this is

the lynchpin of the entire data reduction process.

Setting the tone

To assess PASC's 'ranking-order of meaningful sounds' I ran an exhaustive series of tests placing different combinations of signals in each of the 32 sub-bands. In practice all signals, over a full 100dB range, pass through the 1st sub-band (0-689.06Hz, with 44.1kHz sampling) completely unhindered. Under the toughest conditions, genuine masking first occurs at a level of -90dB in sub-band 3 (1.378-2.067kHz) while peak-level signals here prompt the masking of broadband detail (<-70dB) in the adjacent sub-band 4 (2.067-2.756kHz).

This simple trend continues until we reach the 10th sub-band (6.2016-6.8906kHz) where peak-level signals evoke an 8dB compression (or boost) of local broad band detail (<-60dB). Meanwhile Critical Masking is experienced by the next five sub-bands (11 through 15, corresponding to 6.891 to 10.336kHz). By the time we reach sub-band 15 (between

9.647 and 10.336kHz) there is a marked increase in local noise (+8 to +10dB) within the subband as a result of coding a peak signal. This increase in noise effectively masks any signals below -75dB (rel to a 0dB input) or -45dB (rel to a -60dB input) within the same subband.

At the 30th subband (19.983kHz-20.672kHz) this local noise 'skirt' extends across adjacent subbands and represents a deterioration in S/N of some +25dB. This is clearly depicted on the 2D plot showing a recorded 20kHz signal at -60dB (green trace) whereas the equivalent plot of 1kHz at -60dB shows no such increase in local noise. This simply reflects the importance of Philips' pre-programmed Threshold of Hearing at 20kHz. But why does the masking threshold extend over two sub-bands?

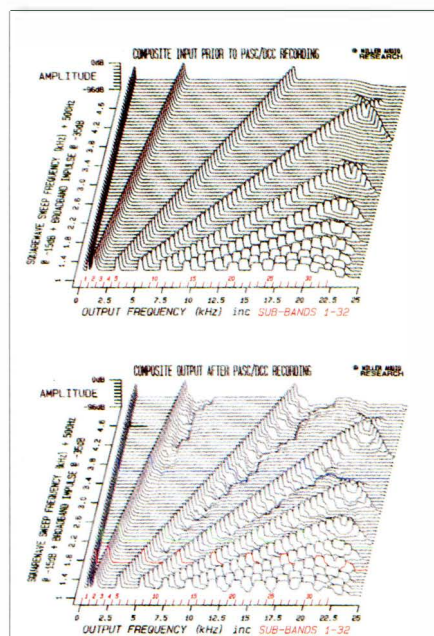
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This is because, in practice, adjacent subbands actually overlap. The -3dB points for each sub-band are certainly placed at 689Hz intervals (for 44.1kHz sampling) but their ultimate stopband frequencies (with abrupt 100dB/octave slopes) lie 50 per cent of the way into each adjacent subband. Consequently it is possible for any one single frequency to exist, and be processed, in two separate sub-bands simultaneously. 20kHz happens to lie very close to the 19.9828kHz transition from sub-band 29 and 30, so it provokes a masking threshold in both. Simple huh!

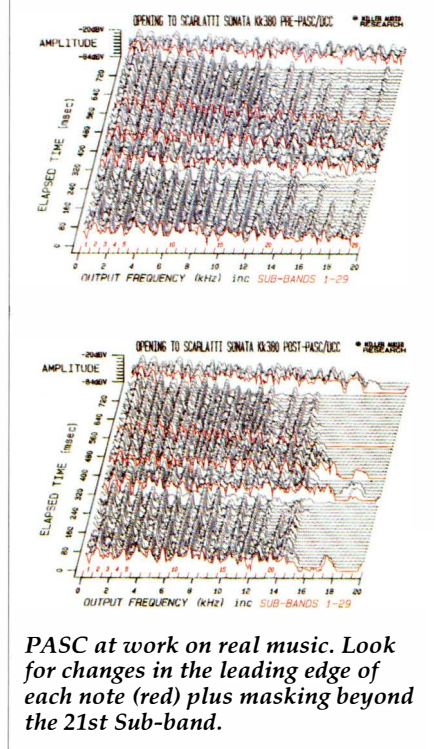
What this tells us, among other things, is that the PASC Threshold of Hearing curves (provided by Philips/Technics and used by virtually every hi-fi mag) are not particularly representative. In reality the mathematics of PASC are more generous for its pre-programmed Absolute Masking 'curve' is entirely flat up to a few kHz before rising gently to provide a +25dB mask at 20kHz!

The first sequence of 3D plots highlight, in dramatic fashion, the effects of both Local and Critical Masking plus the Adaptive Allocation of PASC's bit-pool. The plot illustrates a complex input which provides information for each of the 32 sub-bands. This includes a -3dB sweep running from 200Hz to 10kHz and a fixed 20kHz tone at -20dB. The horizontal lines do not represent noise but are akin to a series of linear 'frequency responses', representing broad musical detail some -60dB below the main sweep. These are furnished by synchronised impulses (with a spectral level of -35dB) that accompany the sweep and 20kHz tone. (The fine product at 24.1kHz is a stop-band pattern produced by the SM5840 digital filter).

The influence of PASC encoding is, er, rather obvious from the next 3D plot. When the main sweep is at low to middle frequencies (passing through sub-bands 1-5) there is no masking of adjacent higher frequency detail. However the impulse response is cut short beyond 15kHz (sub-band 22) just as we had seen in our earlier family of responses. Meanwhile sub-



A combination of inputs revealing progressive stages of masking in the 6th sub-band (blue), 8th sub-band (red) and 16th sub-band (green).



PASC at work on real music. Look for changes in the leading edge of each note (red) plus masking beyond the 21st Sub-band.

bands 29 and 30 are allocated bits to accommodate the 20kHz tone which is reproduced along with its masking 'skirt'.

As the sweep moves to higher frequencies (beyond sub-band 5) Critical Masking begins to eat away at adjacent sub-bands until, at 10kHz, the adjacent masking occupies a range from 10.3-17.2kHz (sub-bands 15-25) with a depth of -86dB! Meanwhile this wholesale masking replenishes the bit-pool and releases extra bits that are then allocated to sub-bands 23-28, effectively 'filling-in' the crater lying to the left of the 20kHz tone!

Look closer along the right hand edge of the main sweep and you'll discover a repetitive pattern. I've made it easier for you by expanding the area between the two red lines on a third 3D plot, restricting our window to between 4kHz-14kHz. This frequency range encompasses the sub-bands 7-20, of which sub-bands 7-13 (plus half of 14) are busy with the 4-9kHz portion of our sweep. As the sweep increases in frequency it crosses from one sub-band to the next (black to red and vice-versa), provoking an obvious increase in local noise (in-band masking) as well as the redundancy of higher sub-bands (out-band masking). Once again local masking extends across not one but a maximum of two sub-bands due to their overlap. Phew!

Assuming you've got the hang of things, the next couple of 3D plots are almost self-explanatory. Here I've bathed the PAS-coder with the customary spread of -35dB impulses (occupying all 32 sub-bands) while simultaneously introducing a 500Hz tone (at -15dB) and a -3dB squarewave sweep whose fundamental runs from 1-4.8kHz (sub-bands 1-7). The 3rd, 5th, 9th, 11th etc harmonics can be seen radiating out to the right, swamping the higher frequency sub-bands.

Just passing through

After PASC encoding we discover that no modification has taken place in the first five sub-bands while the blue trace (line 37) pin-points the first signs of masking when the -3dB fundamental sweep exceeds 3445.3Hz (the beginning of the 6th sub-band). At -15dB, the 3rd harmonic provokes masking of our 'low-level detail' at 4823.4Hz (8th sub-band). You can see this by looking along the red trace. The green trace shows that out-band masking is delayed till sub-band 16 in response to the lower-level 5th harmonic (-20dB).

At the summit of the 3D plot, the 500Hz tone is still clear of masking but the 4.8kHz (-3dB) tone prompts some 80dB attenuation across sub-bands 9-11. Meanwhile



the 3rd harmonic, at 14.4kHz, causes some 66dB pre-masking at 13.5kHz with post-tone masking of 93dB from 15.3-18.6kHz. Our 'low-level detail' is retained from 18.7kHz-20kHz (sub-bands 28-29). So how do these decisions, made by the PASC encoder, influence the complex harmonic and temporal structures of real music?

Measuring music

The following 3D plots illustrate this very question, using the kind of elegant acoustic recording that tends to draw out the most obvious subjective differences between CD and DCC. Here we see the five leading notes of Scarlatti's *Harpsichord Sonata* (Kk 380 in E maj, from CD-SAR27) captured over an 800msec time frame. The impact of each note is traced in red and the subsequent decay in black, clearly showing how some of the instrument's harmonics are more persistent than others. It's this pattern of decay that lends the instrument its characteristic timbre.

The initial note is pitched at 940Hz with overtones extending to 19.8kHz. After 290msecs the members of this note are fired by a second key at 840Hz, followed by others after 370msecs, 525msecs and the beginning of the 5th note at 750msecs. Two features are evident from the replay graph. Firstly that spectral masking has

eliminated much of the original signal beyond sub-band 21 or 22 though the 'structure' of the decaying harmonics is retained intact through all lower sub-bands. Secondly it's the leading edge of each note (the red traces) that exhibit the strongest modification, not only beyond sub-band 22 but also at lower frequencies. This is the influence of Temporal Masking, a feature of PASC encoding not revealed by my previous 3D plots.

But can you detect such brutal masking of this delicate-sounding instrument? With reference to some of the best ears in the business, I have to answer 'yes'. But only just.

Conclusion

From the technical standpoint these results suggest that PASC encoding is a rather violent process. Nevertheless an equally diligent approach to our blind listening proved that the subjective consequences of this 'violent' processing are far from objectionable. Indeed on the rare occasions where CD and DCC could be reliably distinguished, there was no guarantee that our DCC copy would come off second best. Moreover there was even the suggestion that PASC's ultra-high frequency masking prompted a smoother and more entertaining performance than

that of a more explicit but slightly hard-sounding CD player.

This was especially true when Philips' own post-PASC electronics were traded for a very high quality outboard DAC, enabling us to glimpse something of DCC's true potential. So rather than spawning a base-grade digital format Philips have demonstrated, in the most convincing fashion, just how much musical information we can 'do without'.

From the research angle this is both fascinating and highly valuable, shedding new light on what is and what is not acceptable in the manipulation of audio signals by other components, such as CD players and amplifiers. Instead of being tempted to offer these results as evidence of DCC's failings they simply illustrate that Philips has, surprisingly perhaps, got its sums right.

Meanwhile, from standpoint of the enthusiast, DCC promises to be no less flexible than DAT while offering very much more than the 'sound of cheap CD' - a simplistic conclusion too easily formed by the anathematic concept of data reduction. Whether we like the idea or not, adaptive signal processing, from its humble roots in these earliest DCC recorders, will eventually supplant digital audio as we know it today!



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- Kenwood DP3040
- Marantz CD42
- Marantz CD52
- Marantz CD62
- Marantz CD72
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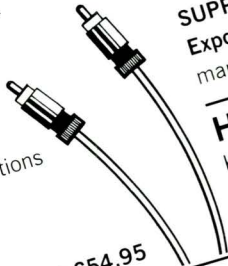


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mains. It works by rotating the disc and applying the wet cleaner first (cleaning solution is supplied), then reversing the direction of rotation and dry cleaning the disc. The whole process takes just 40 seconds and a set of batteries should clean 80 discs

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Newnes Audio and Hi-fi Engineer's pocket book (second edition) £10.95

This useful little book covers a wide range of audio topics with concise explanations to clarify the information.

It covers everything from turntables and cartridges to DCC and DAT with as much technical information as the mere mortal could wish for.

If you really want to know what makes your CD player tick and aren't afraid of the odd wiring diagram or equation this is the book for you.

The Art of Digital Audio - John Watkinson (revised reprint) £49.50

This book describes all of the essential theory of digital audio, and a good deal of practice, but it is not a history book. Nor is it a conventional textbook, largely because such things have to choose a target audience and stick to that academic level.

The need for understanding in digital audio is too wide and the subject is too interdisciplinary for that. As you can imagine this is a comprehensive tome that covers all aspects of digital technology including disc drives, rotary and stationary head recorders and even interconnects. It is a must for anyone wanting to get fully acquainted with the subject.

Audio Technica CD lens cleaner AT-6078 £16.95

The focusing assembly for the laser head of a CD player is a very delicate affair and yet it requires cleaning from time to time.

Rather than fumbling about with cotton buds we would suggest you employ an A-T lens cleaner. This is a standard size disc with eight tiny brushes set into it. To use, just apply a drop of cleaning fluid on one of the brushes, place the disc in your player and press play.

Ten seconds later, hey presto, a clean laser assembly, and cleaner sound from your CDs as a result.

Gold plated 4mm banana plugs £7.95

Top quality solderless gold plated banana plugs for use with speaker cables. Simply push the speaker cable into the body of the plug and tighten for a perfect connection.

This Furukawa plug accepts cables up to 4mm in diameter. Sold in packs of four.



Top left: A selection of accessories from the Last range. Top right: The Hi-Fi Choice Purifier. Left: Furukawa banana plugs.

This month we are pleased to introduce the Last range of cleaning and protection fluids and accessories.

Last SF-100 Extra Strength Record Cleaner £19.95

Last SF-100 is designed to remove the compounds left over from the pressing process. Use for a first cleaning of new records as well as to revitalise older vinyl.

Last SF-200 Record Preservative £21.95

Without going too deeply into the technical details, Last SF-200 is absorbed into the surface of the vinyl and stabilises the vinyl to prevent gouging and fracturing of the groove wall that can occur during playback. A single

application can keep records sounding 'brand new' for 200 plays or more.

Last SF-300 All Purpose Record Cleaner £15.95

The one to use to for day to day cleaning after your records have been cleaned and protected with SF-100 and SF-200.



In order to let you try out the Last record cleaning and protection system we

have negotiated a special price to enable you to purchase a full size bottle of both the extra

strength cleaner and the preservative for just £34.95. We have also secured a limited number of trial samples of all three products which are available at only £21.95 but as stocks are limited we must restrict this offer to one sample kit per reader.

Last SF-500 Stylus Treatment £13.95

As the stylus is the point at which the music enters the replay system it is essential that it is kept clean. Last SF-400 will remove even the most stubborn deposits, yet, when used correctly, will not damage even the most delicate of stylus assemblies.

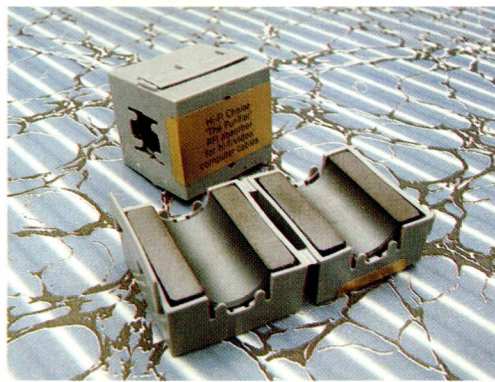
As well as products to protect and clean your record collection, Last also makes a range of products intended to perform the same service on your Compact Discs.

The SF-600 CD Cleaner and protection kit consists of a special CD cleaner/polish — to remove dirt, scratches and finger prints from CDs — as well as protective shields, an applicator, an application base and a brush. The cleaner/polish is also available separately.

**CD cleaner and protection kit £17.95
Cleaner only £13.95**

Improve the sound of your hi-fi system for a mere £15

Ever wondered why some people get taken seriously in hi-fi shops while others are given the run around? Wonder no more. The answer to all your hi-fi problems is the Hi-Fi Choice sweatshirt. Tastefully printed in red and black on grey, as well as being this year's most crucial fashion accessory, it will also readily identify you as a reader of Britain's fastest growing hi-fi magazine. You'll almost certainly be taken more seriously and end up with a better system — and all for a mere £15. We can supply the shirts in two different sizes — Large and Extra Large.



Furukawa cables

We have a variety of interconnects and speaker cables on offer, all sourced from respected Japanese specialist Furukawa and all of which were rated as either Recommended or Best Buys in our comprehensive cable surveys in July and August. For those of you interested in reading more about these cables please see the order form for prices.

Speaker cables

Furukawa FS-2T14

Cheapest of Furukawa's Evencap range, this PCOCC cables was rated a Best Buy because of its "natural sense of dynamics and scale".



Furukawa FS-2T20P

Consisting of some 80 PCOCC strands 20P was praised for its "lively and engaging presentation" and was considered to be "taut, detailed and well controlled".



Furukawa FS-2T35P

Similar to 20P, but with 140 strands arranged in seven bundles, this cable was rated "a real corker".



Digital

Interconnects

Furukawa FV-1010

75ohm PCOCC digital interconnect which earned Recommendation for its good sense of depth and quality of construction.



Furukawa FO-1110

Voted a "must for 'optical only' transports" 1110 employs a PMMA fibre. Glass and multi glass versions, the FO-1210 and FO-1310 respectively, are also available and both merited Hi-Fi Choice Recommendation.



Analogue Interconnects

Furukawa FD-1010

One of Furukawa's 'unbalanced' coaxial range, manufactured from PCOCC and intended for use between the analogue output of a CD player and the preamplifier.



Audiophile Recordings

We are pleased to be able to offer a selection of records from the world famous Reference label. Guaranteed to get the very best from your system these recordings have been selected for the merits of the performance as well as their outstanding sound quality.

Prof Johnson's Astounding Sound Show: Sampler.

Orchestral Fanfare - Red Norvo Quintet - Cal Arts Ensemble - Richard Morris - Organ - Susan Mc Donald, Harp - Kronos Quartet - David Rosenthal, Tubulung.

A perennial audiophile favourite, this sampler of Prof Johnson's early work shows what Reference can do with a wide variety of musical and sonic experiences.

Includes the only known recording of an unusual tuned mallet instrument, the Tubulung. Guaranteed to give your playback system a royal wringing out!

Copland: *Appalachian Spring Suite, Eight poems by Emily Dickinson.* Keith Clark/Pacific Symphony Orchestra, Marni Nixon, Soprano (in the poems).

Music by America's best loved composer, *The Appalachian Spring Suite* is presented in its original version for 13 instruments. Also included is the world premiere recording of Copland's orchestration of eight of his Emily Dickinson songs.

This recording was a Grammy Award nominee in 1987. The CD version also contains *An Outdoor Overture*.

Walker & Garson: *Reflections. Portrait of a friend - Love - First song - Ethereal - Yearnings - Pied piper - The park - Magic spell - You're one of a kind - Reflections - Reason.*

Jim Walker on flute and Mike Garson on piano from the jazz group 'Free Flight' offer something peaceful and soothing for those quiet moments. Surpassingly natural sound.

Helicon Ensemble: *Vivaldi/Bach Vivaldi: Sinfonia in G-Trio Sonata in G minor - Double Concerto in E-Flat. Bach: Trio Sonata in C - Double Concerto in D minor.* (Compact Disc also contains *Prelude in C*)

Albert Fuller conducts from the harpsichord a varied original instrument ensemble in works featuring two solo violins, including the great *Double Concerto* by Bach and three rare, ingratiating works by Vivaldi.

Featured solo artists are Japp



Schroeder, Stanley Richie and Linda Quan.

Recorded at the John Harnes Centre for the Performing Arts in Englewood, New Jersey. CD also has Bach's *Prelude in C*.

Walton: *Facade Suite.*

Walton: *Facade Suite - Strauss/Hasnrohr: Till Eulenspiegel - Scriabin/Elliott: Waltz in A-Flat - Nielsen: Serenata in Vano.* Chicago Pro Musica.

An instrumental from Walton's whimsical *Facade* in the composer's original scoring makes a perfect vehicle for these brilliant musicians. A chamber version of *Till Eulenspiegel* and the seldom heard pieces of Scriabin and Nielsen complete this engaging programme.

Tafel Music: *Popular Masterworks of the Baroque. Pachelbel: Canon & Gigue. Handel: suite from 'Water Music' Purcell: air from Suite no. 3 in D and Suite from 'The Moor's Revenge'. Vivaldi: Concerto op. 10-2, 'La Notte'.*

Canada's finest original-instrument Baroque ensemble plays familiar favourites with outstanding scholarship and musical panache. Note the Pachelbel *Canon* with its seldom heard companion piece, both to the composer's instrumentation. Strings, oboes, recorder and harpsichord offer delightful music recorded in a vaulted ceiling stone church.

Stravinsky: *L'Histoire. Stravinsky: L'Histoire du soldat suite. Blackwood: Capriccio Espagnol.* Chicago Pro Musica.

Stravinsky's landmark composition for a mixed ensemble of seven. Grammy winning performances.

Respighi: *Church Windows.* Keith Clark, Pacific Symphony Orchestra.

This grandiose work, scored for full symphony orchestra, pipe organ and tam-tam, has at last been given its due, musically and sonically, in this celebrated recording. *Church Windows* quite literally pushes to the theoretical limit the dynamic range it is possible to reproduce at home.

The CD also contains Respighi's rare mini concerto *Poema Autunnale* with the violinist Ruggiero Ricci.

Marni Nixon: *Marni Nixon sings Gershwin. Summertime - Let's call the whole thing off - Someone to watch over me - I've got a crush on you - But not for me - The real American folk song - Nice work if you can get it - Embraceable you.*

Marni Nixon's impeccable intonation and diction bring a welcome elegance to these songs which are perhaps too often jazzed up. By beautifully singing what Gershwin wrote, stylishly accompanied by Lincoln Mayorga's piano, Miss Nixon brings new insights to these immortal songs.

Eileen Farrell: *Torch Songs. Stormy weather - Round Midnight - The end of a love affair - Black coffee - When your lover has gone - Don't explain - Something Cool - and more.*

C O P L A N D

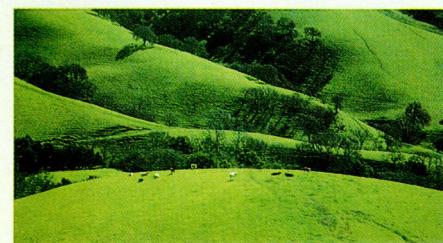
APPALACHIAN SPRING SUITE

ORIGINAL VERSION FOR THIRTEEN INSTRUMENTS

EIGHT POEMS OF EMILY DICKINSON

ORCHESTRATED BY THE COMPOSER - FIRST RECORDING - MARNI NIXON, SOPRANO

AN OUTDOOR OVERTURE



KEITH CLARK - PACIFIC SYMPHONY ORCHESTRA

A PROF. JOHNSON DIGITAL MASTER RECORDING

The album Farrell fans have been waiting for. America's great blues diva makes these songs of lost love her own.

Smoky night club arrangements set the stage for some unforgettable singing.

Dick Hyam: *Dick Hyam Plays Fats Waller. Ain't misbehavin' - Keepin' out of mischief now - African ripples - Honeysuckle rose - Willow tree - Stealin' apples - I've got a feeling I'm falling - Handful of keys - My fate is in your hands - Jitterbug waltz - Squeeze me.*

The world's first direct-to-CD on RR-33DCD. A technological and musical triumph, a true landmark in recording history. RR-33DCD (listed as Ref CD87 on the order form) is available as a deluxe numbered limited edition.

Encoded on the highly sophisticated, computerised Boesendorfer reproducing piano, Hyman's performances were played back for Prof Johnson's microphones, and the digitised signal was transmitted via microwave to the compact disc master as the music was being played.

No recording tape of any kind was used, nor was the digital bitstream corrupted at any stage by copying manipulation or editing.

The digits generated at the recording session are the very digits on the finished Compact Disc. Also on ordinary CD and LP.

Michael Garson: *Serendipity. Lady - Autumn leaves - I should care - Spirit of play - Trio blues -*

My romance

With illustrious sidemen Stanley Clarke (bass). Gary Herbig (sax), Peter Sparague (guitar) and fellow Free Flight members Jim Walker and Jim Laceyfield, Michael Garson has put together a tasty program of exciting mainstream acoustic jazz. Recorded by Prof Johnson in a real concert space, *Serendipity* represents an alternative, non-studio approach to jazz recording. A long standing favourite for audio demo, the CD contains two extra tracks.

Star of Wonder:

Silent night - Nativity carol - We three kings - We'll Dress the house - Come all ye faithful - Deck the hall -

Festive music for the holiday season by an outstanding professional chorus, recorded in San Francisco's St Ignatius Church.

The spine tingling acoustics are ideal for this program and *Star of Wonder* contains the full range of Christmas music: imaginative arrangements of traditional carols, renaissance motets and dramatic 20th century compositions

The CD contains three extra tracks.

Berlioz: *Fantastique. Symphonie Fantastique.* Varujan Kojian, The Utah Symphony Orchestra.

This is widely considered to be the recording of this magical work. The Utah Symphony Orchestra, playing in Salt Lake City's Symphonic Hall, gives a world class performance, and the excellent recording captures it in its entirety.

The CD contains two versions of the explosive finale, one with standard orchestral bells, and another with digitally recorded church bells.

The 2-disc 45RPM LP set contains two copies of *March To The Scaffold* and *Dreams Of A Witches Sabbath*.

Nojima: *Nojima plays Liszt. Sonata in B minor - Mephisto Waltz - La Campanella - Harmonies du Soir - Feux Follets.*

The recipient of more rave reviews than any piano recording in recent memory, this is truly one for the history books.

Japan's most celebrated concert pianist won the Silver Medal at the Van Cliburn competition. Connoisseurs of great piano playing will treasure this recording, which has also been acclaimed for its outstanding sonic realism

Chicago Pro Musica: *Weill, Varese, Bowles and Martinu. Threepenny Opera suite - Octandre - Music for a farce - La Revue de Cuisine.*

Chicago Pro Musica gives brilliant performances of four magnificent 20th Century works. Kurt Weill's pungent suite for wind, brass and percussion is the centrepiece.

Featuring the first stereo recording of a rare piece by Paul Bowles, best known as the author of *The Sheltering Sky* but also a distinguished composer for the stage.

Martinu's Parisian ballet from the 1920s contains the steamiest of tangos and a mad Charleston.

Eileen Farrell: *Rogers & Hart. I could write a book - I wish I were in love again - Wait till I see him - I didn't know what time it was - Love me tonight - Nobody's heart - It never entered my mind - Mountain greenery - Sing for your supper - Can't you do a friend a favour - Lover - My heart stood still - Little girl blue - You're nearer.*

A wide ranging survey including many great standards and more than a few rarities. Farrell's affinity for the songs of this era is undisputed.

Beautifully sung as her earlier pop recordings were, these new performances reveal an added dimension to the Farrell art - total involvement with the lyrics. And what lyrics! A must for admirers of Lorenz Hart.

Nojima: *Nojima Plays Ravel. Miroirs: Noctuelles - Oiseaux tristes - Une baroque sur l'océan - Alborada del gracioso - La valse des cloches - Gaspard de la Nuit: Odine - Le gibet - Scarbo.*

Here is the eagerly awaited sequel to Nojima's first American recording, featuring some of his most renowned specialities.

Gaspard de la Nuit is the pianist's Everest, attempted by only a few. *The Miroirs* are a distillation of Ravel's impressionist style, requiring a totally different technique. The Nojima performances are incandescent.

Opus 3 test record 1: Depth of image.

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. It contains the work of a broad cross section of the label's recording artists.

Opus 3 test record 2: Timbre.

Timbre or tonal accuracy is a crucial area of performance for audio equipment, this disc is composed of tracks designed to show up the timbral strengths of the components its played through. A good recording of interesting and diverse music.

Opus 3 test record 3: Dynamics.

Another compilation on the Swedish Opus 3 label, with musical extracts carefully chosen

to illustrate what is meant by musical dynamics with comprehensive liner notes to show you what you should be listening for. How good is your hi-fi system?

Opus 3 test record 4: Depth of image, Timbre, Dynamics.

In this fourth recording in the test series Opus has linked together the three concepts as a basis for completely evaluating audio equipment. Test record 4 like the first three contains a selection of illustrated music from our catalogue - mostly from the more recent recordings.

Thelma Houston & Pressure

Cooker: *I've got the music in me. I've got the music in me - To know you is to love you - Don't misunderstand - Got to get you into my life - plus four instrumental tracks.*

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!

Eileen Farrell: *Sings Arlen. Let's fall in love - Out of this world - I wonder what became of me - I've got the world on a string - Like a straw in the wind - Down with love - Happiness is a thing called Joe - A woman's prerogative - Come rain or come shine - Little drops of rain - Over the rainbow - When the sun comes out - As long as I live - My shining hour - Last night when we were young.*

Farrell worked often with Harold Arlen, and has long been identified with his music: it was an Arlen tune that gave the title to the first of four albums of pop songs she made in the sixties, *I've got a right to sing the blues*.

This definitive new collection is graced with music notes and personal remembrances by Gene Lees.

Jim Brock: *Tropic affair Pass a grill - Ladies of the Clabash - Tropic affair - Anya - Quo qui's groove - Side walk - Palm palm girls - O vazio.*

Vibrant, steamy and sensual, this contemporary instrumental jazz contains more than a touch of the tropics.

Renowned percussionist Jim Brock has recorded and toured with such diverse musical talents as Dave Valentin, Janis Ian and Scott Cossu.

Brock's dynamic ten-piece band, production by legendary Don Dixon, and prof. Johnson's magical live to two-track studio sonics result in a soundstage of such three-dimensionality, you can step inside the music. Enjoy

a vacation without leaving home with tropic affair!

Eileen Farrell: *Sings Johnny Mercer Skylark - I remember you - Early Autumn - Laura - I thought about you - Too marvelous for words - and more.*

Arranged by Manny Albam and Loonis McGlohan, this album includes rarities and favourites from the vast catalogue of America's most poetic and prolific lyricist.

Eileen Farrell: *It's over I get the blues when it rains - How about me? - Easy to remember - Gone with the wind - I remember April - And more memorable tear jerkers.*

Arranged and conducted by Robert Farnon, this album gives Farrell the opportunity to demonstrate her considerable skills, in touching songs of lost love. These great laments respond eloquently to the lush Farnon treatment.

NEW RELEASES

Robert Farnon conducts the Royal Philharmonic Orchestra:

Film music and other works *Suite from Captain Horatio Hornblower - Lake in the woods - Canadian impressions - A la Claire fontaine - and more.*

The Royal Philharmonic Orchestra, conducted by the composer, Robert Farnon at the Town hall, Watford.

The recording session that *Hi-Fi Choice* contributor Richard Black wrote about in the February issue (103), produced by the legendary Prof Keith Johnson using both analogue and digital tape recorders to produce the finest results for LP and CD.

This has the traditional Reference Recordings virtues of wide bandwidth and dynamic range and an unusual degree of clarity, due in no small part to the simplicity of the recording equipment.

Malcolm Arnold:

Conducts the London Philharmonic Orchestra.

A Sussex overture - Bechus - Dandi Pratt - The smoke - Anniversary overture - The fair field - Flourish for orchestra - The Commonwealth Christmas overture.

On this very latest Reference recording the London Philharmonic Orchestra is conducted by the composer, Malcolm Arnold, at the Town hall, Watford.

This Keith Johnson production includes first recordings of Britain's leading living composer's lesser known works.

Record and CD PriceTable

Prof Johnson's Sound Show:

Ref RR-7 (LP only) (£18.50)

Berlioz: *Fantastique*

Ref RR-11 (double) (£24.99)

Ref RR-11CD (£18.50)

Tafel Musik: *Baroque*

Ref RR-13 (£18.50)

Ref RR-13CD (£18.50)

Respighi: *Church Windows*

Ref RR-15 (£18.50)

Ref RR-15CD (£18.50)

Stravinsky: *L'Histoire*

Ref RR-17 (£18.50)

Ref RR-17CD (£18.50)

Copland: *Apalacian Spring*

Ref RR-22 (£18.50)

Ref RR-22CD (£18.50)

Helicon Ensemble: *Vivaldi*

Ref RR-23 (£18.50)

Ref RR-23CD (£18.50)

Nojima Plays Liszt:

Ref RR-25 (£18.50)

Ref RR-25CD (£18.50)

Nojima Plays Ravel:

Ref RR-35 (£18.50)

Ref RR-35CD (£18.50)

Mike Garson: *Serendipity*

Ref RR-20 (£18.50)

Ref RR-20CD (£18.50)

Walker & Garson: *Reflections*

Ref RR-18 (LP only) (£18.50)

Marni Nixon: *Marni sings...*

Ref RR-19 (£18.50)

Ref RR-19CD (£18.50)

Star of wonder:

Ref RR-21 (£18.50)

Ref RR-21CD (£18.50)

Chicago Pro Musica: *Weill*

Ref RR-29 (£18.50)

Ref RR-29CD (£18.50)

Eileen Farrell: *Torch Songs*

Ref RR-34CD (£18.50)

Dick Hyams Plays Fats Waller:

Ref RR-33 (£18.50)

Ref RR-33CD (£18.50)

Ref RR-33DCCD (£29.99)

Opus 3 test record 1

Ref OP-7900CD (£17.99)

Ref OP-7900LP (£17.99)

Opus 3 test record 2

Ref OP-8000LP (LP only) (£17.99)

Opus 3 test record 3

Ref OP-8300CD (£17.99)

Ref OP-8300LP (£17.99)

Opus 3 test record 4

Ref OP-9200CD (£18.50)

Ref OP-9200LP (£18.50)

Thelma Houston: *Music in me*

Ref CD-2 (£18.50)

Eileen Farrell: *Sings Arlen*

Ref RR-30 (£18.50)

Ref RR-30CD (£18.50)

Jim Brock: *Tropic Affair*

Ref RR-31 (£18.50)

Ref RR-31CD (£18.50)

Eileen Farrell: *Sings Johnny Mercer*

Ref RR-44CD (£18.50)

Eileen Farrell: *It's Over*

Ref RR-46CD (£18.50)

Malcolm Arnold/RPO:

Ref RR-48 (£18.50)

Ref RR-48CD (£18.50)

Robert Farnon/RPO

Ref RR-47 (£18.50)

Ref RR-47CD (£18.50)

William Walton: *Facade Suite*

Ref RR-19 (£18.50)

Ref RR-19CD (£18.50)

Reference Jazz Sampler

Ref CD94 (CD only) (£12.99)

Reference Classical Sampler

Ref RR-S1CD (CD only) (£12.99)

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Furukawa Price Table

Please circle the cables you require.

Interconnects - RCA to RCA

FV1010 (each)

FD1010 (pair)

Fibre optics - TOSLINK

FO1110 (each)

	0.5m	1.0m	1.5m	2.0m
FV1010 (each)	50.00	55.00	57.50	60.00
FD1010 (pair)	85.00	92.50	97.50	NA
FO1110 (each)	NA	45.00	50.00	NA

Speaker cables

Please state termination required, solderless, gold plated banana plugs, spades or pins or any combination. All prices are per pair.

	2.0m	2.5m	3.0m	3.5m	4.0m	4.5m	5.0m
FS2T14	52.00	57.75	63.50	69.25	75.00	80.75	86.50
FS2T20P	65.00	74.00	83.00	92.00	101.00	110.00	119.00
FS2T35P	95.00	111.50	128.00	144.50	161.00	177.50	194.00

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UNIVERSITY AUDIO, 1-2 Peas Hill, Cambridge. (0223) 354237. Roksan, Quads, Meridian, Arcam, Musical Fidelity, Marantz, ATC, Pioneer, Yamaha, Infinity. 2 dems, 1 single speaker. Home trial, free install, Service Dept. Visa, Access, Amex, Credit. 9-5.30.

CHESHIRE

ASTON AUDIO, 4 West St, Alderley Edge (0625) 582704. Wide range of specialist audio, interest free credit. Visa, Access. Home trial. **BADA**
DOUG BRADY HI-FI, Kingsway Studios, Kingsway North, Warrington (Padgate 0925) 828009. 'Largest choice of specialist Hi-Fi in N.W.' All credit cards. 3 Dem rooms. Open 6 days. **BADA**
CHRIS BROOKS HI-FI, 29 Gaskell St, Stockton Heath, Warrington. (0925) 61212/3. Tues-Sat 10-6. 2 dem rooms. Credit facilities. All credit cards Total absence of bull****. **BADA**
CONGLETON HI-FI, 1/1a Duke St, Congleton, Cheshire, CW12 1AP (0260) 297544. Arcam, Linn, Naim Audio, Nakamichi, Epos, Audio Innovations, Voyd, Royd, Neat Peite, B&W, NAD, Rational Audio. Superbly appointed single speaker demo facilities. No appts nec, home trial facilities, free installation. 2 year guarantee on all equipment. Access, Visa. Mon-Fri 10-6, Sat 9.30-5.30, Other times by appt.
PHILIP DOOLEY, 106 Mill Str, Macclesfield, Cheshire SK11 6NR. (0625) 423158. Marantz, Trio-Kenwood, Pioneer, Aiwa, Cambridge Audio, Teac, B&W Loudspeakers, Celestion, Rogers, Tannoy. No appt necessary, home trial facilities, free install, service dept. Visa, Access, Lombard Tricity. Open 9-6pm, Wed 9-1pm.
PETER MARTIN HI-FI, 4 Duke St, Congleton (0260 273206), 1 Stanley St, Leek (0533 383780), Celestion, Creek, Musical Fidelity, Pink Triangle, Rotel, Ruark, Sony, Systemdek, Tannoy, Teac, Technics. 2 Demo Rooms, No appts nec, Home trial, Free install, Service dept. Access, Visa, Combarid Tricity. Open 4-5.30, 6 days a week.
PETERS HI-FI, 4 St Michaels Squ., Grosvenor Precinct, Chester. (0244) 322063/319392. Linn, Arcam, Technics, Sony, Marantz, Dual, Denon, Tannoy, Wharfedale, Quad. 2 single spker dem rooms, no appts nec., free installation, service dept. Access, Visa, Amex, Peters credit chargecard Mon-Sat 9-5.30.
SWIFT OF WILMSLOW, 4-8 St Annes Parade, Wilmslow. (0625) 526213. Arcam, Denon, Kenwood, Musical Fidelity, Marantz, NAD, Cambridge. 2 dem rooms. Tues-Sat 9.15-6pm. No pressure! **BADA**

CLEVELAND

ACTION ACOUSTICS, 155-157 High Street, Redcar, Cleveland TS10 3AN. 0642 480723. Audio Innovations, Cambridge, Harman-Kardon, JBL, Michell, Musical Fidelity, Pink Triangle, Revox, Rogers, Thorens, etc. Dem Room. Appts nec. Home trial facilities, free installation, service dept. Access, Visa & H.P. Open 9.15-5.30.
GILSON AUDIO LTD, 172 Borough Road, Middlesbrough. (0642) 248793. Linn, Exposure, Arcam, Mission, Cyrus, Denon, Marantz, Rotel, Pioneer, Audiobab, Tannoy. Demonstration facilities in main shop and 1 dem. room, appt nec, home trial facilities, free install. on request, service department. Access, Visa, HP. 10-5 - 6 days.

CORNWALL

ART OF MUSIC, Near Launceston, Cornwall. (0566) 86649. Cary, Chessell, Diamond Acoustics, Forsell, Lumley, Reference, Magnum, Dynalab, Magnum Reference, Silverlink Cable, Shinon. Dem studio appointments necessary, home trial facilities, & free installation. Open 7 days.
DEFINITIVE AUDIO, St Austell, Cornwall TR16 5NH. (0726) 844039. Voyd, Audio Innovations, Micromega, Helius, Syrius, Audio Note, System Dek, JPW, SME, Goldring etc. Free Home Demo and Install throughout Cornwall. Credit facilities. Open 7 days

CUMBRIA

MISONS SOUND & VISION, 11 Warwick Road, Carlisle CA1 1DH. Tel (0228) 22620. Bang & Olufsen, Arcam, Quad, NAD < Yamaha, Sony. Demo Suite, No appts nec, Home trial facilities, Free Installation, Service Department. Open 9-5.30 Mon-Fri. Thurs 9-1. Sat 9-5.

DEVONSHIRE

CHELSTON HI-FI, 38 Walnut Road, Chelston, Torquay, Devon TQ2 6HS. Tel: (0803) 606863. Denon, Marantz, Rotel, Musical Fidelity, Acoustic Energy, NAD, Castle, Heybrook, Celestion, JPW etc. 2 dem rooms. Home trial. Free installation. Access, Visa, Amex, Diners, Hi-Fi Markets Chargecard. Credit facilities. 9.30-7.30 Mon-Fri, 9.30-6 Sat.
THE HI-FI ATTIC, 58 New George St, Plymouth, Devon PL1 1PJ. (0752) 669511. One of the South West's oldest hifi shops. We stock all leading manufacturers & if out of the ordinary, we'll get it for you. We are about to be completely re-furnished to give a large demo room with free coffee!! (& whiskey to console the big spenders!!) We have a genuine interest in hifi & believe the customer always comes first. Single speaker comparators & a (hopefully) relaxed atmosphere. Bring your own equipment/dics etc. along to have a listen. We have been completely re-furnished to give a large demo room with free coffee. Home demonstrations & installations

& interest free credit over £700. Open 9.30-5.30 & demos can be by appt
RADFORD HI-FI, 6 Fore St, St Marychurch, Torquay, (0803) 326723. Choose from a huge selection of the world's leading hi-fi manufacturers in one of our 3 modern dem rooms. Expert advice and personal service guarantee your total satisfaction. FREE home trial, FREE installation. Visa, Access credit facilities. 9-5.30 Mon-Sat. **BADA**
RADFORD HI-FI, 107 Cornwall St, Plymouth. (0752) 226011. 2 dem rooms. Other details as above. **BADA**
RADFORD HI-FI, 28 Cowick St, St Thomas, Exeter. (0392) 218895. All details as Torquay shop above. **BADA**
STUDIO ACOUSTICS. (0626) 67060. OCM Technology, Shahinian Acoustics, Superplan amplifiers, Nobis loudspeakers & amplifiers, Mirror Image Audio, J.A. Michell, plus other fine equipment. home trial, free install, in-house service dept. Mon-Fri 9-4.30, appointments only.
UPTON ELECTRONICS, 3' Torquay Rd, Paignton, Devon. (0803) 551329. Pioneer, Denon, NVA, Musical Fidelity, Tannoy, Ruark, Arcam, Audiobab, Mordaunt Short, Rogers, Revolver, etc. Single Speaker Room. HJome demonstrations, Appointments pef for demonstrations. Free installation. Own service Department. Access & Visa, instant credit. up to £1000. 9-5.30 Mon-Sat 9-1 Weds.

DORSET

DORCHESTER HI-FI, 15 High West St, Dorchester, Dorset DT1 1UW. Aiwa, Celestion, Deltec, Heybrook, Infinity, Philips, Pioneer, Rogers, Rotel, Spondor, etc. Single speaker demo lounge. Home trials available. Free installation, Service department, guarantee on all products. Access, Visa. 9-5.30 6 days
SUTTONS HI-FI, 18 Westover Road, Bournemouth. 0202 555512. Linn, Arcam, Mission, Quad, Audiobab, JVC, Akai, Aiwa, Denon, etc. 2 Single Speaker Listening Rooms, Home Demonstrations, Free Installations. Mon-Sat 9-5.30. Call for details. **BADA**

ESSEX

AUDIO T, Gants Hill, 442-444 Cranbrook Rd, Gants Hill, Ilford, Essex 1G2 6LL. Tel: 081 518 0915 Fax 081 554 8463. Arcam, Audiobab, Cyrus, Denon, Kef, Meridian, Rotel, Micromega, Yamaha & many more. Tues-Sat 10-6. 3 yr gntee on Hi-Fi. Free del & instal. 30 day upgrade scheme. Home dems. PX. 2 dem rooms 2 single spker dem rooms. **BADA**
1ST AND FOREMOST HI-FI CENTRE, 49-55 North Station Road, Colchester, Essex CO1 1RQ. Tel: (0206) 549842. Fax: (0206) 762900. Tlx: 987873 SAIDG. Trio Kenwood, JVC, Akai, Aiwa, Sony, Pioneer, Technics, Nakamichi, Panasonic, Revox, etc. Home trial, free installation. Service dept. Instant credit available + all credit cards accepted. Mon to Sat 9am-6pm.
AUDIO T, 442/4 Cranbrook Rd, Gants Hill, Ilford. (081) 518 0915. Mon-Sat, 10-6. Two dem rooms. Access, Visa. Sony Hi-Fi News Best Dealer '86 & '88 (National)
BRENTWOOD MUSIC & HI-FI CENTRE, 2 Ingrave Rd, Brentwood. (0277) 221210. Alphason, Denon, Marantz, Quad, DNM, Rock/Glastonbury, E.A.R., Exposure, Kelvin Labs, Rotel, plus many more. Dem facilities, home trial, evening appts, (high end). Home installations. System problem diagnosis. Mon-Sat 9.30-5.30 (Thurs from 10am, Sat from 9am). Credit facilities. Access, Visa, Hi-Fi Markets Chargecard. Service facilities.
LYON AUDIO, 16 Peartree Business Centre, Peartree Road, Stanway, Colchester, Essex CO3 5JN. (0206) 560259. Mission, Cyrus, Arcam, Denon, Rotel, JPW, KEF, Rogers, Quad. Dem facilities. Mon-Sat 9-6. Installations. Access, Visa, Instant credit. Service dept
RAYLEIGH HI-FI, 44a High Street, Rayleigh, Essex. (0268) 779762/747571. 216 Moulsham St, On-the-Parkway, Chelmsford. (0245) 265245. 132-134 London Road, Southend-on-Sea. (0702) 435255. A&R, Creek, Cyrus, Denon, Epos, Ion, Linn, Mission, Naim, Quad, Rega, Roksan, Rotel, Royd. 0% finance. **BADA**
THOMSONS, 2 High Street, Great Baddow, Chelmsford, Essex. Tel: (0245) 71465, Fax 0245 77528. JVC, Kenwood, Mitsubishi, Toshiba, Tannoy, Mordaunt-Short, Wharfedale, Philips, Audio-Visual dealer. Home trial. Free installation. Service dept. Access, Visa, HP. Open 9-1, 25.30 Mon-Sat. Open 9-1 Wed.

GLOUCESTERSHIRE

AUDIO EXCELLENCE, 58 Bristol Road, Gloucester. (0452) 300046. Great Hi-Fi carefully selected and demonstrated by friendly and enthusiastic staff. Closed Mon. **BADA**
AUDIO T, 40-42 Albion St, Cheltenham, Glos. GL52 2RQ (0242) 583960. Fax (0242) 226435. Great hi-fi from Arcam, Audiobab, Cyrus, Denon, Linn, Meridian, Mission, Rogers, Rotel, Yamaha & many more. Mon-Fri 10-6pm. Sat 9.30-5.30. 3 yr gntee on Hi-Fi. 30 day upgrade scheme. Home dems. PX. Single speaker dem room Free del. and instal. **BADA**
HUTCHINSONS, 295-297 High Str, Cheltenham, Glos. GL50 3HL. (0242)

The Choice Dealer Directory

573012. Pioneer reference point, Technics, Dual, NAD, jWharfedale, Celestion, Marantz, Aiwa, Kenwood, Sennheiser. No appts necessary, free install, service dept. Instant credit up to £1000. Open Mon-Sat 9.15-5.30. RLEWIS & CO Ltd, 45 High Str, Stroud, Gloucestershire GL5 1AW. (0453) 762485/9. Bang & Olufsen, Denon, Dual, Mission, Mordaunt-Short, Pioneer, Sony, Technics, Yamaha, Celestion etc. In store dems, free install, service dept. Access, visa. Open 8.30-5pm 6 days.

HAMPSHIRE

AUDIO T, 4 Feathers Lane, Basingstoke, Hants. RG21 1AS. (0256) 24311, Fax (0256) 24430. Great hi-fi from Linn, arcam, Audiolab, Cyrus, Denon, Linn, Merideian, Mission, Rotel, Yamaha and many more. Mon-Sat 9.30-5.30pm. 3 yr gnteeon Hi-Fi. Free del & instal. 30 day upgrade scheme. Home dems. PX. Single speaker dem room. Free del. and instal.

BADA

HAMILTON ELECTRONICS, 35 London Rd, Southampton, Tel: 0703 228622/3 Fax: 0703 332141. Hi-Fi and Surrounding Sound Specialists. Harman/Kardon, Marantz, Denon, B&W, Quad, Aiwa, Technics, JBL, Hecla. No appts nec, Home trial facilities, Free Install, Service Department. Open 9-5.15pm Mon-Sat. Access and Visa.

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

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 instal. Service dept. 0% finance. Access, Visa. Mon-Sat 9.30-6.

HEREFORDSHIRE

ENGLISH AUDIO, 95 Whitecross Road, Hereford HR40DG. (0432) 355081. Musical Fidelity, Arcam, Pink Triangle, Denon, Marantz, Mission-Cyrus, Audio Innovations, Rotel, NAD, Nakamichi, TDL, and others. Single Speaker Dem room. Home trial. Free install. Service dept. Access, Visa, Credit arranged. Open Mon-Sat 10am-6pm.

GOSPEL MUSIC AUDIO, 32A High St Kington, Herefordshire. (0544) 230254. New Shop open: Castle Video, 1 Spa Centre, Station Crescent, Llandrindod Wells (0587 824 0200) Alphason, Alison, Revolver, Luxman, Yamaha, QED, Audio Systemline, Wharfedale, Jamo, Micromega, No appts nec., home trial facilities, service dept. -5.30 +evening dems.

HERTFORDSHIRE

ACOUSTIC ARTS LTD, 101 St Albans Rd, Watford, Herts. (0923) 245250 Fax (0923) 230798 Absolute Sounds, Acoustic Energy, Audiolab, Denon, Marantz, Meridian, Quad, Ref Imports, TDL., Teak, Tues-Sat 9.30-6.00

BADA

RADLETT AUDIO, 141 Watling Street, Radlett, Hertfordshire, WD7 7NQ. (0923) 856497. Mark Levinson, Proceed, PRO AC, Magnepan, Albarry, Martin Logan, Tube Technology, Audiolab, Rotel, Rega. Home trial facilities, Free Install, Service Dept. Visa, Access 9-5.30 Mon-Fri 10-5.30 Sat

STUDIO 99, 82 High Street, Harpenden, (05827) 64246. Linn, Naim, Meridian, Rega, Nakamichi, Mission/Cyrus, Quad, Creek, KEF, Bang & Olufsen, Yamaha etc. Quiet single speaker dem room. Appts nec. Home trial, free install. Service Dept. Visa/c, Access/c & finance terms. 9-5.30pm (Mon/Sat). Closed Weds.

BADA

THE AUDIO FILE, 27 Hockerill St, Bishops Stortford, Herts CM23 2DW. (0279) 506576. 9.30-5.30 open 6 days. DealerOf The Year 1988/89. Linn, Naim, Quad, Cyrus, Arcam, Roksan, Denon, Epos, Rotel, KEF, Pro-Ac. . 0% credit.

BADA

NORTH HUMBERSIDE

JUST AUDIO, 2A Foston Lane, North Frodingham, Driffield. Tel 0262 488700, call for details.

SUPERFI, 4 Dock Str, Queens Gardens Hull, HU1 3DL. (0482) 24051. See main entry under Nottinghamshire for full details.

KENT

CANTERBURY HI FI, 50 Burgate, Canterbury, Kent, (0227) 765 315 B&W, Denon, Kenwood, Cerwin-Vega, Yamaha, Technica, Rogers, Musical Fidelity, Sony, NAD. No appointments necessary. Free Installation. Service Dept. Access and Visa Mon-Sat 9-5.30

JOHN MARLEY HI-FI CENTRES, 2 Station Rd, West Canterbury. (0227) 769329. Also at Dover - (0304) 207562. Arcam, B&W, Heybrook, Infinity, JPW, Pro-Ac, Pioneer, Rotel, Tannoy, Technics. Dem and home trail fac. Mon-Sat 9-5.30 closed Thurs. Free install. Credit to £1,000. Access, Visa, Credit charge. Service dept.

KIMBERLEY HI-FI, 193 Broadway, Bexleyheath, Kent. (081) 304 3272. Pioneer, Technics, Kenwood, Denon, NAD, Aiwa, Tannoy, Mission, Wharfedale, Castle. Separate dem room, no appt nec. Free installation.

Service Dept. Instant credit facilities. 9.30-5.30. No early closing. PANATEC SOUND & VISION CENTRE, 83b High Str, Gillingham. (0634) 5731141. B&W, Bose, Dual, Kenwood, Marantz, Pioneer, Philips, Sony, Tannoy, Technics. Dem room facilities. 0% credit, Service Dept. Free Installation. Pioneer Reference Point Dealer PANATEC SOUND & VISION, 17 Week Str, Maidstone. (0622) 661488. See above for details.

PHOTOCRAFT HI-FI, 40 High St, Ashford (0233) 624441. No.1 in Kent for Linn, Naim, Rega, Roksan, Exposure, Onix, Epos, Royd, Creek. But before you choose equipment choose where to buy it. Dem room, appts necessary. Home trial and free installation. Visa, Access, Bada Chargecard. 9-5.30 mon-Fri (Wed & Satto 5 only). Service Dept.

BADA

VOLUME ONE, 41 Upper Wickham Lane, Welling, DA16 3AD. 081 304 4622. Arcam, Creek, Dual, Epos, Exposure, Mordaunt Short, Monitor Audio, Nakamichi, Pink Triangle, Rotel. Large demo room, no appt nec, darts & snooker facilities. Evening dems in shop by appt. Home trial & demo, free delivery & installation. Access & Visa, credit up to £1000. 9.30-5.30 Mon-Sat.

V J HI-FI, 29 Guildhall St, Folkestone. (0303) 56860. Mon-Sat 9-6. NAD, Yamaha, Marantz, Cambridge Audio, Denon, Kenwood, Rogers, Dual, Musical Fidelity, Quad, Dem and home trial facilities, free install, credit to £1000. Amex, Diners, Visa, Access. Service dept.

V J HI-FI, 119 High Street Margate. (0843) 226977. Mon-Sat 9-6. NAD, Yamaha, Marantz, Cambridge Audio, Denon, Kenwood, Rogers, Dual, Musical Fidelity, Pioneer. Dem and home trial facilities, free installation, credit to £1000. Amex, Diners, Visa, Access. Service dept.

LANCASHIRE

NORMAN AUDIO, 216 Church Street, Blackpool FY1 3PT. 0253 295661 For details see Preston branch entry (below). Open 9-5.30, Closed Wed

BADA

NORMAN AUDIO, 131 Friargate, Preston PR1 2EE. (0772) 53057. Fax 562731. Sony Hi-Fi News Area Winner. Aiwa, B&W Loudspeakers, Denon, Marantz, Mission, Cyrus, Monitor Audio, Nakamichi, Quad, Roksan, Rotel & many others! 2 lux. dem. lounge. Home trial by arrangement. Free install. Service dept. Inst. cred. facs. with several companies. Most credit cards accepted. 6 days 9-5.30.

BADA

ROMERS HI-FI CENTRE, 94-96 High Street, Rishton, Blackburn, Lancs, BB1 4LQ.

Tel: 0254 887799. Musical Fidelity, Technics, Pioneer, Marantz, Revox, Tannoy, Celestion, Sony, Panasonic, Mission. Single Speaker Dem Room, Also wired for pro logic. No appts nec. Home trial fac by arrangement. Free Install, Service Dept. Access, Visa, Switch, Interest free on selected products. Open 9-5.30 Wed 9-1.00

LEICESTERSHIRE

MAYS HI-FI, 27/33 Churchgate, Leicester. LE1 3AL. (0533) 625625. Sony, Technics, Denon, Kenwood, Pioneer(Reference Point) Philips, B&W, Tannoy, Mission/Cyrus, Dual, Listening room, free install, service dept. Full range of credit facilities. Open Mon-Sat 9-5.30 Thurs 9-1.30 THE LEICESTER HI-FI CO, 6 Silver Walk, St. Martins Square, Leicester LE1 5EW. Tel: (0533) 539753. Fax: (0533) 626097. Acoustic Energy, Arcam, Marantz, Micromega, Mission/Cyrus, Musical Fidelity, Nakamichi, Meridian, 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. Bada member.

BADA

LISTEN sINN, 6 Hotel Street, Leicester. (0533) 623754 (Fax) 0533 623758. Linn, Arcam, Royd, Heybrook, Creek, Neat, Mission, Cyrus, Audiolab, Quad, Dewen, etc. 2 Dem Rooms.

BADA

SOUND ADVICE, The Factory, Duke St, Loughborough LE11 1ED. (0509) 218254. Mission Cyrus, Rega, Naim, Linn, Meridian, Yamaha, Rotel, Arcam, Nakamichi, JPW. 3 demonstration areas, no appts necessary, free installation, service department. Lombard credit charge, Access, Visa Mon-Fri 9.30-6.00, Sat 9.30-5.30.

LINCOLNSHIRE

BOSTON HI FI CENTRE, 65a Wide Bargate, John Adams Way, Boston, Lincs PE21 6SG. (0205) 365477. Quad, Nakamichi, Arcam, Marantz, NAD, Castle, JPW, Rogers, etc. Separate demo studio. Home trial. Free installation. Access, Visa. Tues - Sat 9-5 pm.

BADA

STAMFORD HI-FI CENTRE, 9 Red Lion Square, Stamford, Lincs PE9 2AJ. (0780) 62128. Pioneer, Technics, Cyrus-Mission, Rotel, NAD, Yamaha, Kenwood, Marantz, Quad, plus all major speaker manufacturers. Expert advice, comparator demonstrations, on two floors, part exchange Hi-Fi purchased for cash. No appointments necessary, home trial facilities, free installation, service department. Mastercard, Visa & credit charge, finance available. Mon-Sat 9-5.30pm, closed Thursdays.

SUPERFI, 271A High Str, Lincoln LN2 1JG. (0522) 520265. See main entry under Nottinghamshire for full details.

LONDON

ANALOG AUDIO, 849 High Road, London N12. (081) 445 3267. Cambridge, Denon, Rotel, Yamaha, Marantz, Wharfedale, Teac, Mordaunt-Short, Cerwin Vega, Nad. Free install. Service dept. Instant credit up to £1000. Visa & Access. 9.30-6 6 days.

AUDIO T, 190 West End Lane, West Hampstead, London NW6 1SQ. (071) 794 7848, Fax (071) 431 3570. Great hi-fi from Linn, Arcam, Audiolab, Cyrus, Denon, Meridian, Mission, Philips, Rotel, Proac, Micromega, Yamaha, and many more. Tue-Sat 10-6pm. 3 yr gntee on Hi-Fi. Free del & instal. 30 day upgrade scheme. Home dems. PX. 2 dem rooms. A/V Dept.

BADA

BILLY VEE SOUND SYSTEMS, 248 Lee High Road, London SE13. (081) 318 5755. Arcam, Linn, Naim, Quad, etc. 2 dem rooms. Int. free credit. Access, Visa. Closed Thurs.

BADA

CORNFLAKE SHOP, 37 Windmill St (just off Tottenham Court Rd), London W1. (071) 631 0472. (domestic) (071) 323 4554 (multiroom) Fax. (071) 323 4554 (multiroom) Fax. (071) 436 7265. Tues -Sat 10-7 Rega, Roksan, Naim, Monitor Audio, Arcam, Nakamichi, Rotel, Epos etc. 3 dem rooms. (incl. home cinema) Friendly, professional service. Home trial facilities. Appointments preferred. Full delivery and repair service. Multiroom specialists. Access & Visa.

COVENT GARDEN RECORDS, 84 Charing Cross Road, London WC2 H0JA. (071) 379 7635, Fax (071) 836 1345. London's premier digital audio centre, Photo CD, DCC, CD, & 10X9 TV S. Audio Labs, B&O, Marantz, Mission, Cyrus, Philips, Rotel, Rogers, Quad, Soney, single speaker dem rooms, appointments suggested, installation service available, service department. All major credit cards accepted. Mon-Sat 10am-7.30pm

DOUG BRADY HI-FI, 14-18 Monmouth St. London WC2H9HB. (071) 379 4010. Wide range of top specialist hi-fi from Britain, America and Japan. 3 dem rooms.

BADA

GRAHAM'S HI-FI, Canonbury Yard, 190a New North Rd, London N17 (071) 226 5500. Winner Sony/HFN Greater London Dealer Award 1986-1989-1990. Linn, Naim, Rega, etc. £400-£3000-£13,000.

BADA

HI-FI COMPONENTS, 84 Battersea Rise, London, SW11 1EH. Tel: 071 2231 110. Tannoy, Kenwood, Rotel, NAD, QED-C Wharfedale, Dual, Shure, Ortofon, Celestion. Appts nec, Service Dept. Access, Visa, Diners, Amex. Open 10-6 Closed Wed.

KJ WEST ONE, 26 New Cavendish St, London W1M 7LH (071) 486 8262/63. Fax (071) 487 3452. Arcam, Audio Alchemy, Audio Lab, Audio Research, Croft, Deltec, Epos, Marantz, Meredian, Mission, Musical Fidelity, Pink Triangle, Roksan. Appts nec. Home trial. Free installation. Service dept. Major credit cards. Mon-Sat 10-6pm. (Late night Thur til 7pm).

MUSICAL IMAGES LTD. See under Middlesex & full page advert in the Product Directory.

NICHOLLS HI-FI, 430-434 Lee High Rd, Lewisham, London, SE12 8RW. 081 852 5780. Sony, Technics, Harman, JBL, Mordaunt Short, Kenwood, Panasonic, Hafler, Sumo, B&W. Demo facilities, no appt. nec, Home trail facilities, Free Install. Service Dept, Credit available, Access, Visa. Open 9.30-6 Mon-Sat, Thurs 9.30-1pm.

SOUND SENSE, 350 Edgware Road, London W2 1DX. (071) 402 2100. Alphason, B&W, Nakamichi, Celestion, Cambridge Audio, Dual, Denon, Monitor Audio, Marantz, NVA, Sony ES. Appts preferred. Installations available. Access, Visa, Standard credit facilities. Mon-Sat 9.30-6.30.

STUDIO 99, 79-81 Fairfax Road, Swiss Cottage, London NW6 (071) 624 8855. Linn, Naim, Meridian, Rega, Quad, Nakamichi, Mission/Cyrus, KEF, Bang & Olufsen, Yamaha, Creek etc. 2 single speaker dem rooms. Appts. nec. Home trials, free install. Service dept. Visa/c, Access/c & finance terms. 10-7 Mon-Fri, 10-6 Sat.

BADA

SUPERFI, 2-4 Camden High Street, Camden, NW1 0JH (071) 388 1300. See main entry under Notts for full details.

UXBRIDGE AUDIO - CHISWICK, 109 Chiswick High Road, Chiswick, W4 2ED (081) 742 3444 Fax (081) 742 3295. 2 Demo Rooms, Installations, 2 Year Guarantee, 7 day exchange. Major credit cards, Tues - Sat 10 - 6. See Midx entry for brands stocked.

BADA

VOLUME ONE, 41 Upper Wickham Lane, Welling. (081) 304 4622. For full details see entry under Kent.

ZEBRA, 18-24 Brighton Road, South Croydon CR2 6AA. 081 688 2093. Mission, Pioneer, NAD, Rotel, Marantz, KEF, Tannoy, Celestion, Sony, Technics, and large range of AV equipment. Single speaker & comparator demo in a more casual environment. Service department. Mon-Sat 9.30-6.00. Access, Visa & instant credit up to £1000 subject to status.

GREATER MANCHESTER

THE AUDIO COUNSEL, 12 Shaw Road, Oldham, Manchester OL1 3LQ. (061) 633 2602. Linn, Naim, Rega, Rotel, Arcam, Micromega, EPOS, Creek, Nakamichi, Denon. 2 dem rooms. Free install. Visa, Access, Licenced credit brokers up to £1000 instant credit. 10.00-5.30 Tues, Weds, Sat; 10.00-7 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****

The Choice Dealer Directory

MURRAY HI-FI, 19 Middle Hillgate, Stockport. (061) 429 7666. Linn, Naim, Rega, Arcam, Yamaha, Royd, Epos, Creek, Nakamichi, Rotel. Full demo facilities, free installation & delivery, service dept. Full 2yr guarantee on all products. Access, Visa, Lombard Tricity, licensed credit broker. 10-6 Tue-Sat.

SWIFT HIFIDELITY, 12 Chapel Street, Cheadle. (061) 428 7222. Arcam, Denon, Kenwood, Marantz, Nad, Cyrus, Rotel, Pioneer, Mission, Tannoy. Demo room. 9.30-6. Closed Wed. **BADA**

MIDDLESEX

AUDIO T, 159a Chase Side, Enfield, Middx EN2 0PW. (081) 367 3132, Fax (081) 367 1638. Great hi-fi from Arcam, Audioblab, Cyrus, Denon, Meridian, Micromega, Mission, Philips, Rotel, Yamaha and many more. Tue-Fri 10-6pm. Sat 9.30 - 5.30 3 yr gntee on Hi-Fi. Free del & instal. 30 day upgrade scheme. Home dems. PX. 3 dem rooms. A/V Dept

BADA

HARROW AUDIO, 27 Springfield Rd, Harrow. (081) 863 0938. Mon-Sat 9.30-5.30. A&R, Audioblab, Cyrus, Denon, Epos, Monitor Audio, Musical Fidelity, Nakamichi, Quad, Rotel, Tannoy, Thorens, Yamaha etc

BADA

MUSICAL IMAGES LTD. 173 Station Rd, Edgware (081) 952 5535, fax (081) 951 5864 and 45 High St, Hounslow. Tel (081) 569 5802, fax (081) 569 6353. Most brands available - see full page advert in Product Directory. Interest free credit available, ask for details. Demo Room, Repairs & Service, Mail Order facilities.

RIVERSIDE HI-FI LTD, 422 Richmond Road, East Twickenham, Middlesex TW1 2EB. Tel. (081) 892 7613. Fax (081) 892 7749. A.R., Arcam, Audio Innovations, Castle, Dual, Denon, KEF, Luxman, Michell, Musical Fidelity, Micromega, Marantz, Nakamichi, Rotel, Spenhdor, Systemdek, Tannoy, Yamaha. One demo room, in-car demo for car hi-fi systems. Appts not always necessary. Home trial facilities. Free installation, service dept. Lombard Tricity, Access, Visa, Amex, Diners Club. Mon-Sat 9.30-6, Thurs, Fri 9.30-7.

SIGHT N SOUND, The Treaty Centre, Hounslow, Middlesex TW3 1ES. 081 572 5418, fax 081 572 5417. Sony, Kenwood, Finlux, Toshiba, Philips, Sanyo, Grundig, Pioneer, Technics, Akai. No appts nec, free install, service dept. Access & Visa, financing available. 9-6pm Mon-Sat.

MERSEYSIDE

W.A. BRADY & SON, 401 Smithdown Rd, Liverpool L15 3JJ. (051) 733 6859. 'Largest choice of specialist Hi-Fi in N.W. £100-£20K'. All credit cards. 3 dem rooms. Closed Monday. **BADA**

IN CONCERT HI-FI, 144 Seaview Road, Wallasey, Wirral, Merseyside (051) 630 5055. Denon, Kenwood, QED, Pioneer, Spica, Shan Acoustics, Systemdek, Musical Fidelity, Audio Dimensions, Voyd. Single speaker dem. room. Home trial, free installation. 10-6 - closed Mon. Access, Visa. P & A AUDIO (BIRKDALE) LTD 31 Liverpool Road, Birkdale, Southport (0704) 68373. Arcam, Cambridge, Creek, Denon, Michell, Mission/Cyrus, Mordaunt-Short, NAD, Pink Triangle, QED, Revolver, Rogers, Rotel, Royd, Tannoy. 3 Single speaker demo rooms and Nicam surround sound dem room. Free delivery, installation (Merseyside) Service dept. Mon-Sat 9 - 5.30 Half day Tues, Access, Visa, Lombard PETERS HI-FI, 11 St Werburgh Squ., Grange precinct, Berkenhead. (051) 647 5626. 9-5.30 closed Thurs. See Cheshire branch for full details PETERS HI-FI, 8 High St, Bromborough, Wirral. (051) 334 1874/2825. 9-5.30 6 days. See Cheshire branch for full details.

WEST MIDLANDS

AMADAEUS SOUND & VISION, 10 Boldmere Road, Sutton Coldfield, West Midlands Tel (021) 354 2311. Arcam, Audio Innovations, B&O, Carver, Castle, QED, Wharfedale, Yamaha, Cambridge Audio, Halfer. Single Speaker demo, appts preferred, service available, installations, B&O link install, home trials. Access, Visa, interest free credit available subject to status. 9.30-6pm 6 days.

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. Arcam, Castle, Cyrus, Denon, Linn, Marantz, Naim, Quad, Rega, Rotel. Tues-Sat 10-6. **BADA**

HORNTON ELECTRONICS (1987) LTD, 8-9 Lower Temple St, Birmingham B2 4JD. (021) 643 0972. Aiwa, Acoustic Research, Denon, Marantz, Mordaunt Short, JVC, Mission, Sony, Technics, Wharfedale. Credit to £1000. Access, Visa. 9-5.30 Mon-Sat. Service dept.

MUSICAL APPROACH, 37 High Street, Aldridge, Walsall, W. Mids. (0922) 57926. Linn products, Arcam, Creek, NVA, Revolver, Onix, Epos, Marantz, Rotel, Quad & more. Dem facs. Home trial. Service dept. Credit

facs available. Access, Visa. 9.30-5.30 Mon-Sat. 9.30-1 on Thurs.

MUSIC MATTERS, 351 Hagley Road, Edgbaston, Birmingham B17 8DL. (021) 429 2811. Roksan, Nakamichi, Arcam, Audioblab, 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.

NORFOLK

BASICALLY SOUND, The Old School, School Rd, Bracon Ash, Norwich NR14 8HE. (0508) 70829. Arcam, Linn, Naim, Denon, Spondor, 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**

NORTHAMPTONSHIRE

AUDIO CRAFT 23-25 Derngate, Northampton, NN1 1TY. Tel: 0604 36291 Bang & Oulfsen, Kenwood, Technics, Marantz, Celestion, Mordaunt-Short. No appts nec. Free Install, Service Dept. Open Mon-Sat 9-5.30pm

CLASSIC HI-FI + VIDEO, School Lane, Kettering, Northants. (0536) 515766. Rotel, Musical Fidelity, Wharfedale, Yamaha, JBL, Cyrus, Nad, Pioneer, Marantz, Kenwood, Kef, Celestion, and many more. Home trial, free instal., service dept. Access, Visa, credit facs. 9.30-5.30pm.

LISTEN INN, 32 Gold Street, Northampton. (0604) 37871 (Fax) (0604) 601430. Linn, Naim, Epos, Royd, Mission, Cyrus, Arcam, Audioblab, Neat, Creek, Quad, Denon etc. 2 Dem Rooms **BADA**

NOTTINGHAMSHIRE

CHANTRY AUDIO, Chantry Walk, 18a Eldon Street, Tuxford, Nr Newark, Notts NG22 0LH. (0777) 870372. Pink Triangle, Delttec, Rotel, SD Acoustics, Ruark, NVA, Michell, Ion Systems, Croft Acoustics, Kelvin Labs, and much more. 2 dem rooms. Home trial, free installation. Access, Visa & credit facilities and mail order. Mon-Fri 9.30-5.30pm Sat 9.30-5.30. Sun & evenings home dem by appt.

DEFINITIVE AUDIO, (0602) 813562. For a carefully considered approach to building a true hi-fidelity audio system with components derived from the following manufacturers: Audio Innovations, Snell, Wadia, Micromega, Delttec, Voyd, Systemdek, SME, Revox, Audionote, Ortofon, Pioneer. Demos by appt. Please phone for further details. Installation free of charge. Mon-Sat 10-7pm, Closed Wed a.m.

NOTTINGHAM HI-FI CENTRE, 120-122 Alfreton Road, Nottingham. (0602) 786919. Over 25 years experience, superb demo rooms, extensive range, free parking. Mon-Sat 9-5.30. **BADA**

PETER ELLIS AUDIO, 29 Kirkgate Newark, Nottingham, NG24 1AD (0636 704571) Quad, Castle, Arcam, QED, Sugden, Tannoy, Thorens, Marantz, Dennon, Teac. Demo Room, Free Install, Service Department Access, Visa, Mon-Sat 9-5.30 Close at 1:00pm on Thursday

SUPERFI, 15 Market Str, Nottingham NG1 6HY. (0602) 412137. Kenwood, Technics, Denon, Aiwa, Rotel, Wharfedale, Mission, Marantz, NAD < Celestion, and many more. 2 single speaker dem rooms. Free install on systems, service dept. Access & Visa, Amex. Open 9-5.30, 6 days.

OXFORDSHIRE

ASTLEY AUDIO LTD, 3 Market Place, Wallingford. (0491) 39305/34349. Technics, Panasonic, Pioneer, Kenwood, Sony, Yamaha, Denon, Dual, Mission, Tannoy. Home trial, free installation. Service dept. Access, Visa, Amex, Diners. Instant credit. Tue-Fri 9-5.30, Sat 9-5. Records & CDs stocked

AUDIO T, 19 Old High St, Headington, Oxford OX3 9HS. (0865) 65961,

Fax (0865) 60415. Great hi-fi from Arcam, Audioblab, B&O, Cyrus, Denon, KEF, Meridian, Mission, Rotel, Sony, Yamaha and many more. Open Mon Fri 10-6pm, Sat 9.30-5.30. 3 yr gntee on Hi-Fi. Free del & instal. 30 day upgrade scheme. Home dems. PX. 2 dem rooms. A/V Dept **BADA** OXFORD AUDIO CONSULTANTS LTD, Cantay Hse, Park End Street, Oxford OX1 1JE. (0865) 790879 fax (0865) 791665. NAD, Rotel, Musical Fidelity, Pioneer, Marantz, Rogers, TDL, Thorens, Audio Research, Proceed 2 Demo rooms. Service Dept, Home trial and free installation. Instant credit, Access, Amex, Visa. 10-6 Mon-Sat.

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 10-6 Free installation, credit to £1,000. Access, Visa. Service dept.

SHROPSHIRE

AVON HI-FI, 12 Barker Street, Shrewsbury, Shropshire SY1 1QJ. (0743) 55166. NAD, Quad, B&W, Arcam, Kenwood, Aiwa, Bose, Nakamichi, Revolver, Onkyo. Dem room. Home trial. Free install. Service dept Access, Visa. £1000 instant credit. Mon, Tues, Wed, Fri, Sat 9-5.30.

CREATIVE AUDIO, 9 Dogpole, Shrewsbury. (0743) 241924. Linn, Naim, Roksan, Mission, Arcam, Rogers, Denon, Marantz, Rotel, Celestion, etc. Dem room. Home trial and free installation. Credit to £1000. Access, Visa. Tues-Sat 9.30-5.30. Service dept.

MID-SHROPSHIRE AUDIO, 4 Holland Court, Dawley, Telford TF4 2EX. (0952) 630172. Audio Innovations, Marantz (inc Music Link), Denon, Tannoy, Ortofon, Pink Triangle, Ion Systems, Systemdek, Ruark, Monitor Audio etc. 2 dem rooms. Home trial, service dept. Instant credit up to £1000 Access, Vsa, Amex.

SOMERSET

MIKE MANNING AUDIO, 110 Middle Street, Yeovil, Somerset BA20 1NE. (0935) 79361, Fax (0935) 32923, Mobile (0850) 325965. Naim, Roksan, Pink Triangle, A+R (Arcam), ION, NAD, Pioneer, Rotel, Denon, etc. Dedicated listening lounge, for relaxed and unpressured demonstrations. Appts not usually nec. but best to phone first. Home trial facilities on request, free installation, service department. Instant credit, Access & Visa, etc. 9-5.30 closed Mondays.

STAFFORDSHIRE

GRANGE HI-FI LTD, 153 Branston Rd, Burton-on-Trent, Staffordshire DE14 3DQ. (0283) 33655. Audio Innovations, Arcam, Castle, Denon, Pink Triangle, Rotel, Rogers, Systemdek, SME, Quad, Voyd. Dem fac, appts nec on Sat, Free Install. Service dept Access, Visa. 9.00-5.30pm. Closed Mon & Wed aft, open until 7:00pm Thursdays. Closed for lunch 12.00-12.30.

MUSICAL APPROACH, Unit 7, Woodings Yard, Bailey Str., Stafford. (0785) 55154. Linn Products, Arcam, Creek, NVA, Revolver, Audiotec, Onix, Epos, Marantz, Rotel and more. Home trial. Free installation. Service dept. Credit facilities available. Access, Visa. 9.30-5.30 Mon-Sat.

SUFFOLK

EASTERN AUDIO, 41 Bramford Rd, Ipswich. (0473) 217217. Quad Audio Lab, Denon, Dual, Marantz, Mission, NAD, Nakamichi, Technics, Arcam. Mon-Sat 9.30-6 **BADA**

AUDIO IMAGES LTD, 7 All Saints Road, Pake Field, South Lowestoft, Suffolk, NR33 0JL (0502 582853) Arcam, Quad, Triangle, Rotel, Denon, Rothwell, Michell, Finlux, Meridian, JPW. Separate Demo room No appointments. Home trial facilities, free instal, service dept. Open 10:00-6:00 Tues-Sat 10:00-7:00pm Fridays.

AVALON AUDIO VISION, 12 St Margarets Plain, Ipswich, Suffolk, Tel: 0473 281922. Pioneer, Mission/Cyrus, NAD, Rotel, Yamaha, Marantz, KEF, Mordaunt-Short, Mitsubishi, Wharfedale. Single Speaker Demonstration Room. No appts nec, Home trial fac, Free Install, Service Dept. Full HP fac, Interest Free Credit available on most components, Part exchange. Open 9.30-6.00 Mon-Sat.

SURREY

AUDIO SOUTH, 24 (The Woolmead) East Str, Farnham, Surrey GU9 7TT. (0252) 714555. Audio Innovations, Audio Note, Deltrec, Yamaha, Cary, JPW, Marantz, Rotel, Snell, 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.

The Choice Dealer Directory

PJ HI-FI - the Hi-Fi Shop, 3 Bridge Street, Guildford, Surrey GU1 4RY. Tel: (0483) 504801. 9-6 Mon-Sat. Linn, Meridian, Creek, Arcam, Quad, Revox, Musical Fidelity, Rotel, NAD, Nakamichi, Marantz.

RIVERSIDE HI-FI, 422 Richmond Road, East Twickenham, TW1 2EB. Tel: (081) 892 7613. Fax: (081) 892 7749. See main entry under Middlesex.

ROGERS HI-FI, 13 Bridge Street, Guildford, Surrey. (0483) 61049. Aiwa, Denon, Dual, JPW, Marantz, Monitor Audio, Philips, Pioneer, Systemdek, Tannoy. Demonstration facilities available, no appointment necessary. Free installation. Service department. Access/Visa. Instant credit up to £,000 subject to status. Monday-Saturday 9.30-6pm, later by appointment.

SOUNDS EXCLUSIVE, 1 Kent House, High Str, Cranleigh GU6 8AU. (0483) 268185. Michell (amplification & decks), Marantz, Ariston, Ortofon, AME, Sumo, Proac, Jamo, Origin Live, Kiseki. Demo room, appts preferred, home trial facilities, free install, service dept. Access, Visa. Open 9-5.30 Mon-Sat.

SPALDINGS HI-FI, 352-4 Lower Addiscombe Rd, Croydon, Surrey. (081) 654 1231/2040. 3 dem rooms and home dem. Free installation, credit. Mon-Sat 9-6. Tuesto 8. Closed Wed. Servicedept.

SURBITON PARK RADIO, 48 Surbiton Rd, Kingston-Upon-Thames, Surrey. (081) 546 5549. Quad, Castle, Dual, Denon, Kenwood, Rotel, Pioneer, QED, B&W, Tannoy. Demo facilities. Access, Visa. 9.30-5.00 Tues-Sat. Service dept.

SURREY HI-FI, 45 High Street, Godstone, Surrey RH9 8LS. (0883) 74755. Parking, easy access - just 2 mins off junction 6, M25. Quad, TDL, Nakamichi, KEF, Thorens, Rotel, Marantz, Denon, Michell, Tannoy, JPW, Single speaker demo room. Demonstration by appointment, free installation, service dept. Access, Visa, Mastercard. 0% Credit. Open 9-6, closed Wed.

TRU-FI SOUND AND VISION, 2 Central Parade, Redhill, Surrey. (0737) 767404/766128. Aiwa, Audio Technica, B&W, Nakamichi, Mission, Mordaunt-Short, Nakoaka, Sony, Technics. Dem. facilities. Free installation. Service dept. 0% finance. Access, Visa. Mon-Sat 9.30-6.

TRU-FI SOUND & VISION, 10 Church Street, Leatherhead, Surrey. (0372) 378780. Sony, Technics, Panasonic, Mitsubishi, Ferguson, Aiwa, Pioneer, Sanyo, B&W, Mission. Free installation. Credit facilities. Access, Visa. 9.15-5.30 Mon-Sat. Closed Wed. Service dept.

ZEBRA 18-24 Brighton Road, South Croydon CR2 6AA. 081 688 2093. See main entry under London.

SUSSEX (EAST)

THE POWERPLANT, 66 Upper North Street, Brighton BN1 3FL. (0273) 775978. Roksan, Musical Fidelity, Marantz, Rotel, Yamaha, Tannoy, Audiolab, B&W, Micromega, Epos, JPW, etc. Comfortable single speaker demonstration rooms. No appts. nec. Home trial facilities, free install. Service dept. Credit facilities available on request. Mon-Sat 10-1.00, 2.00-6pm.

SUSSEX (WEST)

AUDIO DESIGNS, 26 High Street, East Grinstead, W. Sussex RH19 3AS. 0342 314569. Linn, Naim, Alphason, Arcam, Rotel, NAD, B&W, Quad, Tannoy, Thorens, TEAC, etc. Very comfortable listening room. No appts nec., Home trial facilities, free installation, service dept. Access/Visa. 9.30-6.00 Mon-Sat, late Tue till 8pm

BOWERS & WILKINS LTD, 1 Becket Buildings, Little Hampton Rd, Worthing. (0903) 2 64141. B&W, Nakamichi, Castle, Denon, Dual, JVC, Mordaunt Short, Philips, Quad, Sony, Technics. 3 dem rooms. Mon-Sat 9-5.30, Wed 9-1pm, Home trial facilities, free install. Credit to £1000, Access, Visa. Service dept.*

CHICHESTER HI FI, 7 St. Pancras, Chichester, W. Sussex PO19 1SJ. Tel: (0243) 776402. Linn, Naim, Rega, Creek, Nakamichi, A&R, Denon, Roksan etc. Tues-Sat, 10-1, 2-5.15 (closed Mon).

TYNE & WEAR

BILL HUTCHINSON LTD, 87A Clayton Street, Newcastle-Upon Tyne. Tel: (091) 230 3600. A.R. Aiwa, Denon, Dual, JVC, Mission, Mordaunt Short, Omar, Technics, Yamaha, etc. Demo facilities. Free Install, Service Department, Instant Credit, Access, Visa, Mon-Sat, Late Tue till 8pm

RED RADIO SHOP AND HI-FI CENTRE, 11 Olive Street, (Off Park Lane), Sunderland. Tyne & Wear SR1 3PE (091) 567 2087. Castle, Carver, Denon, JVC, Kenwood, Mordaunt-Short, Michell, Teac, Tannoy, Monitor Audio etc. Dem room, large with comparator facility. No appts nec, Free install. Service dept. Interest free credit and no deposit 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.

WILTSHIRE

AUDIO T, 60 Fleet St, Swindon, Wiltshire. SN1 1RA. (0793) 538222, Fax (0793) 487260. Great hi-fi from Arcam, Audiolab, Cyrus, Denon, Linn, Meridian, Mission, Rotel, Sony, Yamaha, and many more. Tue-Sat 9.30-5.30. 3 yr gntee on Hi-Fi. Free del & instal. 30 day upgrade scheme. Home dems. PX. 2 dem rooms. A/V Dept.

WORCESTERSHIRE

WEST MIDLANDS AUDIO, 158 Ombersley Road, Worcester WR3 7HA. (0905) 58046. Linn, Naim, Rega, Absolute Sounds, Meridian, Arcam, Ion Systems, Roksan. 3 dem rooms for budget & high end audio. Appointments necessary. Free installation. Service Dept. Access, Visa, Amex, Diners, Lombard/Hitachi. Mon-Fri 9.30-8.30 by appt Sat 9-5.30.

YORKSHIRE (NORTH)

SCARBOROUGH HI-FI CENTRE, 53 Dean Road, Scarborough, N. Yorks YO12 7SN. (0723) 374547. Aura, B&W, Mission, Quad, NAD, Oxford, Alphason, Rogers, Nakamichi, Ruark, Voyd. Dem room, appointment preferred. Home trial facilities. Free installation. Service dept. Access/Visa/Creditcharge/£1,000 instant credit/Amex/Diners. 10-6 Tues to Sat.

HARROGATE HI-FI CENTRE, 15 Commercial Street, Harrogate, N. Yorks HG1 1UB. (0423) 504274. Aura, B&W, Mission, Quad, NAD, Oxford, Alphason, Rogers, Nakamichi, Ruark, Voyd. Dem room, appointment preferred. Home trial facilities. Free installation. Service Department Access/Visa/Creditcharge/£1,000 instant credit/Amex/Diners. 10-6 Tuesday to Saturday

SOUND ORGANISATION YORK, 2b Gillygate, York YO3 7EQ. Tel: (0904) 627108. Linn, Meridian, Micromega, Naim, Rega, Roksan, Arcam, Mission, Denon, Epos, Rotel. 2 single speaker dem rooms. Appts preferred. Home trial. Free installation. Service dept. Credit facilities on request. Access, Visa. 10am-5:30pm Tues-Sat. Sony dealer. Award nominated '86, '87, '88.

VICKERS HI-FI, 24 Gillygate, York. (0904) 629659. Audiolab, Harman-Kardon, Marantz, Musical Fidelity, Pink Triangle, Quad, Systemdek, Tannoy, Technics, & lots more. 3 demonstration studios (2 by appointment) superb showrooms, 2 year guarantee on all hi-fi products. Appts as above, home trial facilities, free installation, service department. Qualified and experienced staff, over 25 years experience. 12 months interest free credit. 10.30-5.30 Mon-Sat.

YORKSHIRE (SOUTH)

BARNESLEY HI-FI CENTRE, 40-42 Sheffield Road, Barnsley, S. Yorks. S70 1HP. (0226) 205549 Fax (0742) 467207. Arcam, Quad, Audiolab, Mission Cyrus, Technics, Denon, Tannoy, Nakamichi, Dual, Rotel. Purpose built demo room, no appts necessary, free install, service dept, Access, Visa, varying finance packages. Open 9.30-5.30, 5 days (closed Thurs)

HI-FI STUDIO, Sunnyfields, Doncaster. (0302) 781387. Heybrook, Monitor audio, Art Audio, TDL, Michell, Sugden, Acoustic Energy, Alphason, Teac, Dual. Listening room demos. Home trial. Free installation. Licensed credit broker, 2 yr guarantee on all equipment. Service available. Access, Visa. 10-8pm 6 days. Phone for further info & FREE fact pack.

YORKSHIRE (WEST)

AUDIO PROJECTS, 45 Headingley Lane, Leeds. (0532) 304565. A&R, Audiolab, Creek, Heybrook, Linn, Musical Fidelity, Naim, Quad, Rega, etc. Tues-Fri 9.30-6, Sat 2.30-5.30.

CLEARTONE (Formerly Erricks), Rawson Square, Bradford, (Near John St Market). (0274) 309266. A&R, Linn, Quad, Exposure, Nakamichi, Mission, Denon, Kenwood. Private demo rooms, no appt nec, home trial facilities, free installation, service dept. Access, Visa, licenced credit broker. Mon/Sat 9-5.30 (Tue 10-5.30)

DOUG BRADY HI-FI, The Forge Cottage, 19 Crossgate, Otley, West Yorkshire LS21 1AA. (0943) 467689. Naim, Arcam, Rotel, Pink Triangle, Meridian, Epos, Castle. Two dem rooms, free install, service. Access/Visa. Open 10-6pm Tues-Sat.

ERIC WILEY, 85 Beancroft Rd, Castleford. (0977) 553066/556774. Celestion, Kenwood, Marantz, NAD, Pioneer Reference Piont, Rotel, Technics, Quad. Car audio specialists. Demo facilities. No appts nec. Access, Visa, Lombard tricity credit chharge. Mon-Sat 9-5.30, closed Wed.

HUDDERSFIELD HI-FI CENTRE, 4 Cross Church St, Huddersfield. (0484) 544668. B&W, Kenwood, Denon, Dual, Arcam, Musical Fidelity, Quad, Audio Lab, Philips, Mission, etc. Dem facilities - appointment reqd. Mon-Sat 9-5.30, Thurs 9-8. Closed Wed. Free installation, credit facilities. Access, Visa.

IMAGE HI-FI, 17 The Springs, Wakefield, WF1 1QE. (0924) 200272. Arcam, Linn, Meridian, Mission, Quad, Rotel, Etc. 2 Listening Rooms. Free Parking, DelL & Instal Mon-Sat 9.30-5.30 pm

IMAGE HI-FI, 8-10 St Annes Road, Headingley, Leeds, L56 3NK (0532) 789374) Arcam, Linn, Meridian, Mission, Quad, Rotel, Etc. 3 Listening Rooms. Free Dem & Instal. Mon-Sat 9.30 - 6:00pm

Northern Ireland

ARMAGH

LYRIC HI-FI, 84 Bridge Street, Portadown, Armagh, N. Ireland. (0762) 358059. 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.

HI-FI EXPERIENCE, 47-49 Fountain Str, Belfast BT1 5EB. (0232) 249117. Quad, Musical Fidelity, Denon, NAD, Rotel, Pioneer, Kenwood, Mission, Tannoy, B&W. No appts necessary home trial facilities, free install, service dept. Credit facilities available. Open 9-5.30, late night Thurs 9pm.

COUNTY DOWN

ASTON AUDIO, Unit 8, Kings Road Shopping Centre, Kings Road, Belfast. Tel: 0232 402220. Akai, Technics, JVC, Mitsubishi, Samsung, Toshiba, Panasonic,, and many more. Demos available, Open Mon-Fir 10-8pm Sat 10-5pm.

LONDONDERRY

ZEUS AUDIO, 23a Kingsgate Str, Colrairie, BT52 4LB. (0265) 56634. Marantz, Mission Cyrus, Aiwa, Aka, Alphason, Sony, Pink Tri, Celestion, Rotel. Open Mon-Sat 10-5.30, Closed Thurs.

Ireland

DUBLIN

LAFAYETTE HI-FI, 50 Wellington Quay, Dublin, Tel: 353177 0443. Technics, Denon, Marantz, Sony, Pioneer, Aiwa, Cyrus, Mission, Cerwin Vega. No appts nec, Free Install. Unique trade in service. Credit Cards welcome. Open 10-6 6 days a week.

Scotland

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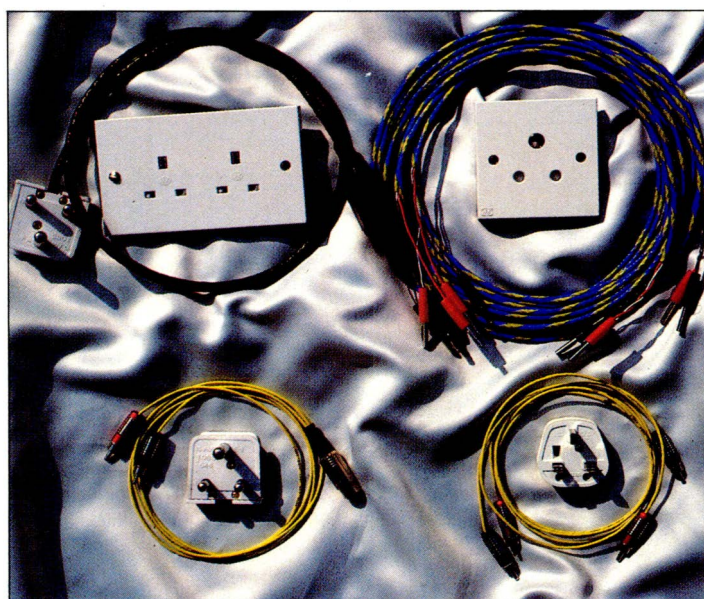
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The Directory

The ultimate buyer's guide with comprehensive information on every currently available product tested by *Hi-Fi Choice*.

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CD players

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Personal stereos

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Turntables

And much, much more

The Directory

The *Hi-Fi Choice Directory* was conceived as a reference guide to all the audio products reviewed by *Choice* that are currently available. The products are split into suitable categories, each with its own introduction containing information about the product type and its applications. They are particularly relevant to the uninitiated first time buyer and help sort out the order of priorities when buying a piece of equipment.

Each product along with its current retail price is placed in its respective category in alphabetical order. The prices of the products are updated on a regular basis, although it should be noted that our value rating are based on the product's price at the time of review.

The next column contains the ratings for the standard achieved in laboratory and listening tests, with the exception of certain product groups where lab tests were not carried out. One important point to remember is that they cannot be used to compare products from different categories — for example, a cassette deck rated 'excellent' in sound quality will not usually offer the same standard of fidelity as a similarly rated turntable or CD player (unless you can get hold of first generation copies of the master tape!).

The Comments column contains a potted summary based on the original review, emphasising the

salient points of a product's character and sonic performance. The space available doesn't allow for great detail but in the 20 or so words we have attempted to put across the essence of the review, in some cases using quotes from the review itself. Obviously, important information on compatibility or auxiliary equipment used in the test cannot be included, and we would advise you to refer to the original review for this, of which more later. Please note that these comments are those of the reviewer and not, as is the case with some magazines, those of the manufacturer.

The next column varies from category to category but is usually either features or specifications, the former being facilities available on a cassette deck or amplifier or the type of drive system on a turntable.

Specifications vary with product type but usually relate to suitability or capability. For instance, in the case of arm matching, figures are given with the cartridges, which tie in with the mass figures for the tonearms themselves, making it easier to avoid compliance/mass mismatches.

Perhaps the most influential letters in the *Directory* are those found in the Value column, the Rs and BBs denoting the Recommended and Best Buy ratings that are appended to products we consider meritworthy. The Best Buy tag

means that a product not only offers good sound quality, but is reasonably priced as well. With source components a price limit of approximately £300 is usually used as a guide.

Recommended means that either the performance of a product is particularly good irrespective of price or, alternatively, that a good value standard is achieved but overall attainment falls short of Best Buy classification. Please note that an expensive Recommended product will nearly always sound better than a cheap Best Buy. An ideal situation would be to choose suitably priced Best Buy or Recommended products from relevant categories and create a Best Buy system, but, due to the variety in tonal balance that exists in much audio equipment, system building is unfortunately not quite that simple.

These ratings make a useful guideline for shortlisting components, but only experiencing the actual combination will tell you whether it works for you.

The final column contains a reference to the issue of *Hi-Fi Choice* which featured the complete review. If you wish to get a better idea of a product by reading the complete review it is possible to order a copy (if still in print) through our back issues department. Every *Choice* issue contains a Back Issues page for this purpose.

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SYSTEM BUILDING

Pre-packaged one-make systems have been commercially very successful, with advantages like cosmetic consistency, competitive pricing, and (assumed) technical compatibility. However, despite the mass market clout of the consumer electronics giants, the hi-fi tradition of specialised separate components seems to be as strong as ever, and certainly represents the route taken by those who place sound quality first.

The first step in putting together a system is to decide which sources you require. There are now three different prerecorded music media competing for the affection of the hi-fi user, and to go for all three will either cost a lot of money or involve substantial compromises in the sound quality of each. For this reason many separates purchasers may start with just one source, adding others or a tuner when funds permit.

Cassette has never really challenged vinyl's superior quality,

but it's a multiple role format, offering 'go anywhere' flexibility, a useful recording capability, plus a broad catalogue of prerecorded music cassette material. As a hi-fi medium cassette suffers from prerecorded material which has been improving but is still patchy in quality and can usually be bettered by a home recording. There is also the worry that a tape made on a specific machine usually plays best on that machine, which may cause aggravation when upgrading a few years hence.

CD is the relative newcomer but in the last decade it has come to dominate the market. The sound quality remains controversial, hailed as near perfect by its fans but derided by vinyl freaks. It is probably fairest to say that CD is fine for the majority of listeners, but may not suit everyone. Certainly the lack of background noise and deterioration are major strengths.

The advent of two box audiophile players has certainly

helped to gain better acceptance for the format and unless you are prepared to spend a substantial sum, CD arguably offers the best performance in terms of sound per pound. Players are now exceptionally cheap, having been reduced dramatically since the format was launched, however, the prices of the discs remains extortionate.

Choosing the components of a system is only part of the task of getting the system as a whole working as well as possible. Both components and loudspeakers benefit to a surprising degree from proper support in the form of stands that enable them to give their best performance, whether floor-standing or wall mounted.

The loudspeakers are most critical of placement, because it is their job to create the stereo image, and it will be impossible to do this if the sound from each is not roughly similar at the listening position. Each loudspeaker should operate in a simi-

lar immediate acoustic environment, unencumbered by other furnishings and structure, and a similar distance from listeners, nearby walls, and corners. Some loudspeakers are designed to operate close to a rear wall, others a metre or so out into the room, but all loudspeakers benefit from rigid support

The key to getting the best results from a 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 as a guide in the sense that you should use the information in it to make a shortlist of equipment and then audition it before taking the plunge. Tastes inevitably differ and it's unwise to buy purely on the basis of our recommendation, as dealers are the most experienced people around when it comes to making systems work as a whole.

The Directory

AMPLIFIERS

The amplifier sits at the heart of the system, processing the outputs from all the various music sources as necessary and then driving the loudspeakers. These two (quite separate) functions are integrated into a single box at the low-to-middle price points; separated pre- and power amplifiers become increasingly common as one moves upmarket. At the upper end of the specialist market, valve amplifiers provide a popular alternative to the transistor types amongst enthusiasts.

There is a substantial difference between specialist (sound quality oriented) amplifiers and the consumer electronics style models. The

former are bleakly simple, avoiding all unnecessary features to provide the most direct signal path in the interests of best sound quality. The latter range from models with just basic tone controls and tape recorder switching, to those with elaborate facilities such as graphic equalisers, remote control (including volume), surround sound options etc. etc.

Lab measurement provides some useful data, particularly in regard to an amplifier's ability to drive a wide range of different types of loudspeakers, but this is only obliquely related to sound quality. We also include our measured power output (RMS, 8ohm load, 1 channel

driven) – but again, paradoxically, this doesn't necessarily correspond to the loudness capability of the amplifier, which has as much to do with the elegance of the overload characteristics within a given system (valve amplifiers invariably sound more powerful than their rating would suggest). The listing of features provides some indication to the complexity of an amplifier: many users prefer to retain the option of tone controls to 'shape' the overall sound according to taste; many others have found living without tone controls surprisingly easy, with additional benefits in terms of transparency.

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Acoustic Research A05 £200	Good + Good +	Capitalises on the strengths of the A-03 and A-07 but escapes the ignominy of their deficiencies. The amp for all AR-based systems	67W, 2 tape, 3 line and both MM/MC inputs. Tone defeat	R	97
Acoustic Research A07 £300	Very Good Average +	Relatively smooth but ineffectual sound quality that lacks some weight and impetus at very low frequencies	75W, 4 line, 2AV and MM/MC inputs		68
Aiwa XA-006 £135	Good Average	Competent enough performer with plenty of facilities. A gutsy sound though one that's rougher via CD than MM.	67W, MM and 5 line i/p/s plus independent rec out.		92
Akai AM-47 £200	Very Good Good +	Something of a surprise from Akai: a made-for-Germany amp with plenty of widgets and an unexpectedly sharp, open and detailed sound. Looks ghastly but sounds strainfree.	104W, 3 tape, 4 line and MM disc inputs. 4mm speaker outlets.	R	104
Akai AM-52 £230	Average + Average -	Basically equipped, this amplifier offers a comfortable but hardly over-detailed sound	95W, MM/MC disc, 5 line inputs, loudness		74
Akai AM-65B £299	Good Average	On-board 18-Bit DAC's actually give better sound than standard CD inputs! Punchy via MM disc	101W, MM, 6 line, digital inputs		80
Akai AM-93 £550	Average Average -	Unfortunately Akai's on-board D/A convertors were less successful than its conventional analogue CD input.	112W, coax and optical dig inputs. MM/MC		68
Akai AM-95 £620	Average Average -	A revamped version of the older AM-93 with newer onboard bitstream DACs. Its sound is just too eager, however	110W, 3 tape, 3 line, MM/MC plus coax/opt digital inputs		109
Albarré PP1 £400-£500	Average Good +	Available with or without various MM/MC disc options, the 'basic' PP1 has an attractively warm, earthy sound. The budget MM stage needs some further work, however.	48W, 4 inputs with extra gain available for low-level sources	R	104
Alphason Apollo £295	Average - Average +	A year and a half later and Alphason's Apollo is still beset with technical problems. This sample buzzed like a distant bandsaw	38W, 5 line, tape and MM/MC inputs. Solid wood fascia		109
Amadeus Gold £360	Average - Good	There is some indication of instability but otherwise sounds very rich, warm and musical. High-ish IMD	56W, MM/MC plug-in cards, 3 line inputs	R	74
Amadeus Silver £270	Average - Good	Limited headroom via disc but still offers a sweet, lush sound. Limited current delivery	37W, MM/MC, 3 line inputs	R	80
Aragon 4004 £1795	Good Good	Despite its imposing bulk, the Aragon is something of a softy at heart. It can deliver oodles of power but its musical presentation is more laid-back	231W power amp		72
Arcam Alpha 3 £200	Good Average	After the enthusiastic reception earned by the older Alpha 2 the generally lacklustre and bland sound offered on this occasion met with (unexpected) disapproval.	53W, 3 line, tape and MM disc inputs. Direct option.		104
Arcam Delta 110/120 £720/£520	Good+ Good	Overall performance is limited by the power amp - in isolation the PDM-preamp offers a remarkably open and detailed sound, particularly in 'digital' mode.	112W power amp, MM/MC + four line inputs + coax/opt digital inp	R/-	92
Arcam Delta 60 £300	Good Good +	Very refined and highly detailed sound via MM and CD without any of the hardness noted via the MC stage	59W, 4 line, MM/MC inputs, no tone controls	R	68
Arcam Delta 90.2 £410	Average + Average +	Dark but slightly dead or conservative sounding version of the original Delta 90. Improved disc stage	73W, MM/MC, 4 line inputs, tone bypass, bi-wire	R	74
Art Audio Quintet £725	Average Very Good	Switchable triode/ultralinear output stage. There's 15W and 15W, but in triode mode these are 15 of the sweetest watts around. Surprisingly gutsy	15/25W, variable feedback	R	100
Audio Innovations 1000/2nd AA £1499/£2999	Poor Excellent	This valve combination offers awesome dynamic range with superb transparency and power to match. Compatibility with other brands is unpredictable	15W, MM, 6 inputs, monoblocks	R	63
Audio Innovations Series 200 £349/£499	Poor + Good	Recently updated, this pre/power combo turns-in a fuller and more substantial performance via MM rather than CD. Otherwise its sound can seem slightly bleached and lacking expression.	10W, 3 line, 1 tape and MM or MC inputs. 'Isolate' switch		109
Audio Innovations Series 300II £500	Poor Good +	Under-powered and over-distorted yet capable of realising an open and captivatingly expressive sound. Sensitive speakers are a must	9W(!) integrated valve amp with tape, 3 line and MM disc inputs	R	97
Audio Note Ongaku £34,000	n/a Excellent	An out and out audiophile product, a single ended, zero negative feedback, triode, line level integrated amp. Probably the best amplifier in the world!	6 line inputs, 27W	R	Coll '90
Audiolab 8000A £410	Very Good Very Good	Recent mods have cured the slightly glassy treble, replacing it with a smoother but richer and more solid style of music making	81W, 3 tape, 4 line and both MM/MC inputs. Tone defeat	R	97
Audiolab 8000C/8000P £375/£545	Very Good Good	Audiolab has revamped its pre/power combo though the very distinctive almost stark neutrality that results will not appeal to all listeners. Good value engineering, nevertheless	157W pow amp + bi-wire outputs. 3 Tape, 4 line + MM/MC on preamp		97
Audion CD-1 £399	Average + Very Good	Nicely presented valve (line-only) preamplifier with fine bandwidth and enjoyable, musical sound. Great if you can justify the cost. Well worth hearing	5 line inputs		77
Aura VA-100 Evolution £270 and £300	Average - Good +	This beefed-up VA50 might overheat when driving insensitive, low-impedance speakers but was applauded for its sense of scale and daram via CD	81W, 4 line, 1 tape and MM inputs. Bi-wire outputs	R	109
Aura VA-40 £190	Average Average +	Based on ITL's earlier MA80, this amp sounded slightly withdrawn or 'dead' if inoffensive	55W, MM 4 line inputs, MOSFET output		80
Aura VA-50 £200	Good Very Good	Superficially similar to the cheaper VA-40 but with much more of the old MA-80's magic! Great sound from a slimline package	65W, one tape, 4 line and MM only. New tape monitor switch	BB	97
Beard 506 £1195	Good + Good +	A versatile valve preamp - the bass sounded lively if a touch softened, while the treble was detailed but lacked a little sparkle and air.	4 inputs MM/MC		50
Beard Audio CA35/P35mkII £695/£895	Average + Very Good	Good build quality and a very smart finish combine with a characteristic valve sound to make a first class amplifier capable of giving hours of musical enjoyment	35W, MM/MC, 4 inputs	R	63
Beard M70 £1995 pair	Good Good +	A substantial British monoblok power amplifier, but not a great deal more impressive than the P35 at half the price	70W		50
Bryston 0.5B/2B £695/£695	Very Good Good	Very rugged Canadian pre/power combo that sounds cool, confident and punchy. Headamp available to suit MC cartridges	65W, MM and 4 line sources, overload LEDs on power amp	R	74
Bryston 12B/4B £1295/£1395	Good + Good	Bryston's massive 4B power amp stood out as the backbone of this combo, the preamp sounding a trifle unbalanced between MM and MC inputs	272W, bridgeable to 800W. 6 line, 2 disc inputs, subsonic filter		68

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ANALOGUE INTERCONNECTS

Silver Sounds 12/2 and 12/3

Reference Imports,
Pineridge, Theobalds
Green, Sandy Cross,
Heathfield, East
Sussex TN21 8BS.
Tel: (0435) 868 004

Two thoroughly spiffing cables by all accounts. Both use matching 12-gauge conductors made of multi-strand silver-plated OF-copper and insulated with oodles of first rate PTFE. Both versions are very tightly wound to minimise microphony and both are screened with a silver-plated braid before being attired with a white PTFE jacket.

The cheaper 12/2 sounds similar to the DNM in many respects, particularly with its sense of space, articulation and subtle detailing. It's a little sweeter through the midband but slightly 'scratchy' through the upper octaves. Another very natural but dynamic performer that elicited a strong and positive reaction.

Meanwhile the 12/3 version is easily recognised by its retractable Ensemble phonos, a socket-friendly version of the Neutrik plugs used by Moth and Chord. The 12/3 also uses an extra 12-gauge conductor for the signal path, bringing resistance down to Cogan-Hall levels but bumping-up the capacitance to 385pF.

Once again, the 12/3 appeared very open, transparent and quickly detailed. However, this version was preferred for its more integrated performance. Worth the extra £35 just to get rid of this faintly scratchy quality. Heartily Recommended.

Test Results

Inductance	0.52/0.30µH
Capacitance	186.3/384.7pF
Resistance	16/11 mohm
Leakage	>350/>350Mohm
Q-Factor (@ 1kHz)	>100/>100
Resonant Frequency	16.2/14.8MHz
Series Bandpass	4.9/5.8kHz
Price (1m terminated pair)	£95/ £130

SPEAKER CABLES

Silver Sounds 12/2

Reference Imports,
Pineridge, Theobalds
Green, Sandy Cross,
Heathfield, East
Sussex TN21 8BS.
Tel: (0435) 868 004

After storming through our interconnect sessions, Silver Sounds was no less triumphant in the speaker stakes. Top-billing was given to 12/2, so-called because its pair of conductors amount to 12-gauge. Inside each Teflon-coated conductor there are 19 silver-plated OF-copper strands though, judging by its high 915pF capacitance, each of these filaments must be coated with a light insulating layer.

So, in common with Audio Note's top models, it's reasonable to assume that 12/2 is a genuine Litz cable. Furthermore, 12/2 is also one of the very few speaker leads to be equipped with a braided screen, grounded, on this occasion, at the 'amp-

end'. Meanwhile even the tight outer jacket is extruded from top quality white Teflon.

Classy conductors and a classy dielectric add up to what our listeners determined was 'a very classy cable'. Tonally accurate and exquisitely detailed, 12/2 opens a very transparent 'window' on the sound. Transients are crystal-clear, free of graininess and smearing just as vocals are rid of sibilance. We simply failed to ascribe 12/2 any intrusive 'character'; a superb result and worth every penny of its £30 per metre

Test Results

Inductance	2.85µH
Capacitance	915.4pF
Resistance	65.5mohm
Leakage	115Mohm
Q-Factor (@ 1kHz)	>100
Resonant Frequency	3.12MHz
Series Bandpass	3.66kHz
Power Loss	0.071dB
Damping Factor	122.1
Price (5m pair)	£300

AMPLIFIERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Carver CM-1090 £595	Average Average +	Looks very professional with its meters and handles but suffers from a loose and dirty sound that shies away from busy tracks	141W, 2 tape, 4 line and MM disc. Sonic Holography feature		97
Cello Audio Suite £1200	Excellent Excellent	Cello's preamp represents a whole new ball game in flexibility and sound quality (or war of attrition on your wallet)	Optional inputs MC etc	R	50
Chord SPM-900 £1850	Average + Good +	Technically very interesting, this mini-powerhouse uses a switched-mode supply to deliver a crisp and refined sound	236W with protection into lower loads	R	85
Concordant Excelsior £856	Very Good Excellent	Cottage industry styling might not inspire confidence, but sonically this preamp is tremendously vivid and detailed. Real high-end performance. We loved it!	MM plus 3 line inputs. External power supply	R	77
Concordant Exultant £700	Average+ Very Good	Individual appearance of this valve pre contrasts with sonic invisibility. An extremely dynamic performer. Recommendation withheld pending more appropriate p.s. plug	3 line, MM, variable gain		100
Conrad-Johnson PV-10 £1100	Excellent Excellent	Pricey, yes, but a fabulous preamplifier which confirms C-J's high reputation in the States. Beautiful imaging, superb detail, plenty of gain on the phono stage classy build quality too	MM plus 4 line inputs	R	78
Conrad-Johnson Premier 7A £8995	n/a Excellent	Price has increased since we tested it but at this price who cares? The 'Seven is designed without compromise, and it's clearly one of the finest (valve) preamplifiers money can buy.	MM, 4 line inputs, sep. Rec Out, versatile cartridge matching	R	Coll '90
Creek CAS 4040s3 £200	Good Good	Now in mk3 guise the '4040 offers a dry but tidy sound via disc and one that's slightly leaner and better focussed on CD.	41W, 3 line and one MM disc i/p. Tone controls.	R	92
Creek CAS 4140 S2 £230	Average Average +	Running production changes inspired us to re-review this amp which now sounds thicker and 'blurred' compared to the original	41W, 3 line and MM/MC inputs, mono and mute facilities		109
Creek CAS 6060 £470	Good Good	An amp that looks like the '5050 but employs the sort of big, confident and meaty-sounding electronics used in the earlier '4040. Dynamic and impressive.	81W, 3 line, 2 tape and MM/MC disc inputs. Bridge-mono facility		104
Croft Series 4S £850	Good Good	The original IV is still available now supplemented by the higher price and power (S); both are fine performers	40(60)W channel	R	57
Croft Series 4SA £1000	Good Very Good	Featuring tuned components chosen for their sound quality, the 'A' variant is an impressive example of Croft's technique in valve design	60W special supply regulation	R	57
Croft Super Micro A £549	Average + Very Good	The looks are somewhat improved, while this 'hot rod' version with tuned components performed very well indeed. There is still no gain on the line inputs. Now in mk.II form	4 inputs, MM, straight line	R	57
Croft Super Micro A OT/Series V £689/£555	Average+ Good	Micro is still unashamedly "cottage" but offers good performance. Combo is let down by the very low powered Series V	15W, valve, dual vol. control, 2 line, MM, tape out		100
Cyclone Catalyst £1995	Good + Very Good	Exceptionally load tolerant and very refined in delivery. Extra options available in future	74W, external MM or MC stages, 3 R line inputs		80
Cyrus I £230	Very Good Very Good	Crisp, meaty and exquisitely detailed, this latest Cyrus amp had us enthralled via CD. MM/MC enjoyed a lesser clarity	34W, 4 line + MM/MC i/p's with dual-conc vol.	R	85
Cyrus II £350	Very Good Very Good	Recently updated this popular favourite captured our attention, once again, with its robust and very convincing sound.	60W, 4 line and both MM/MC disc. No tone controls	R	92
Cyrus PSX £250	Very Good Very Good	The PSX does make the Cyrus Two sound better; and also improves the PCM II CD player giving more wallop and clarity	Auxiliary power supply	R	62
DNM 3A £1590	Good + Very Good	The DNM3 in its acrylic case is a remarkably revealing and neutral state of the art preamp	5 inputs MM/MC twin vol controls	R	44
Deltec DPA 100S £2200	Very Good Very Good	A top-quality transistor power amp, sounding fast, articulate and well controlled, though maybe a touch clinical for some tastes	80W	R	50
Deltec DSP-50S/DPA-50S £725/£925	Excellent Excellent	Remarkable pre/power combo based around the highly linear DH-OA32 hybrid op-amp. Unmatched detail resolution, control and transparency	63W, external feedback wiring, 3 line, MM/MC no tone controls	R	68
Denon DAP-2500/POA-4400A £550/£600 pr	Very Good Good	Denon's fully-fledged preamp also incorporates D/A converters that did not improve the sound of our £299 CD player. The power amps are brill!	172W, monobloks Opt/Coax dig + 2 tape, 4 line and MM/MC inputs		68
Denon PMA-250II £140	Good Good +	Spacious yet tactile and gutsy sound via all inputs. Worthwhile upgrade over original PMA-250	53W, MM 3 line inputs, source-direct	R	80
Denon PMA-350 £170	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
Denon POA-6600 £1000 p	Excellent Very Good	Delivers abundant high quality sound, solid engineering expertise and content clearly compensating for any compromising of purist audiophile principles - now in revised A form	250W monoblok, remote power	R	60
Dual CV600RC £150	Good + Good	The heart of Dual's latest budget range enjoys a very lively, open and vibrant sound. Slightly sanitised via CD perhaps, but still damn good for a features-first integrated amp!	63W, 3 line, 2 tape and MM inputs. Remote control	R	104
E.A.R. 549 £3628 pair	Very Good Very Good	A valve monoblok that measures like a solid state amp is itself an achievement, but exceptional power delivery and bass 'slam' is not fully matched by delicacy and transparency elsewhere	200W monoblok, bias setting		60
E.A.R. 802/509mkII £1098/£1868	Average Very Good	Extremely well made and combining the sonic strengths of both transistors and valves this EAR combo warrants attention	100W, MM, 6 inputs, monobloks	R	63
EMF Audio Sequel £349	Good - Good +	A fresh start for Mike Creek has resulted in the Sequel, a minimalist amp with a very refined but mildly restrained sound	47W, 3 line, 1 tape, MM or MC inputs.		109
Entire Sound EX50 £500	Average- Average+	A new and fairly costly Mosfet power amp of limited output. Resolution of detail is pretty good but sound is cold-hearted.	40W Power amp. Internal P/S included for ES preamp.		92
Exposure VI/VII*/VIII £1580	Good Very Good	An established company like Exposure could do more to improve the 'look' of these amps which, nevertheless, sounded confident, dry and musical. Dual version no longer available	63W, Super mod. 4 line and 2 disc inputs with full rec-out switching	R	68
Exposure VII/VIII £530/£580	Very Good Good	Supplied as a combination without the separate preamp power supply, this pre power combination performed satisfactorily especially on the moving coil input	50W, MM/MC, 3 inputs, straight line		62
Exposure XI/XII/VIII Super £1900	Good Very Good	New preamp and improved power amp led to a smooth and refined sound, MM/MC less transparent than CD	61W, MM/MC, 5 line inputs	R	80
Goodmans GSA-600 £140	Good Poor	Designed to form the heart of a Goodmans separates system, the wishy-washy and faceless sound of this amp fails to stack up	76W, tape, 3 line and MM inputs. Remote control		97
Grant G60AMS £948 pr	Good Very Good	This neat and compact 60W valve monoblok gave good sound on the 8ohm tap, better still on 4ohms. The midrange was particularly natural	60W monobloks 8ohms	R	57
Hafler DH120 assembled £365	Very Good Average	Sound quality results were decent enough, but this power amp won't set the world on fire at this price	60W		44
Hafler SE-100/SE-120 £370/£380	Good + Good +	The smallest of Hafler's pre/power range but still imbued with the open, sparkling quality of their bigger models. Preamp sounds significantly better via CD than MM or MC	96W, bridging option, 2 Tape, 3 line + Aux or MM/MC	R	97
Hafler XL-600 £1200	Very Good Very Good	Sounds remarkably open, transparent and inherently 'musical'. XL-600 is tremendously powerful and very compatible	426W in stereo mode, 1.5kW in bridge	R	74
Harman Kardon Citation 25/22 £699/£899	Good Average +	Not as outrageous as previous Citation amplifiers but neither as punchy nor exciting in the sonic stakes. A good all-rounder but lacks sparkle	138W, MM/MC full range of input and record out		74
Harman Kardon HK6150 £160	Good Good +	Based on the older HK6100 but with a more solid, punchy and expressive performance that attracted considerable praise from our listeners	44W, 3 line, 2 tape and MM inputs, loudness, tone controls	BB	109
Harman Kardon HK6850 £700	Good + Good	This monster is derived from the HK6800 with a similarly deep and powerful sound but a rather steep price tag	101W, 4 line, 2 tape and MM/MC inputs. Preamp direct		109

AMPLIFIERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Heybrook C3/P3 £479/£660	Average + Average -	There's a chance our power amp was a dud for the combo sounded very disappointing on the whole - glassy and uncouth	138W with plenty of current. Passive line inputs		85
Heybrook C3/P3 £479/£660	Average + Average	Since we last looked at this combo Heybrook has improved the manufacture of its power amp though flaws in the preamp's disc input remain unchecked	146W, oodles of current, passive line inputs		104
Heybrook Signature £649+£150/£92	Good + Very Good	Heybrook have re-boxed the best facets of the old C3/P3 to produce a stunningly powerful and vivid-sounding combination which is equally impressive via vinyl or CD	148W, 3 line, tape and MM/MC inputs. Outboard transformer	R	109
JVC AX-A342 £169	Very Good Average	A value-conscious budget amp offering plenty of power but a slightly untidy and inconsistent sound	77W, 3 line, 2 tape and MM inputs, tone, loudness controls		109
JVC AX-A3TN £140	Very Good Good	A true minimalist amp from the masters of mass-production! Offers a very comfortable, accessible sound yet with some loss of deep bass and extreme treble.	50W, 3 line, 1 tape and MM i/ps. CD DiRt and 'Bass Compensator'	R	92
JVC AX-A441 £210	Good+ Average	A return to the traditional style of mass-market design brought an inconclusive reaction from our panel. Blowing 'hot and cold', our listeners ultimately found its music uninteresting.	93W, 3 line, 3 tape, MM/MC inputs. CD direct facility		104
JVC AX-Z1010 £650	Very good Good+	JVC's flagship amplifier also houses a couple of ancient 16-bit DACs for good measure! One of the best behemoths: a big amp with a big, boppy and unmuddled sound	124W, 6 line and MM/MC inputs plus opt/coax digital inputs	R	109
Jadis JP30/JA30 £4990/£4900	Average Excellent	Two-box preamp plus monoblok power amps, classic valve design gives stereotype valve sound. Beautiful build, nostalgic styling and delightful sounding midrange transcend limitations at	30W 2-box pre-, monoblok power, MM-only, 4 line inputs	R	60
Jeff Rowland Coherence One/Mod	Very Good Very Good	The technical design of these amps is very elaborate but ensures they achieve an extraordinarily transparent and potent sound. However, the CD i/p is clearly superior to the disc inputs	448W monoblok MM/MC with loading options. Balanced topology	R	72
Kelvin Digital Integrated £550	Good + Very Good	Not so Class A as before but now fitted with a PDM DAC which offers a smooth, detailed and naturally 'musical' sound	34W, digital, line and MM i/p's only	R	85
Kelvin Integrated £449	Good Good	Recent mods have reversed the Integrated's previous good fortune, this unit was just too syrupy.	21W with 10-12W in Class A. Four line + MM/MC.		92
Kelvin Labs Absolute Zero/M30 £395/295/595	Good + Average +	Latest versions of the M30 offers a true 30W Class A and a slightly muddled but very comfortable sound. MC preamp is a very linear design	33W monoblok MC only + 4 line inputs. Separate L/R balance	R	74
Kenwood KA-3020 £140	Good + Good +	An unassuming little amplifier that turns in a remarkably balanced and entertaining sound. Lively, detailed and engaging	66W, 2 tape, 3 line + MM disc. Source direct	BB	97
Kenwood KA-4020 £170	Good + Average +	On paper this is a beefier version of the '3020 yet our listeners thought it sounded weaker, lacking richness and detail	103W, 2 tape, 3 line + MM/MC. Source direct		97
Kenwood KA-4040R £220	Good + Average +	In many respects this sophisticated amp is a 'digitised' version of the KA-4020 with relay-switched inputs and full remote control. Unusual looks but can seem insubstantial via CD.	82W, 3 line, 2 tape, MM/MC inputs. Full remote control		104
Kenwood KA-5020 £220	Very Good Good+	Something of a powerhouse on the cheap this amp can keep pace with the most challenging of dynamics. Its sound is vibrant but some fine detail is lost.	115W, 3 line, 3 tape and MM/MC. Source direct.	R	92
Kenwood KA-5040R £270	Good + Average	A flexible, remote-controlled amp that uses the old KA-5020 as a building-block. Unfortunately it lacks dynamics, sounding stifled and uninteresting	100W, 3 line, 2 tape and MM/MC inputs. Source Direct		109
Klyne SK5a £2590	Very Good	Beautifully made and presented, this American thoroughbred has a good lab performance, but although versatile, is rather expensive for the quality of sound offered	Balanced output, versatile cartridge loading		72
Lecson Quattra £350	Average+ Good	Underpowered but with the flexibility of four independent power amps. Very deep, captivating sound with 3D soundstaging.	19W via all 4 channels. 5 line and MM/MC inputs.	R	92
Lecson Stereo £200	Poor Very Good	Can reflect the full weight and ambience of a tense, classical performance. A genuinely deep, detailed and enthralling sound marred by unreliability of our sample. New stock will be cured.	76W, 4 line, 2 tape, MM/MC inputs.		104
Lectron JH50 £2300	Average Very Good	Sexily presented valve power amplifier from France. Lovely valve sound too, with delicate and airy top end. Not especially powerful and rather expensive but very desirable!	50W		78
Linn Intek £398	Good - Average +	Linn have slashed its price and made various internal revisions, but their no-nonsense Intek still lacks the authority and confidence to support its forward balance.	55W, 3 line, 2 tape, MM/MC inputs, rec-out, mono + mute		104
Linn LK1/LK280 £598/£763	Good Good -	A very modern, logic-controlled amp with distinctive and inoffensive sound quality. Its restrained sound could do with extra insight and zip.	84W, compact amp CMOS sw. for 2 tape, 2 line and MM/MC. xlr sockets		68
Linx Nebula £500	Average + Average +	Ambitious both in style and design this amp was less impressive in the sonic arena — positive but two-dimensional	88W, logic-controlled i/p switching		85
MFA Magus £1147	Good Very Good	Versatile valve preamp from USA, genuine MC compatibility and high class construction make the Magus a bargain	3 line, MC, tape out, variable gain	R	100
Magnum MP150/MF150 £320/£320	Average + Good	This is no technical masterpiece but the strain-free, fluid sound augers well for CD-based systems. Excellent value	89W, 3 line + MM/MC i/p's. No tone cont.	R	85
Marantz PM-30 £130	Good + Good +	The building-block for Marantz's popular budget 'SE' amplifier is no slouch, providing a lively and very expressive sound with plenty of strong bass. A good 'un.	49W, 3 line, 2 tape and MM inputs, source-direct	BB	104
Marantz PM-30SE £150	Very Good Good+	The breathed-on version of Marantz' PM-30 offers an engagingly detailed and spacious sound though one that's warmer via MM disc than CD.	50W, 3 line, 2 tape and MM disc. Source direct	R	92
Marantz PM-40SE £240	Very Good Good +	The improved version of their basic PM-40 model has itself been updated to provide a bigger and more exciting sound. A good 'un	61W, tape, 3 line + MM/MC disc. Source Direct	R	97
Marantz PM-50 £260	Good + Average +	One of Marantz's new breed, the PM-50 has a big and beefy sound yet one that lacks refinement	92W, MM/MC, 4 line inputs, source- direct		80
Marantz PM-72 £300	Good + Average	This is a very neutral, pleasantly detailed and even-handed performer but one that lacks a sense of emotion or expression	155W, 3 line, 2 tape and MM/MC inputs		109
Marantz PM-75 £500	Good Average	More successful than most amps with on-board DACs but still not as balanced as other Marantz products	136W, opt/coax dig inputs, 6 line + MM/MC		68
Marantz PM-80 £400	Very Good Good +	Technically robust with an equally beefy and tactile sound. Great sense of power and control but spatially a little flat	133W, 3 tape, 4 line + MM/MC. Class A option	R	85
Meridian 201/205 £760/£525each	Very Good Good	A fine preamp with additional luxury option of full system remote, plus competent and attractive monoblok power amplifiers with generally good performance	100W MM/MC 6 line inputs remote capable straight line	R/-	62
Moth Series 30 £132/£203 (£254)	Good Very Good	A modular system capable of cracking results. The passive preamp and power amp combination is especially good value and warrant a Best Buy in their own right.	35W, 4 line inputs on passive pre, MM/MC on phono eq unit	R/BB	109
NAD 3020i £150	Very Good Good +	The most balanced and communicative of NAD's 3020 series. Great at revealing subtle musical clues without aggression	31W with tone controls, 3 line + MM inputs	BB	85
NAD 3225PE £160	Average + Average +	Light and detailed if not as rich or weighty sounding as others. MM input sounds warmer than CD	42W + 70W dyn. headroom; soft-clipping, MM only	R	68
NVA AP20 £260 or £290	Average - Good +	Available with or without a disc stage this utilitarian amplifier sounds gentle and restrained but is euphonic and utterly engaging	35W, 2 line, tape and either MM or MC inputs	R	109
NVA P70MC/A60 £830	Average Average +	NVA's speaker cables are a must, the amp offering well-integrated but not particularly crisp sound	68W, MC, 3 passive line inputs		80
Naim Separates £750 pl	Very Good Good	A consistent and coherent series of 'building blocks' for conventional passive or active operation. Sound quality ignores conventional audiophile standards of presentation, but	40-70W, MM/MC etc	R	60
Onix OA-21s/SOAP £350/£180	Average + Good -	Via MM disc this amp comes alive with a fresh and vibrant sound though its CD input sounds utterly dead by comparison.	60W, 1 tape, 3 line and either MM or MC. Outboard PSU option		97
Orell SA-040 £359	Good Good +	This promising newcomer from a brand new company sounded pretty good and should improve as production settles	45W MM/MC, 4 line inputs, straight line	R	56

AMPLIFIERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Orell SA-040SE £400	Average Average +	Very natural, relaxing if not overly exciting via CD, the sound closed-in to become 'pinched' or fettered via disc	64W, 5 line + MM/MC i/p's. Tweaky components.		71
Philips DFA-888 £300	Good Average	As above but including a modified disc input and onboard DAC. Sounds tight but also slightly thin	107W, as above + opt and coax digital inputs		74
Philips FA-880 £200	Good Average	A new and cheaper design from Philips that sounds best via MM disc. Can appear soft and unbalanced via CD	108W, MM/MC source-direct tone		74
Philips FA-930 £200	Average Average +	Radical styling hides a digital switching facility plus full remote control over what is Philips' best effort to date	99W, tape, analogue and digital inputs with ESI BUS	R	109
Philips FA-890 £230	Good + Good -	Based on their FA880 model but tarted-up with a remote control facility. Inoffensive, civilised but unexciting sound is retained	120W, 6 line + MM/MC logic-controlled input switching		97
Philips FA-960 MkII £300	Good + Average	The MkII '960 still failed to grasp our listeners' attention, but it remains a competent amp nonetheless	122W, 6 line & 2 disc inputs + tone controls		68
Pioneer A-229 £130	Average + Average	An unambitious amplifier that fights shy of tricky speakers with a sound that's equally unadventurous. Slightly soft and comfortably even-handed presentation	60W, 2 line, 2 tape and MM inputs, loudness and direct		104
Pioneer A-300 £160	Very Good Good	The cheapest of Pioneer's dynamic duo gives off its best with CD rather than MM disc which failed to shine quite so brightly.	55W, 3 line, 2 tape and MM. Independent rec out facility.	R	92
Pioneer A-400 £250	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
Pioneer A-676 £280	Good + Average -	A lusty amplifier at a modest price yet one that failed to inspire our listeners with its bland, indifferent sound	98W, 4 line, 3 tape and MM/MC inputs + subsonic filter		109
Pioneer A-777 £400	Very Good Average -	A larger version (!) of the A-676 that offers more power but an equally sluggish and uninspiring sound	121W, 4 line, 3 tape and MM/MC inputs + muting facility		109
Proton 520 £115	Average Average	Very well equipped budget amp with a slightly flat and undynamic sound - acceptable at the price though	31W, MM/MC with variable MC gain, 4 line inputs	R	74
Proton AP-1000/AA-1150 £250/£395	Good + Average +	Bags of headroom available from this pre/power combo, but can seem bloated or unrefined via MM	67W, MM/MC, adjustable MC gain, 5 line inputs		80
QED A240 CD II £249	Good + Good	Latest 240CD is fine value for CD and has competent MM disc input as well	45W MM 5 line inputs straight line	BB	62
QED A270CD/PA £369/£429	Good Good +	Recent updates have bolstered the output of the A270 without adding to its colourations. The PA option is a touch expensive	61W, 2 tape, 3 line + MM or MM/MC from PA board	R/-	97
QED C300/P300 £329/£370	Good Good	A cost-effective combo, limited in its resolution but no less beguiling as a result. Disc stage is sweeter but samey	58W, 2 tape, 3 line, MM/MC + mono/biamp opt.	R	85
Quad 34 £366	Very Good Average	This well-built durable preamp has useful filtering and above average tone controls but was found lacking in sound quality (viz: detail/dynamics)	4 inputs MM/MC tone controls		44
Rational Audio £175	Average- Average+	This wacky newcomer from Czechoslovakia offers a very open and fluid sound via CD but its performance via MM depends very much on the cartridge's load impedance.	129W, caters for line and MM disc sources but has no i/p selector.		92
Ray Lumley Model 75 £1995 p	Average Good +	Monstrous valve monoblocks which represent good value. What they lack in musical subtlety they make up for in sheer muscle. And these are Lumley's small monoblocks!	75W monoblok		78
Revox B150 £1047	Very Good Average +	Beautifully constructed but hampered by Revox's convoluted logic control. Open and smooth sound. Still costly.	117W, CMOS sw. for 3 line, 2 tape and MM		68
Revox B250 £1467	Very Good Good	With much improved sound over its predecessors plus amazing remote control facilities, this could form the heart of a round-the-dream-house system	150W MM/MC system/house remote tone controls		56
Rose RV-23 £395	Good Very Good	Beautifully built classy British 'hybrid' preamplifier. You can spend more to get a more transparent sound but it's hard to criticise given the competitive price	MM plus 3 line inputs	R	77
Rotel RA-930AX £160	Good - Very Good	Based on the original RA-820AX but featuring a new look and a tweaked circuit design, this budget wonder captivated our listeners with its clean, vibrant and thoroughly involving sound	53W, 3 line, tape and MM inputs, tone bypass	BB	104
Rotel RA-940BX £200	Good Good	Rotel's cheapest 'BX' amplifier prompted a mixed reaction, some finding it muddled while others thought it 'exceedingly musical'	53W, 3 line, 2 tape plus MM/MC inputs. Tone defeat	R	109
Rotel RC-960BX/RB-960BX £150/£180	Very Good Good -	With excellent standards of construction, flexibility and plenty of power under the bonnet, this duo represents an ideal choice for the first-time buyer.	80W, bridge-mono facility. 3 line, 2 tape and MM/MC on preamp	R	104
Rotel RC-980BX/RB-980BX £275/£350	Excellent Average	Plenty of watts per pound sterling from a technically flawless combination. Its sound is equally expansive but lacks a sense of poise, of control and fine detail - a disappointment	143W (33A1), 3 line, 2 tape and MM/MC inputs + headphone socket		109
SAE P102/A202 £499/£599	Average + Average +	Microprocessor-controlled pre and power amp that sounds much better at low rather than high volume levels. Pro-oriented aesthetics	151W, MM/MC + 2 liner and 2 tape, tone memory, spk switching		74
Sansui AU-X111 £100	Good Average	Sansui has engineered an amp that's both solid and flexible for the price, but its sound is rather bland compared to competition in the £110 sector	5 line inputs, MM, 52W		92
Sansui AU-X911DG £700	Very Good Good +	At its best when used with the on-board MASH/PWM DAC where it sounds technically neutral but still emotionally charged	112W, 4 dig, 3 line and MM/MC i/p's. Rec-out	R	85
Sony TA-F440E £180	Very Good Good	A new budget amp based on tried-and-tested circuits but free of spurious widgets like tone controls. It has a fresh and up-beat sound with plenty of detail, can sound smeared via CD	109W, 3 line, 2 tape and MM + rec out	R	104
Sony TA-F540E £230	Very Good Good -	An extra £50 buys you an MC input but little else over and above the TA-F440E. This version sounds more consistent from input to input but is still rather superficial or unconvincing	108W, 3 line, 2 tape, MM/MC + rec out		104
Sony TA-F670ES £400	Very Good Good	Nothing fancy, just a heavyweight amplifier that puts up 'a damn fine show'. Fresh and sharp-sounding but a little too expensive	133W, 3 line, 2 tape, direct and MM/MC inputs. Pre-out facility		109
Sony TA-F730ES £450	Very Good Good	A very stable and coherent amp but one that lacks a crucial sense of involvement	133W, MM/MC, 3 tape, 2 line, full rec-out		80
Sony TA-F770ES £600	Good + Average -	Another monster amp offering full remote control and buckets of power. It's also another monster amp that sounds boring	125W, 3 line, 3 tape, direct and MM/MC inputs. Remote operation		109
Sound Audio VP3a/HBP60a £599/£599	Good Average ++	Hybrid power amp and valve line stage. Big 'n' beefy power amp is the stronger partner	4 line, 1tape 60W	R	100
Sugden A21a £395	Average + Good	The modern-day relative of Sugden's original Class A amp and one that offers a smooth, easy-going sound. Best partnered with sensitive speakers.	25W power amp with a good 16W inPure Class A		92
TEAC A-X400 £115	Average Average	Sibilance and a lack of crisp vitality hamper the performance of this amp, as does the stringent protection circuitry	59W, 4 line + MM + tone + mic i/p level control		85
TEAC A-X5000 £229	Good Average -	This amplifier is compromised by a grey and muddled sound that taxed the concentration of our listeners. Better via MM disc	107W, 3 tape, 3 line + MM/MC. Source Direct		97
Technics SU-810 £130	Average + Average	Our sample started off sounding fast, taut and well-integrated yet eventually failed on the MM disc input	66W, 2 tape + 3 line + MM. Tone + loudness		85
Technics SU-VX600 £200	Good + Good	What looks like a fairly ordinary mass-market offering is actually the first 'tweaked' amp from Technics, its solid and sharply focussed sound a taste of things to come.	90W, 3 line, 2 tape, MM/MC + power-amp inputs	R	104
Technics SU-VX800 £450	Very Good Average	On the other hand, this is a mass-market amp still hampered by over-enthusiastic protection circuits! It sounds raw and congested when the going gets tough - positive but raucous	148W, 3 line, 3 tape, balanced input + MM/MC		104
Technics SU-VZ220 £100	Good Average -	Cheap, cheerful and pretty flexible to boot yet the SU-VZ220 quickly sounds thin, splashy and relentless when the going gets tough	50W, 3 line, tape and MM inputs plus tone and loudness controls		109

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MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Threshold FET 10e system/ £2995	n/a Very Good	Almost valve-like limpidity and excellent soundstaging are star qualities of the Threshold amps. Line input resistive loading is too low	Component FET phono stage, line pre, FET power amp 100w		Coll. '9
Woodside SC26/STA35 Renaiss	Good Good+	Synergistic pairing with a cool, controlled sound, good focus and transparency. More about poise than grunt	35W, valve, 3 line, optional MM or MC, 2 tape outs		100
YBA 1 power amp £2995	Good Excellent	This equally well finished power amp offers front rank stereo staging and transparency, and is capable of driving the most difficult loads	85W	R	62
YBA 1 preamp £2895	Very Good Excellent	A front line French audiophile product. Great stereo and a fine Krell style finish	MM/MC, 3 inputs, straight line	R	62
YBA 2 pre & pwr £1395/£1695	Very Good Very Good	Superbly finished French separates, with very good space and transparency, slightly softened bass. Needs extra transformer (£300) for MC cartridges	70W MM (MC extra) straight line	R	56
YBA Model 3 £995/£995	Good Good	Suited to highish sens. Loudspeakers this duo produced see-through, ethereal stereo images that were more convincing towards the centre of the soundstage than at the edges	56W stereo amp MM only with 3 line i/ p's.		72
Yamaha AX-330e £100	Average + Average +	An improvement on earlier efforts but still a little bland or lack-lustre. Very compatible though	48W, MM, 3 line inputs, source-direct option		80
Yamaha AX-550 £240	Very Good Good	neutral yet lacks the ability to involve on an emotional level	131W, 5 line + MM/MC. Pure Direct + remote control		97
Yamaha AX-750 £399	Very Good Average	Big and bulky with remotely-controlled input and volume. Impressive handling, but two samples split the opinion of our listeners, one sounded squashed the other fast and articulate	149W, 3 line, 2 tape, MM/MC inputs + remote control		104

CABLES AND CONNECTIONS

Although cables and connections are sometimes thought to be the least important items in an audio system there has been a growing awareness in recent years that they have a significant effect on sound quality. To this end there is now a vast array of exotic cables and interconnects available to those interested in experimentation. The key observation on cables is that they are much more than mere accessories. Carrying the audio signal, just as any amplifier does, it's really not too surprising that they can influence sound quality.

The characteristics of any cable are determined by the materials and topologies utilised in its construction. The purity of the conductor, nature of the insulator dielectric, mechanical construction, physical geometry, RF characteristics, efficiency of screening and finally the connectors themselves, all play vital roles in the sonic character. These factors tend to vary more with interconnect cables which are used to carry the signal between active components like pre and power amplifiers. The interconnects summarised here were tested in 1m terminated lengths and therefore the results and prices relate

to that length - some cables may well perform differently when used in longer lengths. What's more, most cables are significantly cheaper if you are prepared to fit the plugs yourself. The features column contains information on the material makeup of the different cables with the following abbreviations: OFC - oxygen free copper, OFHC - oxygen free high conductivity (Audionote defines HC as high crystal), PC-OCC - pure copper by ohno continuous casting, LC-OFC - linear crystal oxygen free copper.

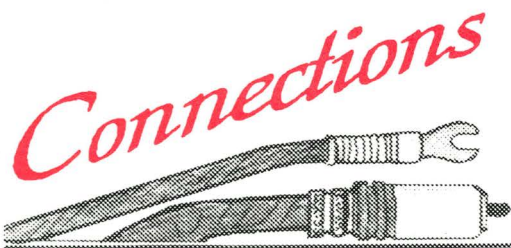
CABLES - INTERCONNECT

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Audio Note Copper ANA £44	Average Good	ANC sounded punchy with a faintly lean but tightly-focused bass character. This crystalline precision waned slightly at higher frequencies	OFHC copper twin-axial	R	59
Audio Note Flexible Silver ANS £99	Average Very Good	ANS scored a hit with its transparent midband and revealing but quite unforced treble quality. Bass transients were slightly softened	Silver signal & Copper screen	R	59
Audio Note Silver ANV £154	Poor Excellent	Far weightier-sounding than the flexible ANS, ANV interconnect also possesses a fair degree of treble clarity and sparkle	21 strand silver Litz		59
Audio-Technica AT-6115 £40	Very Good Average	This cable sounds somewhat 'quieter' than the original LC-OFC interconnect, but is also less transparent and three dimensional	PC-OCC copper coaxial		59
Audioquest Livewire Ruby £49	Average Good	Smoother sounding than the Topaz, the extended crystal Ruby is less grainy and coarse, better able to resolve complex passages	FCL copper twin axial	R	59
Audioquest Livewire Topaz £35	Good Average	Sounding 'bigger' and faintly richer than Reference 2, Topaz was also slightly grainy at the top end	Gold-plated plugs, OFHC copper		59
Chord Mono-t £27/1.2m	Average + Average +	Offers a slightly rolled-off treble but its rich sound is an upgrade from patch-cords	Unsymmetrical 4-conductor cable	R	83 Supp.
Deltec Gortex Black Slink £152	Very Good Excellent	A true reference quality cable providing an exceptionally detailed and transparent sound	Symmetrical, 8-conductors, Gore-tex ins.	R	83 Supp.
Deltec Slink £32	Good Very Good	Ideally used in lengths of under 4 metres, it errs on the lean side of neutral but has an uncommon transparency in the midrange	4 silver plated OFC strands PTFE dielectric	BB	59
Kimber Kable KC-1 £65.55	Very Good Average	Tonally faintly leaner and brighter than the more open-weave PSB, KC-1's treble detail was just too sharp and grainy	Multi-gauge PTFE dielectric		59
Kimber Kable PSB £41.40	Very Good Very Good	An exceedingly transparent midband but slightly 'clanky' treble. It always managed to sound remarkably uncluttered and open	OFC, PTFE dielectric	BB	59
Monster Interlink 300 £30	Average + Average	A big, larger-than-life sound but with some emphasis of midband detail and loss of bass	Screened, symmetrical cable		83 Supp.
Monster Interlink 400 £50	Good Good	Bass is solid and punchy, counterpointed by a slightly overblown midband which tends to make vocalists sound larger-than-life	Multi-gauge	R	59
Origin Live Soli-Core Super £60	Good Average	Improves over previous Soli-core samples in stereo depth and bass weight, but a 'loud' treble presentation remains	Solid-core gold-plated AT plugs		59
QED Incon Graphite P1G Gold £19.95	Average Average	A shielded version of Incon P1, it sounded thicker at the frequency extremes, the top end being coarser and more out of focus. Good for long runs though	OFHC Graphite shielding	R	59
QED Incon P1-Gold £16.95	Good Good	A lively open presentation that just borders on the lean side of neutral, the quick and lucid delivery affording considerable musical insight	OFHC, gold plated Deltron plugs	BB	59
Supra EFF-1 £60/0.75m	Average Average	A new, costly and mildly disappointing addition to the range. Edgy, smeared sound plugs	Screeded, symmetrical dir. cable		83 Supp.
van den Hul MC-Gold £230	Average Good	It possesses a rich and beguiling treble balance that matches a weighty, slightly warm bass character. Seductive balance may prove worthwhile in some circumstances	Silver & gold plated copper		59
van den Hul MC-Silver £750	Good Good	Although remarkably transparent for an asymmetric design this costly cable was not considered to be of 'state-of-the-art' standard, and is bettered by cheaper models	19 silver plated copper strands		59
van den Hul MCD-102 III £61.50	Good Good	Possessing the same endearing qualities as the D300, it presented open and transparent soundstages and improved timbral resolution	Twin axial silver plated copper	R	59
van den Hul Thunderline £92	Good Average	Thunderline essentially parallels the sonic performance of the cheaper D102. HF is occasionally tainted by a 'tizzy' coarseness, bass is tight and dryscreening	Silver plated 'matched copper'		59

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CABLES - LOUDSPEAKER

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Absolute Wire Force 4 £4.75 per metre	Good Average +	By current standards there was a loss of fine, sharp detail at the frequency extremes, but it has a big, friendly sound	744 OFC strands, PVC dielectric		64
Audio Innovations OR-200 £16 per metre	Average + Average +	Open and detailed throughout the midband but a grainy coloration tended to corrupt subtle timbral information at very high frequencies	200 LC strands, polyurethane and cotton dielectric		64
Audio Note AN-SP £100 per metre	Average - Excellent	A clean and open sounding cable that offered a deep and pleasantly detailed perspective. Bass was slightly restricted, but seemed tight and coherent	15 silver strands, polyethylene dielectric		64
Audio-Technica AT-6120 £10 per metre	Average + Average	Compared to earlier LC-OFC cables, this PC-OCC derivative sounded smoother and less aggressive	PC-OCC, PVC dielectric		64
Audioquest Livewire Black £15 per metre	Good Good	It proved clear and punchy but with some grain across the treble. Nevertheless Black remains an interesting concept and proved better than Livewire Green	OFHC, surface only - foam core construction	R	64
Cyrus £2.50 per metre	Average + Good	Because of its impedance characteristic this cable will deliver a smooth and unfatiguing treble balance with loudspeakers offering an easy load	0.8mm single strand, PVC dielectric	BB	64
Deltec 8S £144 - 5m pair	Good Good +	The unerring transparency and detail resolution of 8S throughout the midband makes it a cleaner and more spacious sounding cable than others at the price	4 silver plated OF copper strands, PTFE	R	64
Deltec Gortex Black 16 £528 - 4.5m pair	Very Good Excellent	Improvements in bass resolution, transparency and treble poise maintains status of this cable	Silver-plated OF copper with Gore-tex ins.	R	83 Supp.
Exposure £2.50 per metre	Good Good	It could sound a trifle matter of fact but this emotive flattening was also somewhat dependent on the music program. It is also highly suited to long runs	56 OFC strands, webbed PVC dielectric	R	64
Furukawa FS-2F09 £3.50 per metre	Good Average +	Some loss of bass weight but otherwise offers a fresh and open sound. Good value	Multi PC-OCC stranding, PVC dielectric	R	83 Supp.
Furukawa FS-2T15S £50 per metre	Good + Very Good	An advanced solid-core cable with a highly fluid, detailed and inherently musical sound	Single 1.5mm Super PC-OCC	R	83 Supp.
Kimber 4VS £7.15 per metre	Average + Average	Similar construction to 4TC but dissimilar materials infer a slightly tizzy sound	Open-weave, multistrand, PVC ins.		83 Supp.
Kimber Kable 4PR £54 - 5m pair	Average Average +	This directionally marked cable benefited from an open and airy treble quality but seemed notably leaner than 4TC. Bass was well round and satisfyingly taut	4 x 7 copper strands per conductor, PVC diel.		64
Kimber Kable 4TC £17.65 per metre	Good Good +	4TC made a great impression in the listening tests with an open midband, a smooth and unfatiguing treble with slightly rich but suitably weighty bass	OF copper, PTFE dielectric	R	64
Linn K20 £2.95 per metre	Good Average	Subjectively, it erred on the forward and bright side of neutral but enjoyed an essentially clear and punchy delivery	56 OFC strands, webbed PVC dielectric		64
Monitor PC Silverline PC4 £5.75 per metre	Good Average	Sonically, it laboured under a heavy and claustrophobic balance, lacking the see through transparency and lucidity of the better solid core cables	2072 x 0.07mm silver plated copper strands		64
Monster Original £3.49 per metre	Good Average +	Original sounded relatively congested and murky at higher frequencies but possessed weight and conviction in the bass	Multistrand		64
Monster SCI 16-4 £3 per metre	Average Average	Not as thick-sounding as early Monster cables but still slightly unbalanced. Versatile construction	4 x 16-gauge conductors, OFC strands		83 Supp.
NVA LS1 £6 per metre	Average + Good	A light and breezy sounding cable best suited to short lengths, NVA benefited from a clear and transparent outlook	7 x 0.25mm silver alloy strands, PTFE	R	64
QED 79-Strand £1 per metre	Good Average	For much of the last decade QED 79-Strand has been the first port of call for enthusiasts on the upgrading ladder, a tradition that should still hold true today	79 strand, PVC dielectric	R	64
QED Flat 200 £2.20 per metre	Good Good	I detected a degree of confusion at low frequencies but this did not stifle the acoustic atmosphere which remained open and positive	200 strands, flat webbed PVC dielectric	R	64
QED Incon Graphite £2 per metre	Average + Average +	This graphite version of Incon sounded cruder and generally more heavy handed than the cheaper unshielded type. Overall presentation was mildly restricted and cloaked in a faint aural fog	OFHC, polymeric screen		64
Rotel Supra 10 £8.95 per metre	Good + Good	Supra 10 provided a very free and open sound that was unhindered by any excess at low frequencies. Worth its weight in scrap copper!	2,562 OFC strands, webbed PVC dielectric	R	64
Rotel Supra 4 £3 per metre	Good + Good	Ideal for both long and short runs, it furnishes a big sound that benefits further from a smooth, unatiguing treble	1,036 OFC strands, webbed PVC dielectric	R	64
van den Hul CS-122 £6.50 per metre	Average + Good -	Characterised by a driving and powerful bass, CS-122 is a heavy sounding cable. Mid treble detail was refreshingly clear but there was a slightly muted air about the extreme treble	19 x 0.45mm silver plated strands, rubberised dielectric	R	64
van den Hul D-352 £12 per metre	Good Average +	Subjectively it sounded like CS-122 only more so, the deep rumbling bass tending to overwhelm subtle musical details. It also appeared a trifle peaky in the treble	7 x 0.76mm + 168 x 0.125mm silver plated strands, rubberised diel.		64
van den Hul SCS-12 £10 per linear metre	Good + Good +	SCS-12 set a high standard with a tight and well focused soundstage populated with tactile stereo images. Bass wasn't as extended or resolved as some other cables	19 silver plated strands of 12 different gauges, PTFE dielectric	R	64
van den Hul SCS-2 £99.95 per linear metre	Good + Good +	Overall it was commendably neutral and transparent but nothing less would be acceptable bearing in mind the tremendous cost of a stereo pair	665 silver plated matched crystal copper strands, PTFE dielectric	R	64



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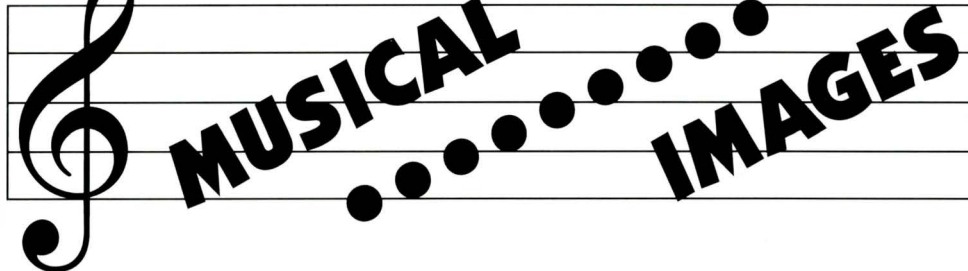
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The bad odour of copyright theft hangs around the compact cassette, but there is no doubt it is the world's most versatile and ubiquitous music storage medium. Hi-fi buffs may wrinkle their noses pointedly, but are still happy to use cassette decks to make up tapes for the car or personal – at the same time complaining loudly about the quality of pre-recorded material. (In fact the very best decks can do a surprisingly good job with musicassettes.)

There is no problem in connecting a cassette deck to any normal amplifier, but some care needs to be taken in choosing the best tapes for a

specific machine. (Trial and error is one effective technique, but many decks have manual bias adjustment and some match up to the tape automatically.)

Lab performance and sound quality often go hand in hand, and are frequently somewhat dependent upon factory alignment. The mechanical integrity of the mechanism itself is another crucial factor, that is often reflected in the asking price.

All modern hi-fi decks have Dolby B and the majority have Dolby C besides; the very worthwhile HX Pro system is becoming steadily

more widespread. Remote control remains rare, though sometimes it is available as a system option.

Three-head recorders allow simultaneous checking of the recording being made. Auto-reverse is a useful convenience feature, but usually with some mechanical compromise, while double-mechanism 'dubbing' decks of dubious quality are fashionable at the bottom end of the market. The welter of different 'music search' systems available is some indication of their frequent ineffectiveness.

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Acoustic Research RD-06 £300	Average Average	Acceptable middle market player with very simple facilities and cramped control section, but unusually good looks	Dolby B/C/HX Pro, fine bias, counter memory, repeat		69
Aiwa AD-F410 £100	Average Average	Comparable to AD-F500 but cheaper: Good all round performance, well adjusted, useful basic and not so basic features	2 head, Dolby B/C/HX Pro, bias adjust	BB	99
Aiwa AD-F500 £160	Average Good	Noise levels are a little higher than usual, but sound quality is otherwise very good - open, explicit and very neutral tonally.	Dolby B/C/HX Pro, cue/review, fine bias, record sensitivity adjust	R	93
Aiwa AD-F810 £200	Good Good	First class budget 3-head machine with a dual capstan transport that really works at reducing the 'fudge' factor	Dolby B, C, HX Pro, bias adjust, track search, variable hdpd	BB	99
Aiwa AD-WX616 £160	Poor Poor	Sonically sub-standard twin transport deck which has sensible range of well implemented features, yet which sounds compressed and uneven.	Twin full logic, 1 records, Dolby B/C track search	R	93
Aiwa AD-WX777 £190	Very Good Very Good	Excellent, middle price dual deck with quick side change and a living, breathing sound though prerecorded tapes sound bright	Twin auto-reverse, one records. Dolby B/C, fine bias	BB	75
Aiwa AD-WX888 £260	Good Good	Inaccurate set-up spoils metal tape operation, but with other tapes the deck works well. This deck offers fine engineering, facilities and sound	Dual auto-reverse twin deck, Dolby B, C and HX Pro	R	75
Aiwa XK-S9000 £700	Good + Excellent	Genuine state of the art in battleship pale gold/wood gloss clothes. Fabulous build, clunky transport and sharp, refined sound quality with Dolby S or B and metal tapes	Dolby B/C/S/HX Pro, built in DAC, R tape alignment	R	105
Akai DX-57 £200	Good Good	Confident sounding deck which eschews fancy gadgets for a good transport and decent electronics. Sound quality is firm and tidy under most conditions of use; avoid Dolby C	3 heads, dual capstans, Dolby B/C/HX Pro, variable bias		105
Akai GX-32 £170	Average Poor	Constrained and smeared sum up this deck well. It has poor bass and treble definition alike, though it proved well aligned for prerecorded cassettes	Dolby B/C, variable bias, headphone out, track search		69
Akai GX-52 £250	Very Good Very Good	Well finished and a pleasure to use, this well specified deck sounds clean and defined with all tape groups, with or without Dolby	Dolby B, C, HX Pro, track locate features	BB	57
Akai GX-65 £300	Average Average	Fine ungimmicky middle ranking deck with simple, purposeful controls, works best with metal tapes. Performance standards fair to good	3-head, dual capstan, Dolby C/HX Pro		87
Akai GX-95II £400	Good Very Good	Sharp, clear and articulate sounding deck, with superb performance extending to frequency extremes	3 heads, dual capstans, tape calibration, Dolby B/C/HX Pro	R	99
Akai GX-R35 £200	Average Average	Middling sound quality at best with Dolby B; deteriorates with Dolby C and unsatisfactory anyway with testing material due to loss of low level information	Auto-reverse (optically triggered), Dolby B/C/HX Pro, bias adjust		99
Denon DR-750A £250	Average Average	Workmanlike and simply equipped dual deck which is more appealing on audio grounds than most of its type	Dual transport, Dolby B, C & HX Pro	R	99
Denon DRM-510 £140	Good Average+	An amnesic Dolby switch and lack of timer standby detract from an otherwise strikingly successful deck with a consistently good performance	2 heads, Dolby B/C/HX Pro heads, record return	R	99
Denon DRM-710 £230	Average Average	Although this is a fair performing model, the design has lost some of the competitive edge of its predecessor, the DRM-700. Memo: must try harder - and where's the timer standby?	Dolby B/C/HX Pro, fine bias adjust, record return		105
Denon DRS-810 £300	Poor Average	Basically good deck with non-stressful material let down by an inability to deal with high energy tapes properly. The horizontal loading mechanism is a success.	CD style loading drawer, real time remaining display, Dolby B/C/		105
Denon DRW-650 £200	Average Average	This simply equipped model is a little fiddly to operate at time, partly because of the way the single set of transport keys is assigned. But sound quality is generally workmanlike - good value	Twin transport, Dolby B/C/HX Pro	R	93
Dual CC800RS £150	Average - Average -	Low(ish) cost auto-reverse deck has mic input but lacks some niceties. Delivers a punchy but ultimately rather crude impersonation of source material, and a thin, lightweight bass.	Auto reverse, Dolby B, C, HX Pro, microphone input.		105
JVC TD-R431 £170	Poor Poor	Modestly specified auto-reverse cassette deck which suffers the usual problems of the breed, to wit unstable, homogenised sound quality	2-head, Dolby B/C/HX Pro, auto reverse		99
JVC TD-R441 £170	Average - Poor	This deck would make a good choice for those who need the unattended recording time to deal with absentee recording off air, but is a less than wholly convincing musical advocate.	Auto reverse transport, Dolby B/C/HX Pro, CD direct input		105
JVC TD-V531 £260	Average Average	A simple but potentially Good deck with an excellent transport, let down by poor setting up. With all tapes, sound quality was thin and lacking in both substance and colour	3 heads, dual capstans, Dolby B/C/HX Pro, var bias		99
JVC TD-V541 £280	Very Good Very Good	Crisp, lively sounding deck with excellent timing and occasionally slightly thin tonal quality. Best with metals and Dolby B	Dolby B/C/HX Pro, 3 heads, fine bias, display off	BB	105
Kenwood KX-5030 £200	Good Average	confusing mishmash of listening impressions caused by poor set-up afflicting metal tapes and Dolby C in particular. Promising otherwise	2 head, Dolby B/C/HX Pro, auto-bias, track search		99
Kenwood KX-5530 £190	Average - Average -	Neat looking and well equipped deck, adequately engineered but somewhat lacking musically. Worth considering if auto-reverse is the key to your happiness.	Dolby B/C/HX Pro, auto reverse, auto biasing, auto fader		105
Kenwood KX-7030 £260	Good Good	Fine, articulate middle price cassette deck whose only (mild) failing with some programme material is a just perceptibly synthetic glaze	3 heads, dual capstans, Dolby B/C/HX Pro, auto bias	R	99
Marantz CP230 £330	Average Average	This is a competitively priced portable recorder though not suited to replay of musicassettes	Dolby B, bias adjust	R	52
Marantz CP430 £400	Average Average	Uniquely flexible and compact package for outside work which at a pinch can double as a domestic cassette deck. dbx is useful for location work; results with Dolby B are acceptable	Portable 3 head, dbx, fine bias, charger/adaptor	R	87
Marantz SD315 £180	Average Average	Sound quality is promising, but somewhat offset by 'shut in' top end. Pitch integrity suspect. Dolby C sound quality and dubbing performance poor	Dolby B/C/HX Pro, twin transports, one rec/play, one play only. Mic i		93
Marantz SD40 £150	Average Very poor	Obstructive aesthetics are offset by apparently good build and sensible features, but sound quality is uneven or worse.	Dolby B/C/HX Pro, fine bias	R	93
Marantz SD50 £230	Good Very Good	Fine, exacting all-rounder offering good stereo, precision and focus. Good with prerecorded tapes too.	Dolby B/C/HX Pro, track & intro search, variable bias etc	R	81
Marantz SD515 £350	Poor Poor +	Good electronic design is let down by mediocre alignment and poor transport stability. Disappointing at the price.	Twin auto-reverse, both transports record, HX Pro, parallel recording		93
Marantz SD60 £350	Good Very Good	A first rate, highly capable deck offering energetic yet refined sound largely due to good electronic design	3-head, Dolby B/C/HX Pro, variable bias & sensitivity	R	81

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CASSETTE DECKS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Memorex SCT-5 £150	Poor Poor	Poor example of a twin cassette deck where everything has been sacrificed on the altar of flexibility	1 rec/play, 1 play only transport, Dolby B/C		87
Nakamichi Cassette Deck One £700	Good Good	New modernised Nakamichi is still curiously old fashioned in many ways, but offers unusually articulate sound of great insight	Dolby B/C, 3 heads, dual capstans, var azimuth	R	99
Nakamichi Cassette Deck 1.5 £500	Good Very Good	High grade 3 head deck with minimal features but fine engineering and sweet, open though slightly coloured sound quality.	Dolby B/C 3 heads, bias adjust	R	105
Nakamichi Cassette Deck Two £350	Very Good Very Good	Not completely neutral, this deck is assured, dynamic and quick, with abundant detail and some coarseness. Stable transport but rudimentary features accompany fine under the skin engineering	Dolby B/C, manual tape type selection, bias adjust	R	93
Nakamichi RX-202E £600	Good Very Good	Fine, clear and articulate sounding player. Excellent with prerecorded material, but idiosyncratic and sometimes obstructive control	Auto reverse, Dolby B, C, 2 head	R	63
Philips FC870 £250	Average Average	Disappointing at the price, this is a well equipped deck with off-tape monitoring, but a somewhat listless, smeared musical style	Dolby B/C/HX Pro, 3-heads, track/intro search etc		81
Pioneer CT-339 £150	Average + Average	Auto BLE tape alignment is the most interesting feature. Sound quality is a little flaky, but reasonable, though pitch problems were encountered with cheap tape stock.	Auto tape align, Dolby B /C/ HX Pro, mic inputs	R	105
Pioneer CT-676 £250	Average Poor	Dull, compressed and hard sounding deck, which is hamstrung by high measured transport flutter. Good points include sophisticated (and accurate) tape alignment	Dolby B/C/HX Pro, auto tape alignment, 3 heads		99
Pioneer CT-900S £500	Good Average	High spec and well built derivative of CT-93, but disappointingly lacklustre sound	Dolby B/C/S/HX Pro, dual capstans, 3 heads, auto alignment		99
Pioneer CT-93 £800	Excellent Excellent	State of the art deck, built like something out of NASA's shuttle, with superb all round performance. Dolby S can muddle ambient information, but increases effective dynamic range	Dolby B/C/S/HX Pro, auto tape align, 3 heads, dual capstans	R	99
Pioneer CT-W650R £200	Average Average	There were some intermittent problems with the tape alignment system on the test sample, but the deck was otherwise good, despite a coloured bass and inability to exploit Type IV tape	Twin deck, both reverse, one records, auto align, B/C/HX Pro	R	105
Revox B215 £1727	Very Good Very Good	Fine, consistent and solid sound quality, with excellent under the skin engineering and many useful features — but you're also paying for the same	Dolby C/HX Pro, 3 heads, dual capstans, auto tape align	R	87
Revox B215-S £1826	Very Good Very Good	This is a superbly engineered deck with a classically fine performance that almost transcends the stereotypes. Ergonomics are flawed but the user interface is both powerful and flexible	3-head, dual capstan, Dolby B/C/HX Pro, auto calibration	R	75
Revox H1 £1,145	Very Good Very good	Bare bones version of B215 is still a sophisticated piece of kit, and lacks for none of the 215's engineering prowess	3 heads, Dolby B/C, auto tape align, semi-auto record level set.		99
Revox H11 £938	Average + Average +	Costly and well engineered deck which boasts the bare minimum of facilities and which is primarily designed for the Revox multi-room H-Line system. Moderate performance.	3 head, Dolby B/C/HX Pro, manual tape alignment		105
Sansui D-X111E £120	Poor Poor-	Very high levels of flutter, and a shabby, hollow sound with metallic colorations and a severe loss of detail - is it necessary to go on?	Dolby B/C/HX Pro, fine bias adjust		105
Sansui D-X211HXR £170	Good Good+	Clean, stable and open sounding recording quality distinguishes this player, - and auto-reverse too. A great improvement on earlier mid price Sansui models, and excellent value.	Auto reverse, Dolby B/C/HX Pro, bias adjust	BB	93
Sansui D-X311WR £250	Poor Poor+	Not wholly successful auto-reverse deck which suffers because it has tried to be all things to all people. Lack of clarity is the main limitation	Twin optically triggered auto-reverse, Dolby B, C & HX Pro		99
Sony K870ES £350	Average+ Average+	Good but not outstanding deck which proved slightly disappointing on audition. This model is no standard setter	3 heads, dual capstan transport, Dolby B/C/HX Pro, tape calibration		99
Sony TC-K520 £170	Average Good	Fine, assured and detailed performer with a very well designed and straightforward user interface	Dolby C/HX Pro, variable bias, display on/off	BB	87
Sony TC-K570 £200	Good Average+	Good if slightly untransparent sounding recorder, comfortable with all noise reduction circuits and all tape groups	3 heads, Dolby B/C/HX Pro, bias adjust	R	99
Teac V-5000 £300	Average+ Good-	Fine middle ranking heavyweight with blemish free overall performance, beaten only on subtleties by the best at the price	3 heads, dual capstans, bias/sensitivity adjust, Dolby B/C/HX Pr		99
Teac V-7000 £400	Good Good	Intrinsically sharp, clear and solid sound spoiled by exaggerated detail with prerecorded material and losses imposed by Dolby circuits	3 heads, quartz locked dual capstans, tape align, Dolby B/C/HX		99
Teac R-9000 £450	Good + Good	Much better than average auto-reverse deck, well worth considering, though short of the special qualities required for formal endorsement at this price. Nicely engineered too.	Auto-reverse, 3-head, tape calibration, Dolby B, C, HX Pro		105
Teac V-8000S £700	Good + Excellent	Superb stability and real subtlety from a cassette deck, this must be the best Teac yet. The only disappointment was the Dolby C circuit which was coloured and lacking in transparency.	3 heads, dual capstans, Dolby B/C/S/HX Pro, tape calibration	R	105
Technics RS-B965 £380	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
Technics RS-BX606 £180	Average + Average +	Good middle ranker with accomplished metal tape handling but some HF roughness. Good with both noise reduction systems and with prerecorded material.	Dolby B/C/HX Pro, 3 heads, variable bias	R	105
Technics RS-BX707 £220	Average Average -	Uneven but ultimately messy sounding deck with a number of oddities, including a tape calibration system lacking in accuracy and poor Dolby alignment	3 heads, Dolby B/C/HX Pro, bias & level calibration		105
Yamaha KX-250 £150	Good Good	Excellent if somewhat fiddly deck with all mod cons. Play trim helps bring recalcitrant tapes back into line. Refined, expressive sound quality and stable transport	Dolby B/C/HX Pro, Intro Scan, Play Trim	BB	93
Yamaha KX-330 £180	Average Good	Cramped control panel but a strong, dynamic and comparatively stable performance distinguish this strong middle-price deck	Dolby C/HX Pro, optional remote control	R	87
Yamaha KX-530 £230	Good Good	Excellent all-rounder that does most things at least competently and many things well. One of the best middle price decks	Dolby C/HX Pro, 3 motors, optional remote control	BB	87
Yamaha KX-650 £300	Average+ Good	Fine audio manners, especially in the midband and treble, mark this high class deck out from the crowd	3 heads, dual capstans, Dolby B/C/HX Pro, play trim, bias adjust	R	99
Yamaha KX-930 £400	Good Average	Worthy but ultimately slightly disappointing mixture of fussy ergonomics and tidy but cluttered sonics	3 heads, dual capstans, Dolby C/HX Pro, remote control		87

CD PLAYERS

Now nearly a decade old, this all digital music source is well established despite high disc prices and the opposition of many hi-fi enthusiasts. Compact Disc's strengths over conventional vinyl are complete freedom from surface noise, ease of use, and more robust software. Remote control is just about standard on all new players.

However, many vinyl enthusiasts find CDs

sound less involving than top quality vinyl.

Prices average out at a little over £200, although entry level models are now available for little more than £100. Even the most basic models can sound very good indeed and employ state of the art decoding chips and the most useful play features. Extra money can buy remote volume control, audio 'tweaks', plus improved build and component quality control.

Digital outputs facilitate an easy upgrade path.

Machines can be split into bitstream and multi-bit with each school having its adherents. Bitstream is the newer technology and will probably win in the end, although the development time spent on multi-bit systems means that excellent results can still be obtained.

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Acoustic Research CD-06SE £450	Average- Average-	Basic Philips machine with beefed-up chassis and a revised analogue board. Distortion is higher than normal while the sound lacks both immediacy and clarity.	Remote control, programming but no direct track access, 16bit 4x		95

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MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Acoustic Research CD-07 £300	Good Good	AR's first Bit Stream CD player relies heavily on Rotel know-how to produce a smooth, detailed but undemanding sound	Few features on player, remote, dig o/p. SAA7321 PDM DAC	R	100
Aiwa XC-300 £130	Average + Average +	Cheap, cheerful and gratifyingly free of digital 'nasties', this new bitstreamer is well-equipped but safe rather than thrilling on the sonic front.	Remote control, optical output, Toshiba bitstream DAC.	R	107
Aiwa XC-700 £180	Good+ Very Good	Generously equipped player that harbours a top Philips' Bit Stream DAC. Offers a characteristically smooth and effortless 'bitstream sound'. Exceptional value	Remote control plus index skip, midship transport and 7350 PDM DAC	BB	95
Aiwa XC-900 £210	Good + Good -	The loss of transparency and general awkwardness of this player comes as a surprise after the XC-700. Extra features have taken their toll	Remote control with variable o/p, midship transport, 7350 PDM DAC	R	100
Akai CD-52 £249	Good Good	A nice surprise from Akai, genuinely good sound from this mid-priced model. Better linearity will help further	Remote, digital output, headphone socket	BB	64
Akai CD-55 £230	Good Average -	Budget model which fails to compare with the CD52	Remote, hdph, Good programming		83
Akai CD-57 £180	Average + Average +	A very flexible machine with a slightly lumpy but fullsome bass, no model of clarity but very entertaining!	Remote control, motorised volume, hybrid PWM DAC.	R	107
Akai CD-62 £330	Average Very Good	Looks, build quality and the technical specification are right up to date. As it stands it sounds good but if the indifferent lab performance is improved, it would probably sound even better	Remote, programme, hdph, comprehensive display etc	BB	70
Akai CD-73 £450	Good Average	A little uneven musically, the Akai tends to smother fine detail, but has first class dynamics and stereo imagery. Worth auditioning	Track entry keypad remote, menu display (switchable)		62
Akai CD-93 £700	Good Very Good	Undoubtedly a CD player of real class in build, presentation, lab performance and sound quality, but also a shade expensive for formal Recommendation though that's not to dissuade lovers of	Track entry remote, menu display etc.		58
Arcam Alpha £420	Very Good Very Good	Arcam's new star, its best CD player yet and great value	Remote, etc, coax dig. out	BB	83
Arcam Delta 70.3 £650	Good Good+	Latest in a line of Delta 70 CD players and one that offers a distinctly rugged, beefy sound. Plenty of power behind individual instruments but lacks a feeling of involvement	Remote control, display dimmer, variable and dig outputs. 7350 PDM		95
Ariston CD1 £400	Good Good	Easy on the ear compact disc for those who like their music Radio 2 flavoured. And it looks good	digital output, remote control	R	87
Ariston Maxim CD2 £550	Good+ Good+	Yet another re-worked Philips player with chunky alloy casework and sophisticated analogue stage. Narrowly escaped a recommendation with its dynamic and purposeful sound. Still a hint	Remote control, coax digital output. 16bit 4x chipset.		95
Ariston Maxim CD3 £430	Good Good	CD1 electronics given room to breathe in the heavyweight CD2 chassis. The result? A fine all-rounder with a positive, dynamic sound that's better than either parent.	Remote control, display-off facility, Philips 16-bit chipset.	R	107
CEC 880CD £230	Poor Average	The dynamic and spritely sound of this machine is gratifying in the light of its primitive design but is otherwise poor value	Remote control, direct track access, dig o/p, hybrid PWM DAC		100
Cambridge Audio CD3 £649	Poor Good +	Unique internal configuration gives the CD3 a fluid and detailed sound falling off at the frequency extremes. The controls and displays are primitive	Optical/electrical digital out, remote control		87
Carver TL-3220 £495	Good Average	A lightweight player with primitive display. We thought it sounded rather sparse and dry, and though Carver's DTL feature certainly fleshed-out the bass it also softened the stereo focus	Remote control with volume keys, 'Digital Time Lens', 18bit 8x		95
Carver TL-3300 £595	Good + Poor	Carver needs to listen critically to CD sounds; in our opinion. DTL does not improve the recipe	DTL, remote, programming, digital output		83
Cary Audio Design CAD-955 £899	Average Average +	Rotel's latest 16-bit wonder with an add-on valve processor to filter-out any residual RF garbage. Nice idea but the player sounds very dry and taut, lacking warmth and body.	Remote control, triode-output stage, Philips 16-bit chipset.		107
Creek CD60 £500	Good + Good	A big and confident sound from a player that's stuck with a green display, green lettering and green-fronted drawer. So it looks ghashly even if the internal design is very thoughtful.	Remote, spring-loaded buttons, coaxial digital output. 16-bit.		107
Denon DCD-1290 £319	Good Good -	This player certainly looks the business but its sound is a real five-minute wonder. Its compelling fizz lasts about as long as your average firework.	Remote, pitch control, index skip, variable output, 18-bit		107
Denon DCD-1460 £400	Good+ Average+	Here's a player that benefits from solid casework and decent features yet the overly complex electronics knock the stuffing from its sound	Remote control, volume, index search. 18+2-bit DACs		100
Denon DCD-2560 £550	Very Good Good	Beautifully built and, once again, generously equipped yet with a sound that's decidedly sluggish or reserved, particularly through the bass. Vocals are more forward but can sound a little glassy	Remote, pitch, tape edit features, opt/coax digital output, 20bit 16		95
Denon DCD-860 £250	Average+ Good+	This is a well designed and generously equipped budget player that offers a very spacious and appealing sound. There's a hint of treble emphasis but it still sounds great at high volumes!	Remote, pitch and full tape edit facilities. 18bit 8x.	R	95
Denon DCD-960 £300	Good + Average	A fine feature package with good lab results, but unfortunately an unexceptional sound quality	Remote inc vol, hdph, keypad, well featured		88
Dual CD1080RC £200	Very Good Average -	A rather strange-sounding player with a top-heavy treble that does little to redress its lack of vibrancy and emotion. The back-lit LC display and clean digital output are plus points.	Remote, coaxial digital output, digital volume, MASH/PWM DAC.		107

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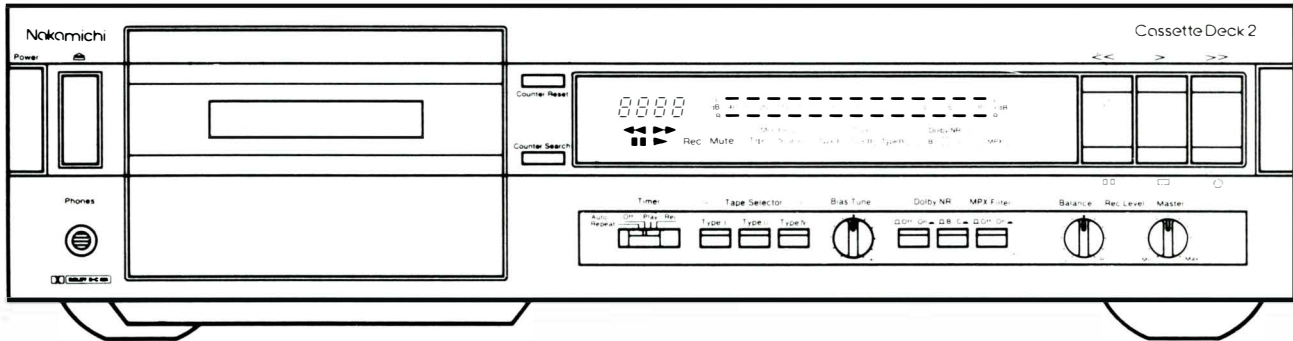


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CD PLAYERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Ferguson CD007 £130	Good Average	The cheapest recommendation in the test group; don't expect the earth but the value is good	Manual, digital output, headphone socket	R	64
Ferguson CD008 £150	Average Average	Not as strong as its relatives, sample fault perhaps? Though performance is fair enough overall	Remote, midi digital output, 2x O/s, timeshare 16 bit		64
Goodmans GCD-435 £140	Poor Average -	Goodmans has the power to source with more care than this, music centre quality!	multibit, remote, basic facilities		88
Harman Kardon HD7450 £230	Poor Average +	This player looks little different to other HKs but its performance is dominated by a budget decoder/oversampling IC. Good bass nonetheless but pop tracks can sound fizzy and tiring.	Remote control, display-off, timed-shared mono 18-bit DAC		107
Harman Kardon HD7450 £300	Good Average	A very stylish machine but one that is let down by its aggressive and dirty treble quality which pierces through most types of music. Weak bass resolution undermines the 'roots' of the player	Remote control but no headphone socket. MASH/PWM bitstream		95
Harman Kardon HD7500II £350	Good+ Good+	An update of the original HD7500 but featuring superior analogue electronics to the HD7450. Tonal integration is much improved, packed with detail that's expressed with enthusiasm.	Remote, variable, digital and headphone outputs MASH/PWM	R	95
Harman Kardon HD7600II £429	Good+ Average+	Based on the HD7500II but with a motorised volume control and extra-heavy casework. Either way it lacks the transparency and sparkle of the cheaper machine	Remote, variable and digital outputs MASH/PWM DAC		100
Harman Kardon HK7300 £200	Average Average -	Budget low bit technology, does not deliver enough for a recommendation	No remote, no digital out; basic control features		83
JVC XL-V231 £149	Excellent Average -	Text book lab result but below par sound, nice and boring. Must be some potential here	Remote, hdph (fixed), JVC 1-bit PFM		88
JVC XL-V241 £160	Good Average	Even with its mkII PEM DAC this new machine sounds pleasant but not especially interesting. Stereo imaging is a trifle suspect	Remote control, slim centralised drawer, PEM bitstream DAC		100
JVC XL-Z1011 £520	Very Good Good+	JVC's current flagship combines old K2 technology with PEM bitstream to deliver a full, beety and engagingly dynamic sound	Remote control, variable and digital outputs, PEM bitstream	R	100
JVC XL-Z431 £200	Very Good Average-	This is a player that started life off the back of the successful XL-V231 but whose performance fails to come up to scratch. The sound is weak and uninspiring - poor use of JVC's PEM DAC.	Remote operation, motorised volume + tape edit. PEM bitstream		95
JVC XL-Z441 £200	Very Good Good	The smoothest-sounding of JVC's budget machines - clear and bold but also very even-handed. One if not their best sub-£500 players to date and strongly recommended.	Remote control, tape edit, index skip, PEM bitstream DAC	R	107
Kenwood DP-4030 £180	Good+ Good+	Kenwood's first and cheapest bitstream player enjoys a deceptively detailed and refined sound but one that is mildly veiled right across the spectrum. Excellent value nonetheless.	Remote, variable and opt digital outputs NPC bitstream DAC	R	95
Kenwood DP-5030 £200	Good+ Good+	This looks like the DP-4030 but has more in common with the DP-7030 inside. Either way its neutral, uncluttered and intimately detailed sound is better than both	Remote control, motorised volume, R disc file. Sony PLM DAC.	R	100
Kenwood DP-5040 £200	Very Good Average	Better built and technically superior to the older DP-5030 but its untidy, detached treble quality proved a real disappointment in our listening tests.	Remote, display control, tape edit, peak search, Sony PLM DAC.		107
Kenwood DP-7030 £300	Good+ Good+	By adapting established Sony bitstream technology Kenwood has moulded its own exceptionally smooth and polite sound. Very nicely built machine with midship transport mechanism.	Remote, index scan, variable and optical outputs. Sony PLM bitstream	R	95
Kenwood DP-7040 £300	Very Good Good	A classy, polished sound from a decidedly refined piece of engineering. Close to the older DP-7030 in terms of performance but better value in construction and technology.	Remote control, Disc File memory, R display control, Sony PLM DAC.	R	107
Kenwood L-1000D £830	Very Good Good	A beautifully constructed and very stylish player that really only gives off its best when teamed-up in balanced-mode with Kenwood's matching pre/power combination	Remote control, balanced XLR's, 16-bit integrating DACs		100
Luxman D105u £699	Average Average	Visible valves are essentially for show in this rather ordinary player - both sound and lab	"valves", remote inc vol, hdph, well equipped		88
Marantz CD-42 £180	Average + Good +	Not as warm or rugged-sounding as the CD-52 but still wonderfully spacious and intimately detailed. Currently the best player under £200, plus it's got a decent coaxial digital output.	Remote control with direct track access, SAA7350 Bit Stream DAC	BB	107
Marantz CD-52 £200	Average+ Good+	Hardly the most neutral player on the planet but its rich, full and very generous sound cannot fail but warm the coldest of hearts	Remote control, FTS and dig outputs. SAA7350 PDM DAC	BB	100
Marantz CD-52SE £180	Average + Very Good	A similarly dramatic yet far more neutral sound than the basic CD-52. Either way, its engaging and believable performance was a real hit with our listeners.	Remote, FTS memory, switchable digital output, Bit Stream DAC	BB	107
Marantz CD-62 £300	Good Good-	Basically this is a Philips CD850II with Signetics op-amps all plonked into an old CD-50 chassis. Something of a range-filler	Remote control, index, 8-step volume and FTS. SAA7350 PDM DAC	R	100
Marantz CD-72 £400	Good - Good +	A heavily-constructed player based on the same digital electronics as the CD-42 and CD-52. This implementation sounds astonishingly solid and immediate but also rather too 'clean'.	Remote, variable and digital outputs, FTS, Bit Stream		107
Marantz CD-80 £560	Very Good Good	A dynamic and bold sound from a machine that is equally bold in appearance. It betrays no fear of the most thundering crescendos yet can sound a little hard or glassy with pop CD's.	Remote, motorised volume + FTS programming, 16bit 4x.		95
Memorex CD1650 £200	Poor Poor	An overpriced music entre player. Surely the giant Tandy corp. can get a better standard than this?	remote, keypad, multi bit, midi		88
Meridian 206B (DAC7) £971	Good + Very Good	Plenty of tight, strong bass but a little mechanical or even sparse at times. Its technical presentation of music is spot-on, only the sense of drama or anticipation needs working on.	Remote control, novel direct-loading transport, DAC7		107
Meridian 208 £1,550	Excellent Excellent	State of the art CD sound combined with a decent preamp and full remote control	Hdph + remote level. Programming, R phase invert, various outputs		83
Micro Seiki CD-M100 £5541	Very Good Good	One of the hernia inducing bricks of hi-fi, the Micro is extravagantly styled, finished and built. The good lab performance led to an 'only good' sonic display when the price demanded excellent	Balanced output, remote, display blanking		72
Micromega Logic £500	Good- Good	A rather expensive version of Philips CD624 with new op-amps and CD tray. Still, it does sound rather meatier, better integrated and more purposeful	Remote control, no FTS but switchable digital output, SAA7321 DAC		100
Mission DAD5 £300	Good Average +	Similar-sounding to Philips' 600-series players: lively, plenty of space and full of 'bounce' but a little too eager to impress in the short term.	Stylised remote, no 'stop' key on player, digital out, Bit Stream		107
Musical Fidelity CD1 £400	Average + Good -	Put together in Taiwan to MF's specifications, the main PCB and digital electronics are also used by Rotel's RCD-965BX! This version lacks the creamy, engaging quality of the latter.	Simple remote, index and track skip, digital out, SAA7323 DAC		107
NAD 5425 £200	Very Good Very Good	Not much in the way of facilities on offer but a sound that is both wonderfully open, detailed and appealing. This is a very communicative player that sounds positive without being brash	Worthless remote control, track skip/scan. MASH/PWM bitstream DAC	BB	95
NAD 5440 £300	Very Good Good+	The 'no compromise' version of NAD's 5425 but still rather lacking in facilities. Its sound is smoother and richer than the 5425, preferring to seduce with subtlety rather than have	Remote with direct track access, variable output, MASH/PWM	R	95
Nakamichi CD Player 2 £625	Average+ Average+	This may look like a CD Player 4 but features a special transport able to store 7 CD's with one in play. Nevertheless its digital electronics are flawed and its sound powerful but blunt	Music bank, remote, volume control, digital o/p, 18 bit DACs		100
Nakamichi CD Player 4 £300	Average+ Good-	Attractively styled but suffers high-ish distortion for a modern CD player. Best suited to up-beat pop rather than complex classical works which seem to lack focus and secure soundstaging	Remote with track access, coax dig. output. 18bit 8x		95
Nakamichi OMS-5EII £1500	Good + Very Good	"... delivers near state of the art performance and build quality in a deliberately starkly functional package, but at a very high price ..."	Skip and scan, simple track programming.I		51

CD PLAYERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Nakamichi OMS-7EII £2000	Good + Good	The only serious criticism here is of the price. And in our opinion you can get better sound quality for less elsewhere in Nakamichi's range	10 digit track entry programming, hdph		51
Philips CD604 £130	Poor Average +	To all intents and purposes this slightly ponderous but weighty-sounding player is the older CD610mkII minus remote control. Good sound at a daft price.	No remote, tape edit, peak search, digital out. 16-bit	R	107
Philips CD618 £170	Good Good	Cheapest of Philips bitstreamers and quite possibly the best with its excellent definition, punch and sparkle	Remote control, shuffle play, variable headphone, SAA7321 PDM	R	100
Philips CD624 £200	Good Good-	Philips' cheapest Bit Stream machine is still equipped with a vast array of features. Sounds pretty civilised too but lacks the crispness and freedom necessary to set it apart.	Remote, FTS programming, digital output. SAA7321 Bit Stream DAC		95
Philips CD634 £250	Good Good-	The all-singing all-dancing version of Philips' budget Bit Stream player and one that seems better able to cope with the pizzaz and dynamics of a decent recording. Nevertheless it	Remote, FTS + Title + personal programming. SAA7321 Bit Stream		95
Philips CD850mkII £400	Very Good Good	This looks just like the original but sounds completely different, trading a little transparency and pizzaz for an altogether smoother but slightly less memorable performance	Remote control, 2 FTS, personal presets. SAA7350 Bit Stream DAC	R	100
Philips CDV185 £350	Average + Average	Hard to value with the video singles facility but it all works well enough for a recommendation	Video singles + CD scart + digital out etc	R	76
Pioneer PD-75 £800	Very Good Very Good	A confident yet beautifully poised and relaxing sound from an equally luxurious package. Oodles of refinement plus Pioneer's hi-tech Stable Platter transport, but still expensive.	Remote, index and track skip, display off, PDM Bit Stream DACs		107
Pioneer PD-7700 £250	Good+ Good+	A busy-looking player with an upside-down transport yet one that offers a very tight, confident and dynamic sound. Bubbly and entertaining but still very refined	Remote control, turntable drive mechanism. 1-bit PDM DAC	R	100
Pioneer PD-8700 £300	Good+ Very Good	A pair of PDM DACs builds upon the sound of the 7700, crafting a generous soundstage populated with big-hearted and thoroughly captivating musical images	As 7700 plus index skip, display off and motorised volume. 1-bit	BB	100
Pioneer PD-91 £900	Excellent Excellent	Close to state of the art in nearly all areas soundstaging, clarity and simple lack of artificiality. A well made and sophisticated player	Track entry remote, calendar display	R	64
Pioneer PD-93 £1430	Very Good Good+	The extremely civil, understated feel of its music contrasts markedly with the over-engineered construction of this unit. It will not offend anyone but then neither will it spark much excitement	Remote with fader and index facilities. Two dig o/p's. 20bit 8x		95
Proton AC-120 £180	Average Average -	Fine styling, low price but barely average performance	15 track memory, simple design, remote, hdph		76
Revox B126 £649	Very Good Good	Made in Switzerland so the build quality and technical performance is high, but then so is the price and the sound quality is only good	Programming, Revox system compatible		70
Revox B226S £840	Good Average	Top quality build and finish for the Revox system enthusiast. For high value sound look elsewhere	Remote vol, hdph, 19 track memory, digital op		76
Rotel RCD-955AX £260	Good + Average	Touted as a repackaged version of the evergreen RCD-855. In practice, however, our sample disappointed on several visits lacking the clean, cohesive quality of the original.	Remote control, digital output, repeat, scan, Philips 16-bit		107
Rotel RCD-965BX £300	Average+ Excellent	Two years on and the 865's replacement turns out to be an exceptionally refined bitstreamer: transparent, exquisitely detailed and powerfully emotive. A landmark player	Remote control, index skip, digital out. SAA7323 PDM DAC	BB	100
SAE D102 £700	Good Good	Considering the high price of this player, most of the innards seem fairly prosaic. Sound quality and lab performance are both respectable enough, but hardly justify the price premium involved	Remote (inc volume), skip, scan etc.		58
Sansui CD-X311mkII £250	Good+ Good	Sansui's mid-ranked player uses Technics' technology but provides a warm and cuddly sound that's atypical of the breed	Remote control, variable and digital out, MASH/PWM DAC	R	100
Sansui CD-X317 £300	Good + Average	Not in the same class as Sansui's older CD-X311mkII. Same technology and a similar appearance but the sound is neither as responsive or engaging.	Remote, fixed, variable and digital outputs, MASH/PWM DAC		107
Sansui CD-X711 £600	Excellent Very Good	Luxury features, finish and sound from this classy Sansui; no excuses required here	Hdph + vol, remote full programming	R	83
Sharp DX150 £129	Average Average	This is one oversampled player which is rather outclassed for technical and sonic merit by the vast majority of the competition. Pretty enough but would you want to put discs in it?	Programmable, skip, search, repeat		70
Sharp DX750 £179	Average Average	It has a remote control but it's too like the 150 which is rather outclassed for technical and sonic merit by the vast majority of the competition	Remote, programmable, skip, search, repeat		70
Sony CDP-591 £160	Good+ Average+	Tons of features at a highly affordable price but let down by its lacklustre if inoffensive sound quality. The sound of these new Sony players lacks the grip and purpose of the last generation	Remote control, variable and optical digital out. PLM bitstream		100
Sony CDP-797 £200	Good + Good -	Another day, another DAC. This new budget player succeeds with its taut imaging, clean and impressive soundstaging. Can seem a little too lean or dry, however.	Remote, motorised volume, edit and scan facilities, PLM DAC	R	107
Sony CDP-991 £230	Good+ Average+	Another well-equipped and well-specified machine and one that can sound very up-beat and detailed with simple material. Tends to loose its way with complex stuff, however	Remote control, Custom File programming, variable out. PLM DAC		100
Sony CDP-X333ES £400	Very Good Good-	This beautifully built player has a very tidy and well-ordered style of music-making, but in the long run it lacks the ability both to excite and involve	Remote control, Custom File programming. Complementary PLM DAC		100
Sony CDP-X339ES £430	Excellent Very Good	Superbly constructed, this tour-de-force of features and technology offers a tightly detailed almost cavernous sense of acoustic. The mid and treble can sound positively magnetic.	Comprehensive remote, Custom Navigation System, new PLM DAC	R	107
Sony CDP-X77ES £1000	Excellent Good+	Rather like Pioneer's PD-93 this flagship player is beautifully put together but simply lacks the thrill or conviction of cheaper and perhaps more ragged-sounding machines. Still,	Remote, everything but Custom File titling. Complementary PLM		95
Stax Quattro £2995	Very Good Very Good	Now in mkII guise this substantial player recreated exceptionally strong and convincing bass lines together with a beguilingly musical midband	18-bit DACs, 20-track memory, full IR remote, variable o/p	R	72
TEAC CD-P4500 £250	Good + Good	TEAC's first genuine 1-bit player uses Philips BS DAC to great effect, its sound described as having a certain 'organic warmth', very composed and easy-going.	Remote, pitch control, variable out, SAA7350 Bistream	R	107
Technics SL-PG200A £160	Good+ Good+	This season's version of last season's favourite (the SL-P277A) offers extra features and a similarly punchy, dynamic and up-beat sound. All this plus an uncommon poise - Best Buy	Remote control, random play, variable out. MASH/PWM bitstream	BB	100
Technics SL-PG420A £160	Good + Good +	No repackaged version of the SL-PG200A but a new player in familiar clothes. Still offers an open, transparent and uncommonly fresh sound but a little of the 'magic' is missing.	Remote, digital volume, synchro edit, auto cue, MASH/PWM DAC	R	107
Technics SL-PG520A £200	Good + Very Good	A cracking player that builds upon the astonishing out-of-the-box sound of earlier budget players. Superb clarity and dynamics, thrilling but musically involving too.	Remote, shuttle search dial, edit mode, peak search, MASH/PWM DAC	BB	107
Technics SL-PS900 £350	Very Good Good-	Just about the quietest transport in existence and a sound that is equally unobtrusive, polite and refined. There's plenty of detail too but the overall result won't set your pulse racing	Huge remote control, function manager MASH/PWM DAC		100
Wadia WT/Digimaster 2000 £5614/£6641	n/a Very Good	Very high grade player which provides state of the art in believable music making from CD, and promises a degree of upgradeability	Transport/multi bit DAC - 32, 44.1, 48kHz o/s		Coll. '90
Woodside WS2 £1095	Good Good+	Prompted a mixed reaction on audition, responding well to our jazz and classical selection but sounding bright and grainy with the pop CD's. RF emission is very high	Remote control, display defeat, variable and digital outputs, 16bit		95
Yamaha CDX-450 £170	Average+ Good+	A contentious player this and one that prompted a range of reactions from enthusiasm to disinterest among our listeners. It could prove too safe-sounding but worth a try at the price.	Remote control, track access, variable out. 18-bit hybrid DAC	R	100
Yamaha CDX-750 £250	Good Average+	A sleek machine that can sound rich and vibrant with simple material but seems to lack expressiveness and subtlety when dealing eith busier, more complex passages	Remote control, variable and digital out, LC display. PDM DAC		100

CD TRANSPORTS AND DACS

A CD player can be split into two basic components, the mechanism which reads the information from the disc, known as the transport, and the device which turns the digital numbers contained on the disc into the music that comes out of your speakers, this device being referred to as a digital to analogue convertor or DAC. Although at the lower end of the market both of these are contained in a single box, at the top end of the market two box machines consisting of a CD transport and a separate DAC become more common.

Although many of these units will be purchased as two box machines, which are generally considered to sound better than a one box equivalent, a DAC can also be used to upgrade an existing CD player. A good example is where an early machine with a satisfactory drive unit but a rather dated DAC can be brought up to the latest spec by the addition of a new DAC.

When upgrading an existing player best results are usually obtained using the electrical digital output rather than optical, and obviously

to be upgradeable your CD player must have a digital output in the first place.

The choice of interconnect is crucial in linking drives and DACs and conventional interconnects used for analogue signals should be avoided, a dedicated 75ohm digital cable will give far better results.

Mixing and matching transports and DACs from different manufacturers can be a bit of a lottery and readers are referred to the full reviews where this subject is discussed in more detail.

CD TRANSPORTS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Arcam Delta 170.2 £620	Very Good Good	An upgraded Delta transport, it sounds different but not really better. More research is required here	Transport only, display off, usual programming		88
Kenwood DP-X9010 £500	Average Average +	Compromised by jitter, RF noise and poor clock selection this transport generally encourages a dynamic but bright and edgy sound with most DACs	CD transport, optical + coax outputs, Class 2		96
Marantz CD-95DR £1500	Very Good Good	At its best with Philips-based DACs, this transport sounds confident if not totally pure, sparkling or fresh	CD transport, optical + coax digital, Class 1		96
Meridian 200 £895	Very Good Very Good	Broadly compatible with most DACs and offering a light, fresh and very bubbly sound that is both natural, engaging and unfatiguing	CD transport, optical + coax outputs, Class 1	R	96
Meridian 602 £1,750	Very Good Good	This dedicated CD transport teams-up most successfully with the 606 DAC. Otherwise it lacks the life and pizzazz of the 200	CD transport, optical + coax outputs, Class 1		96
Philips CDD882 £500	Good Good	A butchered CD880 CD player-cum-CD transport that pairs up well with most Philips-based DACs. Dynamic and lively but can also sound a little mechanical	CD transport, optical + coax outputs, Class 1		96
TEAC P-10 £1499	Good Very Good	A chunkier and altogether more successful transport than the P-500 with an especially beefy and compelling sound. TEAC's best	CD transport, coax + optical outputs, Class 1	R	96
TEAC P-2 £2849	Very Good Good	TEAC's flagship CD transport is beautifully styled and constructed but its sound is bleached and generally less inspiring than that of the P-10	CD transport, coax + optical outputs, Class 1		96
TEAC P-500 £649	Good Good +	Provides a smooth and very sympathetic sound with most DACs yet is also rather vague, lacking the crispness and resolution of its peers	CD transport, coaxial and optical outputs, Class 2	R	96
Technics SL-PA10 £470	Good + Good	Built to partner the SU-MA10 upmarket integrated amp/DAC, this transport has the unusual limitation of only optical output. Reassuringly solid and more immune to vibration than most	CD transport, optical output only, remote		88
Wadia WT2000 £5614	Very Good Good +	Based on TEAC's P-2 with outboard mains transformers, active digital output and solid alloy casework. Dynamic and crisp sound best realised with Wadia DACs, otherwise less impressive	CD transport, AT&T opt +direct -coupled coax outputs, Class 1		96
Wadia WT3200 £1800	Excellent Very Good	Based on Marantz's CD-95DR with new casework, active digital output and revised grounding. Very clean, clear and authoritative sound with Wadia and Philips-based DACs	CD transport, AT&T opt + direct -coupled coax outputs, Class 1	R	96

DIGITAL TO ANALOGUE CONVERTORS (DACs)

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Arcam Black Box 2 £260	Very Good Very Good	An upgraded version of the old BB1 with more inputs and improved sound quality	Optical and wired inputs	BB	76
Arcam Black Box 3 £360	Good + Very Good	Top of a series of three decoders it can offer a high sonic standard with top class transports	Bitsream, auto input switching,	R	88
Audio Alchemy Digital Decoding Engine V1.0 £376 £3898	Good Very Good	A very sweet and seductive sounding unit that gives good results with a wide range of CD players/transports	Coaxial and optical inputs, phase invert, Bit Stream DAC	BB	101
Audio Research DAC1-20 £3898	Very Good Good	This expensive DAC works surprisingly well with Meridian's cheaper 200 transport, an impressively weighty and engaging combo that proved entertaining on audition	BNC, Toslink and AT&T optical inputs, phase invert, 20-bit DACs		103
Audiolab 8000DAC £695	Very Good Good	Needs to be used with a genuine Class 1 digital drive. At its best with the Wadia WT3200 where it sounds vivid and alive. Otherwise can sound a little antiseptic.	Coax and opt inputs, phase invert, crystal lock, Bit Stream		103
Deltec Bigger Bit £650 + £98	Good Very Good	Partnered with either TEAC P-10 or Meridian 200 transports, the Bigger Bit delivers a very taut and dynamic sound, bathed in an open acoustic. Deltec's RF mains filter is a must.	Coax and opt. inputs, Deltran sync facility, DAC7 Bit Stream	R	103
Deltec Little Bit (Optical) £400	Very Good Good	Our sample suffered from radiated RF interference but new LB's are now cured. Works especially well with Meridian's 200 transport but does require the services of Deltec's 'Power' mains filter.	Coaxial and optical inputs, SAA7350 Bit Stream DAC		101
Deltec PDM1 £500	Average Very Good	A no frills audiophile bitstream converter at an affordable price	Coax-in, special cable and mains filter options	R	83
Deltec PDM1 Series 3 £1195 + £196	Very Good Good +	Hailed as a budget version of the PDM2, it bears technical comparison with both the PDM2 and Bigger Bit but - in terms of sound quality - is no great advance on its cheaper relative	Coax and opt inputs, two-box construction, DAC7 Bit Stream		103
Deltec PDM2 £2000	Excellent Excellent	State-of-the-art technical performance with a pristine sound to match. Repertoire includes a solid, invert, two-box DAC7	Coaxial and optical inputs, phase invert, two-box DAC7	R	101
Forte Audio Model 50 £950	Good Very Good	The first American DAC7 design and one that offers a typically big and full-blooded sound, infiltrated by a slightly euphonic quality but never hard or gritty.	2 Coax and 2 optical inputs, DAC7 Bit Stream technology	R	103
Kelvin PDM DAC £200	Average + Average +	Don't disregard this DAC-in-a-matchbox for though it can sound a little unconvincing it is capable of developing a surprisingly lyrical and natural sound with the right transport.	Single coaxial input, low analogue outputs, SAA7320	R	103
Meridian 203 DAC7 £510	Good Very Good	This is another broadly compatible DAC that's free of fatiguing nasties yet remains bubbly and exciting. If you find the 606 too sober then the 203 will undoubtedly suit	Coaxial and optical inputs, single-box DAC7 Bit Stream	R	101
Meridian 606 DAC7 £1220	Very Good Good	Extra cash buys you a better standard of construction and finish over the 203 yet by refining its sound further Meridian have also tempered its vibrancy and 'life'. Fickle with other transports	Two coaxial and optical inputs, phase invert, DAC7 chipset		101
Micromega Duo BSII £500	Average Good	This DAC has a tendency to sound light, airy and 'fast' but it can also become a little hard or - fatiguing with some digital outputs. At its best with Meridian's 200	Coaxial and optical inputs, phase invert, SAA7321 Bit Stream		101
PS Audio Superlink £1498	Average Good -	Another transport-fussy DAC that, once again, does the business with Meridian's 200 but can sound bloated, smeared and even vaguely electronic with standard 75ohm digital outputs.	Touch-sensitive coax and optical inputs, phase invert, 18-bit		103
Proceed PDP2 £1595	Average Good -	The PDP2 has a wobbly input impedance that's suited to specific drives, ie Meridian 200, or Proceed's own. At its best expressive and enticing, otherwise it can seem gutless and smeared.	Coax and XLR inputs, balanced outputs, 18-bit DACs		103
Stax DAC-Talent £1400	Excellent Good +	Natural, refined and never over-zealous, the DAC Talent is also capable of sounding very spicy and dynamic. Capable of wielding a maturing influence over a light or bright-sounding system	Coaxial and optical inputs, phase invert, mute, 20-bit DACs		101
TEAC D-500 £399	Good + Good +	An unusual combination of NPC oversampling filter and no less than two Philips' DACs. Its reliable 75ohm input infers broad compatibility. A dynamic and 'interesting' sound	Coax and optical inputs, complementary 16-bit DACs.	R	103

DIGITAL TO ANALOGUE CONVERTORS (DACs)

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Threshold DAC 1/e £3150	Very Good Very Good	The DAC 1/e can sound beautifully detailed with a marvellous sense of scale and sharp, solid images. Its unpredictable behaviour with unknown transports precludes recommendation.	Coax and opt inputs, balanced outputs, phase invert, MASH/PWM DA	R	103
Wadia DigiMaster X-32 £2000	Average - Good -	Wadia's freaky input circuit gives unpredictable results with non-Wadia transports. Otherwise it can sound bold, dynamic and crisp but lacks the warmth to bind its music together	BNC and optical (Toslink and HP) inputs, 18-bit 32x	R	101
Wadia DigiMaster X-64.4 £5000	Average Good*	The X-64.4 positively buzzed with vibrant, sharply-etched detail. An exciting sound	BNC + Toslink/AT&T optical inputs, phase invert, 18-bit 64x	R	101
Woodside DAC 1 £895	Good Good	Fine but slightly dated and costly package in performance terms - but flexible, musical and well built	2 electrical + optical i/p. tape ou	R	87
Woodside DAC2 £510	Good Good +	Based on Woodside's earlier 16-bit CD player and offering a similarly sharp and dynamic sound, all the more captivating for its lack of graininess and 'tizz'. Should be a reliable upgrade	BNC coaxial input (no optical), 16-bit 4x	R	101

DIGITAL AUDIO TAPE

DAT, or digital audio tape, has been on the market for quite some time now but has never really 'made it' as a consumer medium, probably due to the fact that very little prerecorded software has been made available.

In the last year or so it has begun to carve itself a niche at the top end of the market replacing reel to reel tape recorders as the audiophile's tape based medium.

The DAT standard specifies a 48kHz sampling rate, which is higher than CD, so direct copying in the digital domain is only possible on those machines with dual sampling frequencies, ie 48kHz and 44.1kHz. Some machines also record at 32kHz to give a longer recording time for a given length of tape.

To try and get around the copying problem many machines incorporate SCMS, the Serial

Copy Management System, a device which enables you to record from a CD but not to 'clone' one digital tape from another

Portable machines are now entering the market but make sure the price you are quoted includes an analogue to digital convertor, with some portables these have to be purchased separately and increase the price considerably.

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Aiwa HD-S100 £450	Average - Average -	Largely bulletproof in non-critical and semi-critical applications. Despite the usual limitations of DAT as a hi-fi medium, the HD-S100 is a practical and well built tool.	Portable, ADC, mic in, phone/line sockets (3.5mm), 70 min battery	R	105
Aiwa XD-S1100 £550	Poor Average -	A muddled fascia detracts from the appeal of this inexpensive deck, but the real no no is a significant loss of the finer virtues: detail, imagery etc	SCMS, analogue, coaxial & optical in/outputs, full subcode editing	R	99
Aiwa XD-S260 £500	Poor Poor	Unlovely sounding deck lacks weight, clarity and presence. Low pricing and mini dimensions excuse many sins however	SCMS, optical/coaxial and analogue in, optical/analogue out	R	99
Denon DTR-2000 £800	Good Very Good	Not cheap, but first rate DAT recorder, good to excellent fidelity in all modes, with a slightly cool detached quality when differences are detectable.	Digital LP/digital & analogue SP rec/play, LP analogue play only	R	93
JVC XD-Z505 £620	Good Good	Competent middle market DAT with uncomplicated (but still flawed) user interface, but good basic sound quality. A fine CD dubbing machine.	DAT SP/LP en/decode, low bit conversion, remote control	R	105
Kenwood DX-7 £500/Sony	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	Mains recorder, LP mode. Optional accessory packs adds battery/ADC	R	94 Supp.
Kenwood DX-7030 £700	Average Average-	Bland sounding deck that lacks low level clarity and imaging. No analogue LP mode. Build quality is good however and ease of use ranks highly	Remote control, stand-alone DAC facility, optical/coaxial in/out	R	99
Pioneer D-500 £600	Good - Average	Looks extremely good. Fascia design is complex yet accomplished, and offers very slick tape handling. Musically however it is on the messy side compared to others in this price area.	SP/LP en/decode 1-bit converters, many search/display aids	R	105
Sony DTC-750 £450	Good Good	Superb value for money: the lowest price full size DAT on the market, fine features, build, measurements and sound approaching the best DAT has to offer at any price.	SP/LP record, real time/date recording	BB	105
Sony DTC-77ES £1000	Excellent Average	Superb engineering, many well implemented features (including off tape monitoring) and technical near perfection (!) don't offset perceptibly slowed, thickened sound	4-head, tape monitor, many search/display options, SP/LP	R	105
Sony DTC-M100 £799	Very Good Very Good	Only available from professional outlets. Clean clear sounding second generation model with most of the features and sound of the DTC-1000ES	Midi-width, alpha-numeric display, remote, optical interfaces	R	63
Sony TCD-D3 £500	n/a Very Good	At the time of writing, this model represents the state of the art, and beats all comers.	DAT recorder, detachable rechargeable power pack, LP/SP	BB	94 Supp.

EQUIPMENT SUPPORTS

It's becoming more and more apparent that all the components in a hi-fi system benefit from being placed on the right kind of support. It is already acknowledged that performance of electro-mechanical transducers, such as turntables and loudspeakers, can be greatly improved by using highly rigid supports. This notion has been expanded to include electronics such as amplifiers and compact disc players, and inevitably a broad range of stands and supports have been produced to cater for this requirement.

With loudspeaker stands there seems to be two broad schools of design. The most common

is the open frame type which uses square section steel tubing (usually less than an inch square) made up to form a tripod or quadropod stand usually fitted with spikes top and bottom to ensure good coupling to both floor and cabinet. However, for reasons of domestic harmony this latter option is often not pursued as eagerly as perhaps it should be.

The alternative approach is to use mass. Larger section (approximately 3 inch x 2 inch) tubing is welded between square top and bottom plates and filled with sand and/or lead shot. Again, this type uses spikes at the base but Blu-

tack or the like for coupling with the cabinet.

Equipment supports generally place isolation quite high on the list of priorities and usually use a lightweight steel frame to support an MDF platform. Once again spikes are used to minimise contact with the platform and ensure good coupling to the floor. Minimising weight without compromising rigidity seems to be the aim with turntable supports but those designed for electronics often employ some form of damping to kill vibration, sometimes in the form of mass.

EQUIPMENT SUPPORTS - COMPONENTS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE (H x W x D)	VALUE	ISSUE
Alphason R444 £120	Rack Good	A heavyweight structure with stressed MDF shelves, ideally suited to the Sonata turntable	82 x 60 x 39.5cm	R	83
Audioquest Sorbothane Feet £40 for four	Feet Good	These large gumdrops are very useful for damping vibrations in amplifiers and especially CD players.	6.5 x 2.5cm (circular)	R	57
Cornflake TCS6 £60	Shelf Good	A squat and rigid frame supports a Medite top board with four adjustable spikes, better suited to suspended sub-chassis turntables.	43 x 23 x 33cm	R	83 Supp.
Foundation Stable Table £100 (with Supe	Table Good	Similar to Stand Design's table though less well finished and certainly less stable	64 x 46.5 x 36cm	R	58
Origin Live Skyline Super £100	Table Good	An asymmetric table that helps provide a quick, lucid and solid sound with most decks	41 x 50 x 40cm	R	83
Roksan Equipment Table £169	Rack Good	An upgradable/expandable system suited to Roksan's Xerxes if not other competing turntables	65 x 52 x 38cm	R	58

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EQUIPMENT SUPPORTS - COMPONENTS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE (H x W x D)	VALUE	ISSUE
Sound Organisation Table £55	Table Very Good	A deceptively simple structure that just happens to be engineered in a thoughtful, and ultimately successful manner.	37 x 45 x 35cm	BB	57
Sound Organisation Wall Stand £40	Shelf Very Good	The first of its ilk and still amongst the best, this simple framework represents a vast improvement over standard furniture shelves.	27.5 x 43 x 35cm	BB	57
Sound Organisation Z022 £97	Table Excellent	A small but costly table made from thin steel tubing. Suited to the LP12 but not other decks	49 x 45.5 x 36cm		58
Stand Design Duplex £75	Table Very Good	Well made and nicely finished, this table is broadly compatible with most heavy turntables	63.5 x 46.5 x 36cm	R	83
Target TT2 £64	Table Very Good	Standing up to the best in most areas, the TT2's only real foible concerns a slight loss of bass 'slam'. Design was updated in 1990	52 x 46.5 x 35.5cm	BB	57

EQUIPMENT SUPPORTS - LOUDSPEAKERS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE (H x W x D)	VALUE	ISSUE
Appolo A10 £52.50	4 leg Average	A robust and lightweight model, it would make an ideal upgrade for those still happy with the big boxes of old.	19 x 19cm 44cm	R	58
Appolo A820 £44	4 leg Average	A light open-framed budget design slightly lacking in rigidity and subjectively superceded by other stands costing £10 more.	19 x 19cm 53cm		58
Foundation Fred £70	2 leg Average	With sand filling the Freds made speakers sound tight and coherent with a more even balance.	19 x 19cm 36/43/59cm		58
Foundation Maggi £159 to order	Plinth Very Good	Made for Magneplanar and other similar panel speakers they seem to have a healthy effect on the sound quality thereof.	50 x 2cm 2cm	R	58
Foundation Pi £269 to order	2 leg Very Good	Overpriced in material terms the Pi nevertheless has a very positive effect on the low frequency performance of conventional speakers.	20 x 20cm 25/38/46/5	R	58
Foundation Sir Fred £80	2 leg Good	Upgraded 'Fred' with special in-fills. Sweet sound but one that also lacks bite and edge	19 x 19 x 46.5cm		83 Supp.
Goldring Black Satin £65	1 leg Very Good	Screw together stand tastefully hewn from medite. Some loss of bass but still pleasantly rhythmic	18 x 20 46cm	R	83 Supp.
Heybrook HBS1 £109	4 leg Very Good	With its new aluminium base frame the HBS1 fared very well in the listening tests. It allowed much of the speakers own 'sound' to remain intact.	23 x 21cm 47cm	R	58
Heybrook P5S £69	3 leg Very Good	An unusual triangulated open frame stand that can help certain speakers sound more transparent and fluent - a good value stand	23 x 21.5cm 47cm	BB	58
Linn Kan II £101	4 leg Very Good	Built to support Linn's Kan speaker this stand is well suited to the task, but is less successful with other loudspeakers.	19 x 16cm 59cm		58
Linn Sara £112	4 leg Very Good	The Sara exhibits some odd properties so its use other than with the Sara loudspeaker should be viewed with caution.	25 x 21cm 53cm		58
Origin Live Three Leg £89	3 leg Good	An unusual tripod stand devoid of top plate and taking up more floor space than normal, subjective and technical performance was exemplary.	(support area) 22 x 17.5cm 52cm	R	58
QED TS22 Tristand £60	3 leg Very Good	Most tracks sounded uplifted or buoyant, never thick nor coloured. It worked well with most of the speakers tried and encouraged a fluid and revealing midband.	19 x 17cm 45/50/58cm	BB	58
Standesign Z20 £75	1 leg Excellent	Well built and finished with optional sand in-fill. Ideally suited to Wharfedale 505.2's	16.5 x 19 50cm	R	83 Supp.
Target HJ15/3 £107	3 leg Very Good	Sound quality was basically very good though without the sand infill some loudspeakers may sound a little unbalanced as both bass and treble regions are subjectively exaggerated.	28 x 28cm 40cm	R	58
Target HS20 £64	1 leg Excellent	This monopod stand can be used either filled or unfilled and encourages different characteristics in the speakers sound accordingly	19 x 16.5cm 53cm		58
Target T-40 £51	2 leg Very Good	Not very stable, tends to infer a slightly forward, ragged sound with diluted pitch	19 x 19 40cm		83 Supp.

HEADPHONES

There are a variety of different approaches to headphone design, and examples of each turn up in this group. Amongst the more expensive esoteric models, electrostatic drivers are used in square open-backed phones such as the Jecklin and Stax models.

The majority of these come with some form of transformer which takes the signal initially from the speaker terminals on the amplifier. The actual speaker cables then travel from this unit

bypass switch to the loudspeakers

The more down to earth models feature dynamic drivers in circular open-backed designs. The advantage of open backs seems to be a correspondingly open sound and a less claustrophobic feel to the music.

One can also of course hear external noises, as well as irritating the hell out of people on public transport

The third category are closed-back designs,

which are useful in situations where it is necessary to block out background noise. Another means of distinguishing different types is the way they sit on your head.

There are three styles: circumaural models enclose the ear and rest on the side of the head; supra-aural designs press on the outer ear (pinna); and intra-aural types rest inside the ear and are popular amongst users of personal stereos.

MODEL PRICE	FIT SOUND	COMMENTS	TYPE	VALUE	ISSUE
Aiwa HP-X30 £31	Good Good -	A flashy personal stereo phone which alternatively could be used at home. A slight LF tonal preference slightly colours the response, but it ain't a bad can	Supra-aural, closed-back, dynamic		75
AKG K1000 £500	Very Good Excellent	One of the best moving coil headphones on the market, hooks directly to speaker outputs and makes much of the competition sound lame. Looks a tad weird	Extra-aural, open-back, dynamic	R	99
AKG K135 £33	Poor Average	Despite a very appealing design the K135s don't live up to the usual AKG standards, though they do have the ability to reproduce rhythm well	Supra-aural, semi-open, dynamic		63
AKG K145/S £60	Good + Good +	Electrostatic tweeters combine with a dynamic mid/bass unit to create very confident sounds in a comfortable headphone. Balance is on the bright side	Supra-aural, semi-open, electrostatic/dynamic	R	75
AKG K240 Monitor £60	Very Good Good	Something of a classic, these AKGs are very user friendly in all respects; sonically on the warm side of neutral	Circumaural, semi-open, dynamic	R	63
AKG K280 Parabolic £90	Good Very Good	A very revealing and unusual twin driver design that uses the same principle as a satellite dish to beam sound into the ear	Circumaural, open-backed, dynamic	R	63
AKG K340 £140	Good Excellent	Heavyweight cans in most respects, the K340 with its electrostatic tweeter is a very revealing headphone. Gives the total electrostatics a good run for their money	Circumaural, closed-back, electrostatic/dynamic	R	75
AKG K44 £40	Good+ Average	Good quality personal oriented phone, could have a better sense of space but is musically quite communicative	Supra-aural, open-back, dynamic		99
Audio-Technica ATH-609 £31	Average Average-	Warm feeling and sounding with impressive physical substance for the price, could be more relaxed and open	Circumaural, open-back, dynamic	R	99

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HEADPHONES

MODEL PRICE	FIT SOUND	COMMENTS	TYPE	VALUE	ISSUE
Audio-Technica ATH-611 £51	Average Good	Same basic design as 609 but bigger thinner diaphragm makes this a more relaxed and informative headphone	Circumaural, open-back, dynamic		99
Audio-Technica ATH-909 £60	Average Average	Quite impressive in the treble though a bit bass shy, the 909s worked well at highish levels	Circumaural, semi-open, dynamic		55
Audio-Technica ATH-910 £70	Average Good	The closed-back 910s are an improvement on the 909s with a nice rhythmic quality rarely found with headphones	Circumaural, closed-back, dynamic	R	55
Audio-Technica ATH-911 £80	Very Good Very Good	Nicely finished dynamic headphones with all the trimmings, plus a very clean and subtle sound	Circumaural, open-backed, dynamic	R	63
Beyer DT 325 £32	Very Good Average	Lightweight in more ways than one, the 325s may be a little bright for some systems and tastes but will suit duller sources	Supra-aural, open-back, dynamic	R	63
Beyer DT330 Mk II £50	Good Poor	Not the most revealing 'phones encountered, the 330s were nevertheless enjoyable and rarely offended	Circumaural, semi-open, dynamic		55
Beyer DT550 £61	Good Good	On their own the 550s sound articulate with a slightly 'gritty' treble and 'keen' midrange; not suitable for headbangers!	Circumaural, semi-open, dynamic		55
Beyer DT880 £80	Good Good	Well made cans with a warmish sound but fairly solid midrange, though they're not that informative for the price	Circumaural, semi-open, dynamic		63
Beyer DT990 £102	Very Good Very Good	The 990s are definitely a significant pair of dynamic headphones; they have a smooth and yet revealing neutral sound that is hard to criticise	Circumaural, open-back, dynamic	R	55
Beyer IRS690 £203	Good + Very Good	High quality infra-red headphones with soft comfy earpads and mellow but informative sound quality which is hard to dislike	Circumaural, open-back, dynamic	R	75
Jecklin Float Electrostatic £399	Good Excellent	One version of the state-of-the-art, these electrostatics have an openness of sound rarely found in the breed, with good dynamic range to boot	Circumaural-ish, open-back, electrostatic	R	55
Jecklin Float Model One £79	Good Very Good	Whilst very unusual in appearance, the Floats give remarkable sound quality and openness at a reasonable price	Circumaural-ish, open-back, dynamic	BB	55
Jecklin Float Model Two £99	Good Very Good	Helmet shaped and pretty unflattering but open sounding and comfortable in the long term. Note lack of adjustment means you should try before you buy	Circumaural-ish, open-backed, dynamic	R	63
JVC HA-D990 £65	Good + Good +	Good looking well made cans that offer good sound quality for the money. Sonic nature is of the easy-going, laid-back variety	Supra-aural, closed-back, dynamic	R	75
Koss K/6X Plus £30	Average Poor	'Sixties-style' phones from the good ole US of A, their sonic style is unique and can make a system sound quite different	Supra-aural, closed-backed, dynamic		63
Koss TD/60 £20	Good Average	Although they're devoid of channel identification and have a decidedly Stateside approach to sound, these are very listenable phones for the price	Supra-aural, closed-back, dynamic		75
Pioneer SE-72 £30	Good + Average -	Neat, very nicely made personal stereo phones along the lines of Sony V3s. Sound is on the veiled side, good for aggressive sources	Supra-aural, closed-back dynamic		75
Quart Phone 30 X £40	Good Average	Slightly dark character makes these more suitable for some sources/material than others, specifically music that needs bass weight	Supra-aural, open-back, dynamic		99
Quart Phone 70 £70	Good Good	Competent performers that were hard to criticise but lacked the life and sparkle of which some of the competition are capable	Circumaural, closed-back, dynamic		63
Quart Phone 95 X £100	Good+ Good+	Can sound even handed, relaxed and open with a good drive system but may be a bit too transparent for lesser headphone outputs	Circumaural, open back, dynamic	R	99
Ross RE2530 CD £20	Average Average	Rather an 'average' £20 phone that some found uncomfortable due to high pressure on the ears. Sonic balance is on the bright side	Supra-aural, closed-back, dynamic		75
Ross RE2560 CD £25	Good Average +	If you're not too fussy about quality of finish and don't have an elfin head then these British phones warrant attention. Sound could be smoother	Supra-aural, semi-open, dynamic		75
Sennheiser HD40 £20	Very Good Good -	Very light and comfortable headphones with an even sonic balance that will suit most sources, but jack is 6.3mm and not suited to personals	Supra-aural, semi-open, dynamic	BB	75
Sennheiser HD450II £40	Good+ Good-	A neat looking supra that makes quite acceptable noises with a variety of outputs, could sound more spacious but is pleasantly relaxed	Supra-aural, open-back, dynamic		99
Sennheiser HD480 Classic II £60	Good+ Good	The same basic design as the 450 but improved sound quality as a result of aluminium coil and extra damping, natural with good bass	Supra-aural, open-back, dynamic	R	99
Sennheiser HD520 £65	Good + Good +	A very comfortable and musically capable headphone. If you've got this sort of bread to blow on cans, give 'em a blast	Circumaural, semi-open, dynamic	R	75
Sennheiser HD530 £75	Very Good Good +	One of the better dynamics in its group, the 530s create a sense of space that eludes most sub £100 cans, and they're dead comfy to boot	Circumaural, semi-open, dynamic	R	75
Sennheiser HD540 Ref Gold £160	Good Very Good	The 540 Golds prove that dynamic headphones can be subtle, informative and capable of creating a remarkable sense of space	Circumaural, open-back, dynamic	R	55
Sennheiser HD560 Ovation II £120	Very Good Good+	A comfortable and nicely styled headphone that could be more natural sounding at HF, but is detailed and open with good power	Circumaural, open-back, dynamic		99
Sony A21EX £20	Good - Good -	Forward facing in-ear drivers on a folding plastic band provide exceptional clarity for such an inexpensive phone. However, no bass, and fit isn't to everyone's taste	Intra-aural, semi-open, dynamic	BB	75
Sony MDR-CD3000 £300	Very Good Very Good	Better than most of the headphone outputs around so hard to make the most of, potentially up there with the electrostatics	Circumaural, closed-back, dynamic	R	99
Sony MDR-CD350 £32	Good+ Good	Very impressive for the price the 350 is possibly the most open sounding cheap closed back can around, lightweight in balance but transparent	Circumaural, closed-back, dynamic	BB	99
Sony MDR-CD550 £50	Good+ Good+	A very competent headphone for the price, creates a remarkable sense of space for a closeback design and sounds natural to boot	Circumaural, closed-back, dynamic	BB	99
Sony MDR-R10 £2500	Excellent Excellent	Costly state of the art sealed moving coil design built to the highest standards using the finest materials. Sound quality reflects this care, being big, clear, sweet and refined	Circumaural, closed-back, dynamic	R	72
Stax Gamma pro/SRD-X pro £296/£230	Very Good Excellent	The Gamma pros are like a stethoscope for your hi-fi, revealing subtleties that many loudspeakers fail to resolve	Circumaural, open-backed, electrostatic	R	63
Stax Lambda Signature/SRM-T1 £470/£895	Very Good Excellent	The Signature when combined with the SRM-T1 valve driver must be the most transparent headphone available	Circumaural, open-backed, electrostatic	R	72
Stax SR Gamma £299 (inc. SRD-6 Adaptor £100)	Very Good Very Good	The next model down the Stax range from the Lambda, the Gamma is an excellent headphone with little to criticise but the price	Circumaural, open back, electrostatic	R	55
Stax SR Lambda Pro/SRD-7SB Mk 2 Adaptor £360/£185	Very Good Very Good	A bit of an industry reference, the Pros are frighteningly revealing, bringing across more information than loudspeakers costing twice as much	Circumaural, open-back, electrostatic	R	55
Stax SR Lambda Pro/SRM-1 Energiser £360/£635	Very Good Excellent	This combination extracts layers of information that other headphones only hint at. The SRM-1 has more edge than the SRM-T1, but it's good	Circumaural, open-back, electrostatic	R	75
Stax SR34 £140	Average Very Good	The least expensive Stax headphones around, the SR34s are lively and rhythmic with good tight bass and a sweet midrange	Supra-aural, open-back, electret		55
Stax SR84 £210	Very Good Very Good	The stepping stone between dynamics and full electrostatics, these electret phones are revealing, open and highly enjoyable	Supra-aural, open-backed, electret	R	63
Yamaha YHL-006 £30	Average Average	Unusual personal stereo oriented phones that curl up when not in use. Earphones are like golf balls and balance is well suited to Walkmans	Supra-aural, open-back, dynamic		75

LOUDSPEAKERS

Last item in the hi-fi chain, to some extent the loudspeaker is merely the slave of what has gone before, capable only of reproducing a signal as good as it is fed. Nevertheless the distortions (colorations and stereo effects) introduced by loudspeakers (and rooms) tend to be more immediately obvious than those anywhere else in the chain, so careful choosing according to taste is very important.

The average loudspeaker consists of a smallish enclosure, much of which may have begun life as part of a tree, plus a couple of drive

units hidden behind a removable grille. Inside the box lurks a simple electrical circuit known as a crossover, which divides the incoming (full range) signal into the right bits for the drivers to handle. Variations on the above formula are specifically identified in the entries. The designer's primary task is to balance the sensitivity of the loudspeaker (how loud it goes for a given electrical input) against the bass extension (how low does it go) for the given box size. After that such subtleties as coloration and dispersion come into the equation.

Careful placement of the loudspeakers within the room is as important as the initial choice of model.

For good stereo they need to be more or less the same distance from nearby walls, and preferably on rigid stands. The listener should be about the same distance from and listening angle to each loudspeaker. The ideal placement depends on the way a particular model has been balanced (not to mention a number of other factors), and our recommendation is given in the entries.

■ MODEL ■ PRICE	■ LAB ■ SOUND	■ COMMENTS	■ SIZE ■ PLACEMENT	■ SENSITIVITY ■ BASS FROM	■ VALUE	■ ISSUE
ATC SCM20 £1419	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 28Hz (in room)		86
Acoustic Energy AE1 £767	Good Good	Amongst the best miniatures around, this metal driver pioneer shows exceptional mid focus and coherence, but is pricey and could be faster and more agile.	29.5x18x25cm stands clear of wall	84dB 48Hz (in room)		102
Acoustic Energy AE2 £950	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	88dB 45Hz	R	66
Acoustic Energy AE3 £1650	Very Good Very Good	Solid, authoritative and impressively accurate — if a shade ponderous and slow — AE's latest 'big one' is a much better bet than the earlier '4, combining	63 x 26.5 x 37cm low stands in free space	85dB 23Hz (in room)	R	86
Acoustic Research Pi 3 £219	Average- Average	Lively good value box has extra bass driver to give plenty of thump, but lacks refinement and extension	51.5 x 21 x 23cm close to wall	88dB 50Hz (in room)		110
Acoustic Research AR M1 £199	Good Good	Cute shaped miniature delivers splendidly unboxy bass and midrange, but is a little marred by a rather bright treble	27 x 20 x 26cm close to wall	85dB 30Hz (in room)	BB	110
Acoustic Research AR-112 £125	Average Average -	Nicely presented and engineered, but sounds a bit small and boxy without true coherence	36 x 19 x 18.5cm stands near rear wall	87dB 75Hz		66
Acoustic Research AR-122 £150	Average Average	Despite a promising enough list of ingredients, the 122 failed to excite real enthusiasm amongst the listening panel	38.5 x 19 x 22cm stands near rear wall	87dB 68Hz		68
Acoustic Research AR-132 £200	Average + Average -	Good presentation and detail engineering was not sufficient to counter bass heavy balance problems on auditioning	44.5 x 23 x 25.5cm stands 1ft from rear	87dB 50Hz		66
Acoustic Research AR-152 £373	Good Good-	Large bookshelf size model with luxury finish has a slightly thin overall balance, but fine coherence and agility makes it well worth considering	44 x 23.5 x 28cm stand 1-2ft wall	87dB 25Hz in room		98
Acoustic Research Red Box £100	Average Average	Lively and balanced if a bit crude and uneven, this econobox succeeds partly because of its simplicity, and works well with some rear wall assistance	32 x 19.5 x 17cm close to rear wall	87dB 85Hz	R	74
Alexander SE11 £299 (s)	Good Good	Clearly better than its cheaper stablemates, the metal jacket delivers a different — and in some respects superior — sound than the wood-based	52 x 14 x 17.5cm stands close to wall	86dB 25Hz (in room)	R	82
Alexander SE5 £199	Average Average	Particularly well suited to surround sound A/V applications, the SE5 can give any miniature a run for its money on bass performance; hardness and coloration	40.5 x 12 x 15cm ALS stands near wall	82dB 50Hz (in room)		78
Allison AL100 £120	Average- Average	Loud and lively budget wall-mount is bigger and beefier than most of the competition, if lacking some subtlety and refinement	33.5 x 24 x 21.5cm stands against wall	87dB 30Hz (in room)	BB	94
Allison AL105 £150	Average Average -	Pretty enough in appearance, sonically the AL105 doesn't really make the grade at the £150 asking price	37 x 24 x 21cm high stands against wall	87dB 45Hz (in room)		78
Allison AL110 £220	Good+ Good-	Compact bookshelf model is a little dry and mid forward, but bass is extended and solid. Free space balance is good, though build quality could be improved.	40x24.5x22.5cm stands 1-2ft from wa	86dB 28Hz (in room)	R	102
Allison AL120 £429	Good Average	Cleverly engineered compact floorstander is pretty well balanced if slightly mid forward, but sound quality is a little disappointing for the price	63 x 28 x 27cm floor, clear of walls	88dB 30Hz (in room)		98
Allison CD6 £290	Average Good -	An unusual cube-shaped model designed for wall mounting gives exceptional bass extension from a small box, though it's also a bit heavy, coloured and slow	28.5 x 28.5 x 28.5cm stands against rear	88dB 45Hz	R	71
Allison MS 200 £220	Average- Average-	Built as small and solid as a brick, this micro-miniature has limited bass and bright balance, but sounds agile and communicative	25.5 x 14.5 x 15cm close to wall	85dB 50Hz (in room)		106
Alphason Amphion £695	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 47Hz (in room)		78
Alphason Artemis £299	Average Average+	Pretty little miniature sounds nicely unboxy but is also a bit short of punch and balanced rather too bright.	27 x 17.5 x 22cm stands 1ft from wall	86dB 50Hz (in room)		94
Alphason Orpheus £1070	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 43Hz	R	71
Apogee Caliper Signature £3998	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 30Hz (in room)	R	81
Arcam Alpha £200	Good Good	It has its own colorations to be sure, but delivers a fine room balance with unusually good dynamics, timing and 'life', and is fine material value	46 x 26.5 x 26cm stands close to wall	89dB 30Hz (in room)	BB	82
Arcam Delta Two £340	Average+ Good	Pretty luxury compact sounds a shade forward and coloured but has dynamic and lively bass for its size	37.5 x 22.5 x 27.5cm stands 1-2ft from wa	87dB 40Hz (in room)	R	94
Ariston Image £180	Average - Average -	Despite a sweet treble character, the Image fails to impress with a 'lumpy' over-rich balance that has room integration problems	42 x 22 x 27.5cm stands in free space	89dB 28Hz (in room)		82
Ariston Q £395	Average + Average	The prettily shaped Q delivers a good impression of scale from a small box, but a rather laid back, ponderous and over-rich overall sound	35 x 16.5-25 x 20-27cm high stands in free	85dB 30Hz (in room)		86
Audio Electronics TC10 II £599	Good - Good +	Oddball appearance is rescued by a respectable technical performance, interesting and impressive engineering and fine sound quality	70 x 33.5 x 33.5cm low stands in free space	87dB 40Hz	R	68
Audio Note AN-E £1300	Very Good Very Good	Lovely coherence, great midband dynamics and transparency, extended bass and high sensitivity — pity it's so darn ugly!	80 x 36 x 28cm low stands, free space	91dB 20Hz (in room)	R	106
Audio Note AN-J £799	Very Good Very Good	Light damping and local unevenness adds some coloration, but doesn't spoil the very lively, dynamic and coherent sound. Fine sensitivity and balance.	58.5 x 33 x 24.5cm heavy stands, free s	90dB 25Hz (in room)	R	110
Audioplan Kontrapunkt £799	Good Good +	Cute little German miniature sounds as sweet as it looks, dressed expensively in real wood with matching stands. Not for bass or loudness freaks	31 x 24 x 13cm free space, matching stan	83dB 48Hz (in room)	R	86
B&W 610 £200	Good Average	Fine presentation and good perceived value, with good in-room bass extension and impressive loudness credentials too, but rather indifferent integration and coherence.	49x23.5x30cm stands clear o	89dB 25Hz(in room)		102
B&W 620 £320	Good Good	Good value floorstander has well balanced, laid back and slightly lazy sound that is pleasantly easy on the ears; could do with its own spikes	74 x 23.5 x 30cm floor, free space	89dB 25Hz (in room)	BB	94
B&W DM600 £160	Good+ Average+	Attractive hi-tech appearance and clever engineering makes for an impressively smooth overall balance, but sound is a touch bland with it	35 x 20.5 x 25cm stands 1-2ft from wa	85dB 30Hz (in room)	R	98
B&W Matrix 801 £3295	Good + Good +	Lacks the transparency of the best panels, and the drama of the best dynamics, but is something of an acoustic tour de force, with low coloration and fine imaging	77/99 x 56 x 43cm floor or stands, fre	86dB <20Hz (in room)	R	81

LOUDSPEAKERS

■ MODEL ■ PRICE	■ LAB ■ SOUND	■ COMMENTS	■ SIZE ■ PLACEMENT	■ SENSITIVITY ■ BASS FROM	■ VALUE	■ ISSUE
B&W Matrix 805 £795	Very Good Good	A genuine compact monitor, stylish, with remarkable imaging properties, good balance and low coloration, though less successful at communicating musical	42(max) x 26 x 22.5cm Slate stands in free	87dB 30Hz (in room)		98
Bose 305 £360	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 40Hz (in room)	R	78
Bose 401 £430	Average - Average	Cheaply built but distinctively styled semi-omni floorstander suffers from heavy midbass but still manages to sound lively and open	78.5 x 30 x 28.5cm clear of walls	89dB 28Hz (in room)		110
Bose 901 MK6 £1650	Good Average	Still controversial after all these years, the pre-equalised multi-driver 901 is cleverly engineered to deliver exceptional loudness.	33 x 54 x 32cm rigid stands in free space	(9dB midband) 28Hz (in room)		86
Bose Interaudio 3000XL £160	Average Average -	Lots of perceived value and well enough balanced, but low cost cabinet and driver engineering results in a crude and unsuitable sound	46.5 x 29 x 23cm stands in free space	89dB 45Hz		71
Boston A120 £349	Average + Good -	Ugly but cleverly engineered, the 120 combines a tiny main driver with much larger ABR to give a generous, bighearted and lively sound despite little bass	62.5 x 31.5 x 25cm stands in free space	89dB 48Hz	R	86
Boston A40II £120	Average Average -	Competent performance for size and price but below average relative to the UK competition	34 X 21 x 20cm on stands near wall	88dB 63Hz		41
Boston Acoustics T830 £399	Good Good	A lot of speaker for the money, the T830 is a smooth and accomplished performer with a big and easy - or alternatively a lazy and laid back - sound	82.5 x 25.5 x 24cm floor, away from wal	87dB 30Hz (in room)	R	82
Boston HD5 £115	Average Average	Tiny and prettily shaped miniature has an attractive lack of boxiness, but is a little short of drama and dynamic drive	25 x 16 x 18.5cm close to wall	86dB 30Hz (in room)		110
Brinkmann Endymion £395	Average- Average+	Omnidirectional design with rococo styled urn-shaped ceramic enclosure. Distinctly bass light, but sounds impressively coherent and solid	48 x 29 (diam)cm stands in free space	85dB 50/150Hz (in room)		106
C-J Synthesis LM210 £895	Good Good+	Elegant compact US floorstander is eminently relaxing and listenable, with open and coherent midband, if a bit short on welly and drive	90 x 26 x 27cm 28Hz (in room)	86dB clear of walls	R	106
Cabasse Bisquine £600	Good+ Good+	Classy French large bookshelf speaker has great coherence and dynamic grip, but a rather mid-forward overall character	48 x 26 x 30.5cm 20-30cm from wall	91dB 30Hz (in room)	R	110
Cambridge SoundWorks Ambianc	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 45Hz (in room)		94
Canon S-50 £349	Average Average+	Though only a small cone miniature at heart, the fascinating styling and extended stereo listening area feature make it utterly original and unique.	30x24(diam)cm stands in free space	84dB 48Hz (in room)	R	102
Castle Chester £599	Good Very Good	A brilliant throwback, using horn-type approach to provide startling midrange dynamics and coherence.	94 x 23 x 27cm floor, experiment	87dB 45Hz	BB	98
Castle Durham £259	Average + Average	Listening results were encouraging, well engineered and finished, but lean on treble and a bit weak on bass; still recommended	41 x 21.5 x 25cm near rear wall	89dB 67Hz	R	46
Castle Pembroke £379	Good Average +	Comfortably recommended, a sweet smooth sound with good overall balance of engineering-based performance	55 x 37.5 x 30.5cm open space on stands	88dB 46Hz	R	31
Castle SG Trent £129	Average Average	The grey paint finish looks much more modern than black vinyl woodprint, and this miniature wall-mount sounds lively and engaging, if a bit rough at the top.	33.5x18x20cm stands close to wall	88dB 50Hz (in room)	R	102
Castle Warwick £229	Good Average -	Excellent presentation and fine engineering with overload protection, but a sonic disappointment in bass and dynamic qualities	46.5 x 25 x 23cm stands 1ft from rear	88dB 50Hz		66
Castle Winchester £1400	Very Good Very Good	This unconventional and beautifully crafted model is physically large for its bass extension but is engagingly agile and sounds attractively open and airy	114 x 24 x 47cm in free space	87dB 25Hz	R	90
Castle York £340	Good Average+	Pretty little real wood compact has an engaging transparency, good balance and fine timing, but could do with more authority and welly	43 x 22 x 26cm clear of walls	86dB 30Hz (in room)		110
Celef CF2 Nimbus £230	Good - Good -	Nicely balanced overall but a little uneven with it, this lively and dynamic largebookshelf model came close recommendation	46 x 25.5 x 24cm stands in free space	88dB 55Hz		71
Celef Cirrus £180	Average Good	It's nice to see Celef back in the UK, with this decent sounding small reflex box that seems unusually tolerant of siting	39 x 20.5 x 23cm stands in free space	84dB 60Hz	R	66
Celestion 3 £115	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 55Hz (in room)	R	78
Celestion 5 £155	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 30Hz		90
Celestion 6000 £1510	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	82dB	R	60
Celestion 7 £200	Average Average+	Good value, good looking large bookshelf size wall-mount has lively up front presentation. Can sound a bit coarse and stand selection is critical.	45 x 24.5 x 32cm heavy stands close to wall	87dB 30Hz (in room)	R	98
Celestion 9 £249	Good Average	Nicely presented and fair material value, with impressively flat bass-to-mid balance, the 9 doesn't really make a convincing case for the return of the three-way.	49.5x20.5x24cm stands clear of wall	89dB 30Hz (in room)		102
Celestion DL8 Series II £205	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	87dB 60Hz	R	59
Celestion SL12Si £615	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 clea	85dB 50Hz		66
Celestion SL600Si £820	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 52Hz		68
Celestion SL6Si £409	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 wa	86dB 30Hz (in room)		94
Creek CLS20 £120	Good Average -	Looks good material value, but sound is distinctly over-rich and thick in the mid-bass region; maybe the box is a little too large.	49 x 24.5 x 24cm open frame stands, free	88dB 30Hz		90
DCM Timeframe TF250 £350	Average + Average	Neat and unusual floorstanding presentation, marred by indifferent build and cuddly but rather coloured sound, especially on spoken word	86 x 32 x 16cm close to rear wall	88dB 45Hz		90
Dali 700 £600	Very Good Average	Good material value and fine bass extension for size and price, but overall sound is disappointing, perhaps due to complexity of driver array	110 x 28 x 35cm clear of walls	88dB 20Hz		90
Diamond Acoustics Ref III £895	Average Good+	Lovely freestander suffers from indifferent bass alignment, but is fast, coherent, solid and very informative indeed.	87 x 27.5 x 28cm well clear of walls	90dB 30Hz (in room)	R	106
Duntech PCL1000 Crown Prince £8478	n/a Excellent	Immensely 'listenable', refined sounding speaker capable of creating lifelike musical images. Not overly transparent to source, but very civilised	180 x 30.5 x 43.5 free standing away from	90dB 42Hz	R	72
Duntech PCL500 Marquis £5250	n/a Very Good	Better value for money than the Crown Prince - and arguably more dynamic, with real bass 'slam' but a little less refined in the higher registers	147.5 x 27 x 40cm free standing away from	92dB 48Hz	R	65
EItax Linear Response 8 £399	Average- Average+	Good material value Danish floorstander suffers from 'loudness contour' balance due to twin main drivers, but nevertheless has pleasing coherence	97 x 21 x 33cm floor, free space	88dB 22Hz		98
Epos ES11 £330	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 45Hz (in room)	BB	94
Epos ES14 £485	Good Very Good	Substantial stand mount model delivers delightful midrange focus and delicacy with good bass control. Tends to be system sensitive	49 x 22.5 x 29cm own stands 1-2ft from wa	85dB 25Hz (in room)	R	98
Equation 0 £1290	Average + Very Good	Expensive but most attractive floorstanding miniature. Bass is limited and mid tends to shout but sound is fast and lively with fine dynamics and timing	85 x 20 x 35.5cm floor, c1ft from wal	85dB 45Hz	R	90

The Directory

LOUDSPEAKERS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	ISSUE
Faraday FS5 £589	Good Good	Pricey and ugly, but with its own sonic charm nonetheless, thanks to the substantial (largely positive) influence of the concrete enclosure has upon the sound	46x27x26cm stands in free space	90dB 28Hz (in room)		102
Faraday Siren £330 (d)	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 48Hz (in room)		94
Genexa SE100 £150	Average Average	Pretty little Tandy-stocked miniature is attractively lively, coherent and communicative, but could do with more grunt and welly and lower coloration	28 x 15.5 x 19cm close to wall	84dB 50Hz (in room)		110
Goodmans B-Max/Maxim 2 £100/£9	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 55Hz (in room)		78
Goodmans M100 £80	Average + Average -	Effectively a Maxim on the cheap, the M100 measures more smoothly but sounds somehow less involving than its more famous stablemate.	20 x 17 x 26cm close to rear wall	85dB 50Hz (in room)	R	86
Goodmans M300 £110	Average Average -	Conveying much of the charm and life which has made the Maxim 2 so popular, the M300 is sensitive, but hampered by upper bass cabinet coloration	38.5 x 21.5 x 17cm stands close to rear	89dB 50Hz (in room)	R	82
Goodmans M500 £130	Average Average-	Large 'bookshelf' size means plenty of speaker for the money plus good sensitivity, let down by unruly mid/bass performance and indifferent build	47 x 24.5 x 21.5cm stands, free space	89dB 50Hz (in room)		94
Goodmans Maxim 3 £110	Good Average	Smooth and accomplished wall-mount miniature makes a worthy replacement for the bestselling Maxim 2	26 x 17 x 21cm stands against wall	85dB 50Hz (in room)	R	106
Harbeth HL Compact £584	Very Good Average	The clean and neutral sound lacks resolution and gives rather unsubtle though well differentiated stereo. Can be bi-wired to advantage	52 x 27.2 x 28.1cm open space, on high	87dB 65Hz		59
Harbeth LS3/5A £379	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 60Hz		66
Heco Presto Superior 750 £600	Good+ Average	Tall slim and attractive floorstander delivers a fine, even in-room balance but lacks transparency, coherence and dynamic drive	95 x 24 x 27cm clear of walls	87dB 22Hz (in room)		106
Heco Reflex 10 £160	Average+ Average	This nicely balanced and well mannered small bookshelf wall-mount is a competent rather than exceptional package for the price, thanks to indifferent build	32x21x23cm stands up to 1ft fro	90dB 30Hz (in room)		102
Heco Superior 740 £599	Good Good -	A similar sonic package to the cheaper Interior 530, these Superior clothes are very pretty indeed, though spikes are still awaited	84.5 x 22 x 25cm on floor in free space	88dB 30Hz (in room)		78
Heco Superior 940 £999	Good Good	This large and beautifully finished floorstander has an impressively smooth and transparent midband. Bass is well extended but follows rather than drives the music	110 x 26 x 31.5cm free space	88dB 20Hz		86
Heybrook HB1 S3 £250	Average+ Good	Latest version of long established favourite delivers good liveliness and fine coherence for the price, even though the shape looks a bit dated	47 x 29 x 24cm HBS1 stands close(ish) to	88dB 30Hz (in room)	BB	98
Heybrook HB100 £300	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 50Hz	BB	66
Heybrook Prima £120	Average+ Average+	Neat and discreet miniature delivers fine coherence, pace and timing, though balance is a trifle forward and bass a bit light	29 x 19.5 x 18cm close to wall	86dB 50Hz (in room)	R	110
Heybrook Sextet £1079	Good Very Good	Elegant floorstanding 3-way is engagingly coherent and a highly analytical, partly due to distinct and not always comfortable upper-mid forwardness.	96x27x20cm close to wall	85dB 25Hz (in room)	R	102
Heybrook Solo £159	Average + Average +	Discreetly styled wallmount sounds a little untidy in both bass and treble but handles complex rhythmic material much better than most	36 x 23 x 22cm HBS1 stands close to wall	87dB 28Hz	R	90
Infinity Kappa 6 £795	Good Good	Interestingly styled US loudspeaker has unusual high tech drivers and good neutrality, but the sound seriously lacks excitement	63 x 38 x 24cm stands, free space	85dB 35Hz		66
Infinity Kappa 8 £1850	n/a Very Good	Very nicely made and unobtrusive but large four-way speakers which have a tendency to sound bass heavy unless used with solid core cables	118 x 51.5 x 17.5cm floor standing, open	89dB 33Hz		72
Infinity Modulus £695	Good Average +	Luxury high-tech miniature, carefully conceived and beautifully built. Undeniably attractive in the mid and treble, it failed to handle the bass as successfully	30 x 18 x 26cm high stands 1ft from wall	84dB 45Hz (in room)		86
Infinity RS2001 £180	Average Average +	A little coloured and unruly in the treble, the 2001 nevertheless retains the lively dynamic bounce of its predecessor; pity the price has gone up	36.5 x 22.5 x 20cm lightweight stands	87dB 50Hz (in room)	R	78
Infinity Reference 10 £149	Average Average	Follows the Infinity tradition in providing an engaging and lively sound from a prettily finished and substantial small bookshelf size model	36 x 23 x 23cm stands in free space	87dB 50Hz (in room)	R	98
Infinity Reference 20 £220	Good Average	Large bookshelf size model is well presented and balanced with good bass control, but somehow lacks convincing cohesion and agility; build was slightly suspect too.	46x27x24cm stands 1-2ft from wa	88dB 27Hz (in room)		102
Infinity Reference 30 £330	Good Good	Drivers from Ref 20 in box from Ref 50 creates a well balanced and extended floorstander at a very competitive price	85 x 26.5 x 25cm clear of walls	87dB 25Hz (in room)	R	106
Infinity Reference 50 £499	Average Average-	Despite hi-tech drivers, attractive presentation, good bass extension and sensitivity, this three-way floorstander suffers from a forward, coloured sound	86 x 26.5 x 25cm floor in free space	89dB 25Hz (in room)		98
JBL Control 1 Plus £206	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 50Hz		90
JBL LX33 £270	Average + Good	A bit of a cheat, but a lot of speaker for the money, which manages a better room balance than many 'large bookshelf' rivals, and delivers a fine acoustic	80 x 25 x 21cm floor, 1ft from wall	89dB 48Hz	R	82
JBL LX44 £350	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 40Hz		71
JBL LX55 £400	Good Average	This big bluff three-way provides lots of speaker, bandwidth and loudness for the asking price, but is ultimately a bit of a dinosaur	66x34.5x29cm stands clear of wall	91dB below 20Hz (in room)		102
JBL XE2 £160	Average- Average-	Budget Danish-built 'bookshelf' model has anomalous 'laid back' balance and lacks the genuine JBL spirit	38 x 23 x 23cm stands in free space	88dB 48Hz (in room)		98
JPW AP2 £180	Good Average	Good size bookshelf model offers real wood veneer at a bargain price; performance is cleaner but broadly comparable to P1 Vinyl overall	43.5 x 25.5 x 26cm 45Hz (in room)	86dB stands in free space	R	106
JPW AP2 £175	Good Good	Few grounds for criticism but purchasers should check out the treble qualities to avoid hammering the ear anvils	46 x 26 x 25cm 40cm from wall on 45cm	89dB 65Hz	R	53
JPW AP3 £225	Good Average +	Pretty good stereo and well balanced overall it had its own character which is well suited to vinyl replay	52 x 25 x 29.5cm near wall on stands	90dB 57Hz	R	46
JPW Minim £79	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 28Hz (in room)	R	82
JPW P1 £155	Good Average +	Honest and basically articulate if not very sophisticated, resolution is good but it can sound a little wearing in bright systems	44 x 25.9 x 26.1cm free space on stands	89dB 60Hz	R	59
JPW P1 Vinyl £135	Good Average	Not particularly pretty, this is still a lot of highly competent loudspeaker for the price, with a safe and middle-of-the-road sound that's unlikely to disappoint	43.5x25.5x26cm stands 1-2ft from wall	87dB 32Hz (in room)	BB	102
JPW Sonata £115	Good Average +	Well balanced and integrated, this near-miniature offers fine sound if limited bass and dynamic range, plus real tree wood at a nearly silly price	32 x 23 x 20cm stands near rear wall	86dB 55Hz	BB	71
JPW Sonata Plus £135	Average Average -	This luxury variation on the redoubtable Sonata theme features a metal dome tweeter, and is not the better for it	32 x 23 x 21cm about 1ft from wall	87dB 30Hz		90
JRT AD1 £500 (s)	Average + Good +	A most auspicious Choice debut for relative newcomers JRT. A fair share of cosmetic deficiencies do little to spoil the impressive coherence and timing	59.5 x 28 x 36cm own stands close to rear	86dB 28Hz (in room)	R	86
JRT AD1 Micro £389	Average Good	Beautiful bijou miniature has delightful life and coherence and gives 'surprising impression of scale; some aggressive tendencies but very open to system tuning	28 x 17 x 21cm stands against wall	87dB 50Hz (in room)	R	94

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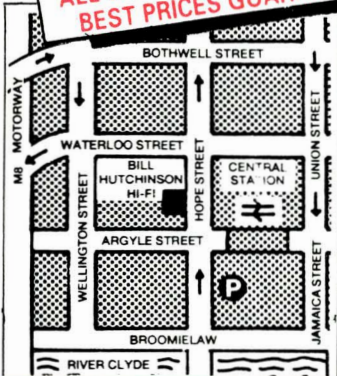
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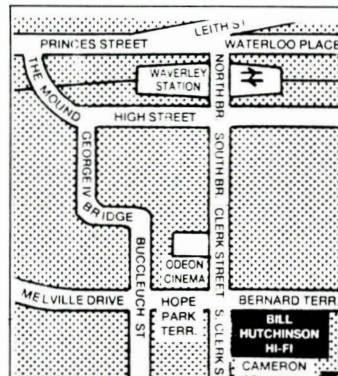
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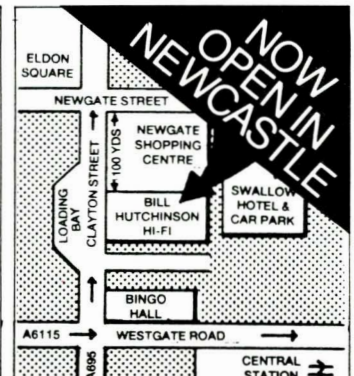


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The Directory

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MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	ISSUE
Jamo Concert II £300	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 48Hz		66
Jamo Concert V £500	Average Average	Compact, solid, nicely finished floorstander delivers unusually extended bass at the expense of lowish sensitivity; midband is smooth but laid back.	86x24x28cm well clear of walls	85dB below 20Hz (in room)		102
Jamo Concert VII £800	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 25Hz (in room)		94
Jamo Cornet 40 £110	Average- Average	Pretty little Danish-built miniature with respectable rather than exceptional sound quality for the price	32 x 20 x 22cm stands 1-2ft from wall	86dB 48Hz (in room)		98
Jamo Cornet 50 £150	Average Average+	Good value bookshelf size speaker has a rough and ready sound but good heart, engaging liveliness and fair timing	42 x 23 x 22.5cm away from wall	87dB 28Hz (in room)	R	110
Jordan JH400 £504	Average- Average+	Beautiful piano finish hexagon has single full range driver and controversial sound, with uneven balance but delightful mid coherence	33 x 24 x 30.5cm 1-2ft from wall	83dB 50Hz (in room)	R	106
KEF 104/2 £1,295	Very Good Very Good	A reference point for dynamics, preferred without KUBE, suited to many rooms. Good stereo, high sound level	90 x 28 x 41.5cm floor standing in free spa	92dB 50Hz	R	60
KEF K120 £159	Good Average	Physically pretty and sonically competent but undistinguished medium bookshelf size model has good sensitivity but limited extension	34 x 20.5 x 26cm 1ft from wall	87dB 45Hz (in room)		106
KEF Q60 £379	Good Good	Uni-Q co-axial driver provides fine imaging and mid coherence, while magnet decoupling reduces cabinet coloration. Bass not entirely convincing	48x25x27cm stands close to wall	90dB 25Hz (in room)	R	102
KEF Q80 £499	Good Average+	Uni-Q floorstander has good stereo and fine midband coherence, but bass lacks extension, drive and resolution	85 x 24.5 x 26.5cm free space	87dB 45Hz (in room)		106
Kammerzelt Reference Mini Monitor	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	27x17x24cm stands 1-2ft from wa	85dB 50Hz (in room)		94
Kenwood LS-770E £260	Good Good	Impressively communicative made-in-Japan large bookshelf size model has fine vigour, scale and dynamics, if not the smoothest sound around	48 x 27 x 25cm stands in free space	89dB 25Hz (in room)	R	106
Lindley New Age £1100	Average - Average +	Attractively different presentation with classy finish, this tall cylindrical floorstander has fine bass extension but a rather uneven overall balance	105 x 23 x 23cm clear of walls	86dB 25Hz		90
Linn Helix II £357 (s)	Good Good+	Ku-Stone supported, this is one of the best 'large bookshelf' size models around. Dry, controlled bass and very open, if slightly aggressive balance.	57x24x30cm KuStones 1-2ft from	88dB 33Hz (in room)	R	102
Linn Index II/KuStone £110	Good Good	Stand and speaker looks and sounds very good for the price, good bass extension and control, fine dynamic range. Clean, clear if a shade slow	44 x 21 x 23.5cm (box only) close to rear	86dB 28Hz	BB	90
Linn Kaber LS500 £1198	Average Good +	Wall-mount package trades sensitivity for fine bass extension and midbass performance; little relentless but has prodigious dynamic capabilities	93 x 19 x 28cm floor against rear wall	86dB 28Hz (in room)	R	82
Linn Kan II £495	Average + Average +	A niche product for those prepared to tolerate its strong character for the sake of its fine bass performance and near invisibility	30.5 x 18.5 x 16.5cm Kan stands against	82dB 35Hz (in room)		78
Linn Nexus LS250 £458	Good Average	Good features include a solid, meaty bass plus good imagery and tonal balance. The catch is that Nexus lacks resolution and timing	49 x 23.5 x 30.4cm near rear wall	89dB 60Hz		59
Magneplanar MG1.4 £1090	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 40Hz	R	72
Magneplanar SMGa £688	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 56Hz		46
Marantz LD-50DMS £230	Very Good Good	Well behaved larger two-way has fine balance, stereo and integration with good bass extension, albeit with mild boxy, chesty and fizzy effects	106 x 22 x 32cm floor, free space	88dB 30Hz (in room)	R	71
Martin Logan CLS II £3998	n/a Very Good	Much improved high resolution design, fussy about system set-up and demanding of ancillaries and software alike. It rewards the efforts though	60 x 28 x 7.5cm open space	86dB 45Hz	R	72
Meridian Argent 1 £995	Good+ Good+	Beautifully built, finished and shaped but pricey compact has fine bass extension and virtual absence of 'boxiness'; needs a big amplifier	33 x 27(max) x 27(max)cm Slate stan	83dB 28Hz (in room)		98
Meridian Argent 2 £875	Good+ Good	Beautiful but pricey high-tech 'large compact' delivers 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 23Hz (in room)		94
Meridian M30 £950	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	AcDb 40Hz		46
Mission 760i £120	Average+ Average+	Attractively styled little wall-mount miniature has livelier dynamics and bass drive than most of its type, but sounds as little shut in	29.5 x 18 x 20cm close to wall	87dB 48Hz	R	110
Mission 761i £170	Good Average	760 theme adds an extra main driver for easier amp loading and power handling. Sound judged slightly inferior to its simpler, cheaper stablemate.	38x19x24cm stands close to wall	88dB 48Hz (in room)		102
Mission 762 £230	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 55Hz		66
Mission 763 £350	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 40Hz	BB	68
Mission 764i £450	Good Average	Despite improvements, this large floorstander still lacks low frequency authority, which is probably a function of its comparatively modest price	88.5x25x32.5 1ft from wall	87dB 20Hz		94
Mission 765i £700	Good Average+	Big heavyweight floorstander has good sensitivity and bandwidth, but somehow lacks agility, authority and dynamic grip	102 x 25 x 33cm clear of walls	91dB 22Hz		110
Mission Cyrus 780 £180	Good Average +	Pricey but very pretty miniature based on Mission 760 but with beefed up box and crossover network to enhance sound quality still further	29 x 18 x 26cm light stands close to wall	88dB 50Hz	R	90
Mission Cyrus 781 £250	Average + Good	Properly run in, the pretty little 781 delivers a fast, dynamic and informative sound which more than justifies its price.	43 x 22.5 x 28cm matching stands 1ft	88dB 28Hz (in room)	R	86
Mission Cyrus 782 £350 (s)	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 50Hz		71
Monitor Audio MA700 Gold £400	Good Average	Lovely luxury compact does a good job of voice reproduction, but sounds a bit lazy and off the tempo with faster, busier material	35 x 21.5 x 25cm clear of walls	85dB 50Hz		110
Monitor Audio MA1800 £1400	Good Average +	Attractive and beautifully finished, even when ballasted with lead shot the 1800 inclines towards upper bass richness and lacks genuine extension	106 x 22 x 32cm floor, free space	88dB 30Hz (in room)		81
Monitor Audio Monitor 11 £330	Average Good	This tall and slim and attractive free space compact has an extra driver to help out in the bass, giving extra urge at some price in delicacy	52 x 20 x 24cm stands free space	87dB 48Hz (in room)	R	94
Monitor Audio Monitor 14 £400	Average Average	Floorstanding version of M11 suffers from excess upper bass, giving a thick, chesty coloration beneath a quite lively and well focused mid and treble	78 x 20 x 24cm floor well clear of walls	86dB 30Hz (in room)		98
Monitor Audio Monitor 7 £180	Average - Average	This lively and punchy near-miniature looks pretty enough and is good value but is let down by an unruly and indifferently integrated tweeter	34 x 16.5 x 17cm stands 1ft from wall	84dB 70Hz		74
Monitor Audio Monitor 9 £220	Good Average	Despite a much better treble balance than the 7, the Monitor 9 is less engaging and lively at low frequencies than its smaller sibling	37 x 20 x 21cm high stands near wall	85dB 30Hz		78
Monitor Audio Monitor One £150ewood	Average+ Average+	Pricey but very cute little micro-miniature just about gets away with it sonically, though performance envelope is inevitably limited	24 x 15 x 16cm stands against wall	85dB 55Hz (in room)	R	106

LOUDSPEAKERS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	ISSUE
Monitor Audio Studio 10 £1200	Average Average +	Expensive, luxury build/finish and all-metal driver diaphragms provide engagingly transparent midrange and treble, spoiled by over-strong mid-bass.	40 x 20 x 25cm heavy stands clear of wall	87dB 45Hz		90
Monitor Audio Studio 15 £1,600	Average+ Good	A little slow and lazy but better balanced than the smaller Studio models, the midband coherence and focus is superb, but it ain't cheap	51x20x26cm free space	87dB 45Hz (in room)	R	102
Monitor Audio Studio 5 £700	Average+ Average+	All metal diaphragm luxury miniature has splendid presence coherence but sound can be aggressive and lacks welly.	32 x 18 x 20cm stands close to wall	83dB 28Hz (in room)		98
Mordaunt-Short 5.10 £119	Good Average	Plenty of well engineered speaker for the money, and smoother than most of the competition, but lacks timing and enthusiasm	30.5 x 18.5 x 21.5cm c20cm from wall	85dB 50Hz		110
Mordaunt-Short 5.30 £200	Average+ Average-	Good hi-tech material value for money, but a disappointingly dull and rather bland sound. Safe but uninspiring	42.5 x 25 x 28cm stands clear of walls	86dB 28Hz (in room)		106
Mordaunt-Short 5.40 £299	Average+ Good	Elegant near-floorstander has an even balance that makes it very easy on the ears, yet also inviting and informative	64 x 21.5 x 26.5cm low stand clear of walls	85dB 28Hz	R	110
Mordaunt-Short Classic 20 £395	Average+ Average+	Luxuriously finished compact delivers beguiling mid transparency but bass is altogether less convincing — one for the carpet slippers generation perhaps	37x22x27cm stands in free space	86dB 45Hz (in room)		102
Mordaunt-Short MS3.10 £100	Average Average+	Probably the liveliest and most communicative miniature around, this beautifully presented design is probably better suited to budget 'real hi-fi'	28.5x17.5x20cm stands in free space	88dB 48Hz (in room)		78
Mordaunt-Short MS3.20 £140	Average Average+	All the charm of its BB rated £99 baby 3.10 brother, plus a smidjeon more bass for those in a suggestible frame of mind	35.5x18x20cm stands against wall	85dB 50Hz (in room)	R	82
Mordaunt-Short MS3.30 £200	Average Average+	A little too mid-forward for neutrality or formal recommendation this attractive, good sized model nevertheless has more than enough appealing qualities	46x23.5x27cm stands 1-2ft from wall	87dB 38Hz (in room)		78
Mordaunt-Short MS3.40 £260	Average+ Average	It looks pretty and sound civilised but the 3.40 failed to ignite any degree of enthusiasm amongst our listeners. LF room matching is critical	57x23.5x27.5cm stands in free space	87dB 30Hz (in room)		86
NAD 8100 £300	Average+ Average+	Floorstanding variation on attractive 8225 miniature adds some half convincing extra bass thump and saves the price of stands - very cost effective	75 x 20 x 25cm floor clear of walls	88dB 25Hz (in room)	R	98
NAD 8225 £150	Good Average +	Notwithstanding lacklustre styling and an unprepossessing appearance, this NAD miniature has a smooth and even midband plus an appealing overall jauntiness.	34 x 20 x 18cm stands close to wall	87dB 45Hz (in room)	R	86
NVA Cube 1 £600 (s)	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 wa	85dB 52Hz	R	71
NVA Cube 2 £380	Average Good	A rude but exciting miniature, with unusually accomplished bass capabilities for its size	28.5 x 27 x 28.5cm NVA stands against wall	85dB 48Hz (in room)	R	82
NVA Cubix £1100	Average Good	Too idiosyncratic for formal recommendation, the Cubix possesses remarkable bass extension for its size, but is tricky to optimise	60 x 32.5 x 32.5cm	84dB 28Hz (in room)		78
Naim NA IBL £798	Average+ Good	This tiny floorstanding wall mount delivers outstanding dynamics, speed and detail, marred by pronounced upper mid forwardness	80x18x15-20 against wall	84dB 30Hz		94
Naim SBL £1475	Good Very Good	Impressive scale full bandwidth coherent an attractively discrete floor standing wall-mount coloured midband very well balanced and agile with it.	88x26.5x17-27cm close to wall	86dB 25Hz (in room)	R	102
Neat Petite £525	Average Good+	Pricey and far from perfect, this near miniature is nevertheless one of the most entertaining and enjoyable speakers around, colorations notwithstanding.	30.5x20x18cm stands close to wall	86dB 33Hz (in room)	R	102
Nobis DM7 £560	Average+ Good	Pretty but pricey US bookshelf size model has more than enough speed, timing and coherence to make up for a measure of coloration	38 x 21.5 x 28.5cm 30-60cm from wall	85dB 25Hz		110
Opus 3 Capella £599	Good Good	The sound of this Scandinavian curiosity certainly benefits from the crushed marble enclosure, though presentation is strictly DIY	32 x 40.5 x 26(ave)cm amongst books in	86dB 45Hz		66
Opus 3 Credo £399	Average Average	Credo's odd-shaped silicate-based cabinet confers good box and bass performance, but the sound could be more neutral for the price	32 x 28 x 32cm stands in free space	88dB 65Hz		74
Origin Live OL1 £499	Very Good Good	Luxury miniature has very good overall balance, sacrificing sensitivity to achieve remarkable bass extension for the box size	30.5 x 19 x 21cm stands close to wall	82dB 25Hz (in room)		106
Pearl & Oakley Victoria 200 £1099	Average - Average -	Extraordinary — and to many very attractive — 'ginger jar' presentation in Staffordshire ceramics, but let down by need for further acoustic development	93 x 33 x 33cm on floor in free space	87dB 30Hz (in room)		78
Philips FB820 £470	Good Average	Big-but-less-than-beautiful three-way is well enough balanced but lacks communication skills in the time domain	86 x 27 x 35cm floor clear of walls	87dB 28Hz (in room)		98
Philips FB825 £700	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 25Hz	R	90
Professional Monitor Co LB1 £998	Good+ Good+	Delightful smoothness and transparency distinguishes this classy compact, though bass extension and sensitivity are both limited	53.5 x 18 x 26cm high stand well clea	86dB 33Hz	R	110
QLN Model One £700	Good Average	Similar to Signature at two thirds the price, Model One exaggerates the latter's rich and heavy midbass and lacks its velvet smoothness	35 x (16-25) x (21-27)cm pillar	85dB 28Hz (in room)		82
QLN Signature £1100	Good Good	Beautiful but expensive luxury compact has a rather laid back and 'heavy' sound, but coloration is low and stereo imaging very good	37 x 18 x 36cm heavy stands in free space	83dB 30Hz (in room)		78
Quad ESL-63 £2072	Good + Very Good	With its unusual but subtle characteristics this classic electrostatic may not be punchy in the bass, but has strengths that some cannot live without	92 x 66 x 27cm open stand well clear of	84dB 34Hz	R	60
RAM Hermes £425	Average- Average+	Slim small floorstander is a bit tall for its footprint. Good sensitivity is combined with an attractively lively sound, but it's uneven and not truly coherent	70 x 21.5 x 23cm floor, freestanding	91dB 45Hz (in room)		94
RCF Mytho 3 £1,395	Average Average+	Undoubtedly very attractive and well built, incorporating a number of unusual and interesting ideas, the high price isn't really justified by the performance.	100x21.5x30cm away from walls	88dB 25Hz (in room)		102
Rega ELA £405	Average+ Good	Very compact floorstander with integral stand has serious coherence and dynamics, but a measure of brightness and untidiness	84.5 x 20 x 30cm c20cm from wall	86dB 30Hz	R	110
Richard Allan CD5 £176	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 80Hz		68
Rogers LS2a/2 £220	Good+ Good	Balance is a bit warm and rich but 2a/2 has delightful mid-to-treble coherence and transparency, and more welly than Mk1	35.5 x 23 x 22cm stands clear of walls	84dB 30Hz (in room)	BB	106
Rogers LS4a/2 £300	Good Average+	Very civilised but a trifle lazy with it, this large bookshelf size model hasn't quite the timing or agility to be particularly engrossing or exciting	43 x 25.5 x 25.5cm clear of walls	86dB 25Hz		110
Rogers LS8a £450	Average + Average +	This modestly priced floorstander is a mixed bag, with plenty of scale and welly but lacking the subtlety, clarity and agility delivered by some rivals	89x25.5x25cm clear of walls	91dB 48Hz (in room)		102
Rogers Studio 1a £599	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 36Hz	R	66
Roksan Darius £1569 (Good Very Good	Now totally realigned, the current Darius provides an exceptionally impressive combination of transparency and delicacy with fine information retrieval and speed	47 x 27 x 40cm own stands angled in spa	82dB 20Hz	R	86
Royd A14 II £199	Average Good	Not the smoothest or prettiest around, this is still an informative if sometimes aggressive large bookshelf model, with plenty of welly for the price	40 x 26 x 23cm stands 1ft from wall	87dB 30Hz (in room)	R	94
Royd A7 Series 11 £115	Average + Average	Lively clear sound; good upper bass and dynamics, but treble "ramp" made vocals sound shut in. Try before you buy	31 x 20 x 17cm shelf or 50cm stands near	86dB 75Hz	R	53
Royd Apex £500	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 33Hz (in room)	R	78

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LOUDSPEAKERS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	ISSUE
Royd Eden £245	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 85Hz	R	66
Royd Sapphire £200	Average+ Good-	Neat little miniature sounds a touch cold and thin but unusual main driver delivers remarkable speed and coherence for such a reasonably priced model	30.5 x 20.5 x 21cm frame stands 1ft fro	88dB 28Hz (in room)	R	98
Royd Sintra £330	Average + Good	Balance is bass light and a little bright, but superb dynamics, speed and timing make this luxury miniature musically very informative and satisfying	30.5 x 20.5 x 19cm stands close to wall	88dB 50Hz	R	90
Ruark Swordsman £219	Good Average	Very attractively styled and finished, the Swordsman is a well built 'small bookshelf' model that delivered better test than listening results	38.5 x 20 x 27.5cm stands 0.5m from wal	84dB 50Hz		71
Ruark Swordsman Plus £269	Good Average	This real wood variation on the established Swordsman theme looks and measures rather better than it sounds, probably due to rather prosaic drivers	38 x 20 x 28cm stands 1-2ft from wall	84dB 27Hz (in room)		98
Ruark Talisman £629	Average Good	Clever and beautifully finished compact floorstander has some coloration but is impressively informative and communicative, with fine pace and timing	83.5 x 21.5 x 31 (max) cm close to rear wal	86dB 30Hz	R	90
SD Acoustics DBS £865]	Average Good	Recent changes have added some refinement to a seductive midrange, good timing and fine sensitivity, though bass extension is limited and coloration obvious	102 x 35 x 25cm floor, angled, away from	92dB 30Hz (in room)	R	82
SD Acoustics Ribbon £2295	Average Good +	A little underdeveloped and rather amplifier sensitive, Ribbon is a lively and loud hybrid marred by some colorations; some like it, others don't	152 x 30 x (15-30)cm floor, angled, away	91dB 30Hz (in room)		81
SD Acoustics SD1 £1650	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 50Hz	R	60
SD Acoustics SD3 £399	Good Good	Port firmly blocked, the new SD3 has the agility and charm of a quality miniature, with good bass extension but low sensitivity	38 x 19.5 x 29cm stands 1ft from wall	83dB 25Hz (in room)	R	106
Seventh Veil System IV £1290 (Average Good +	Lacks welly and loudness but delivers astonishing results with female vocals in particular. Antithesis of the 'good allrounder'	72 x 44 x 21 x 29cm own-stands close to	84dB 28Hz (in room)	R	86
Shahinian Arc £1062	Average Good	Unusual and occasionally wonderful small floorstanding omni; too bright but exceptionally coherent and revealing	69 x 35 x 25cm well clear of walls	85dB 24Hz		110
Shan Shimna £315	Average+ Good-	Pretty little miniature with resin-based enclosure has a bright, thin but sweet and communicative sound; loudness and welly are both limited	31 x 21 x 17cm own stands 1ft from wall	84dB 48Hz (in room)	R	98
Sony APM-101ES £100	Good Average	Big hearted sound from small bookshelf successor to BB '10ES, sounds a little untidy at frequency extremes, so suits CD better than vinyl	39.5 x 22.5 x 23.5cm stands, free space	86dB 52Hz	R	71
Sony APM-121ES £150	Average Average -	Good perceived high tech value, but the balance has an artificial 'loudness' character, too rich in the bass and too strong in the treble	43 x 25 x 28cm stands, free space	86dB 25Hz (in room)		86
Sony APM-141ES £200	Average Average	A great deal of loudspeaker for the money, the rich sounding '141 needs a big room and still shows significant 'loudness' (boom'n'lizz) tendencies	61.5 x 26 x 32cm stands in plenty of	88dB 30Hz (in room)	R	78
Sony APM-181ES £300	Very Good Average	Big and beefy but equally fat and bass heavy, this well engineered 3-way has notable strengths but lacks transparency and sounds better at lower levels	57.5 x 29 x 36cm low stands, free space	87dB 40Hz		71
Spendor S20 £510	Very Good Good	This solid and elegant luxury compact maintains Spendor's tradition for peerless mid-to-treble coherence and perspectives. Bass is rather unconvincing.	38x22x26cm stands 1-2ft from wa	83dB 25Hz (in room)	R	102
Spica Angelus £1295	Good Average	A little bass shy and soft in the bass and lower mid, the free standing Angelus is otherwise tidy, extremely lively and fluid, if uneven overall	116.8 x 53.3 x 26cm away from walls	86dB 50Hz		60
Spica TC50 £599	Good - Good	This triangular-profile 'grown up' miniature is a shade boxy and laid back but has good rhythmic and musical integrity	40.5 x 33 x 29cm stands in open space	88dB 55Hz		71
Spica TC50SE £799	Good - Good	A heavily UK-modified TC50, the SE sounds less boxy and more spacious, but lacks some of the urgency of the standard model	40.5 x 33 x 29cm stands in open space	88dB 55Hz		71
Studio Power DMS100 £249	Average + Average +	Close to a BB rating, and in many respects remarkable value for money. Delivers an impressively smooth and large sound, but sheer ugliness will limit its appeal	51 x 26 x 32cm open stands 1ft from wall	86dB 25Hz (in room)	R	82
TDL Monitor £1999	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 28Hz	R	66
TDL Studio 0.5 £450	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 40Hz (in room)		94
TDL Studio 1 £650	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 Free space	84dB 25Hz (in room)	R	78
Tannoy 603 £120	Average+ Average+	Pretty hexagonal cabinet miniature is optimised for free space siting and delivers fine imaging with little boxiness, but little in the way of welly and power either.	33.5x22(max)x16cm high stands in free	85dB 45Hz (in room)	R	102
Tannoy 605 £150	Good Average+	Largish bookshelf size hexagon is potentially fine performer, though unusual stand sensitivity makes optimisation difficult	40 x 27.5 x 18cm stands 1-2ft from wall	85dB 25Hz (in room)	R	106
Tannoy 609 £250	Good Good	Distinctive hexagonal cabinet reduces box colorations, and new dual concentric driver is sweeter than its predecessors, making this one very superior speaker	50x32(max)x22cm stands clear of wall	90dB 25Hz (in room)	BB	102
Tannoy 611 £399	Good Average	This compact floorstander would seem to have plenty going for it, but somehow failed to gel musically under our listening conditions	72 x 32 x 24cm clear of walls	92dB 25Hz		110
Tannoy Westminster £3600	n/a Good +	These awesome horn loaded speakers are remarkably controlled and impressive, if only suited to a few pockets and rooms	Huge, flat against rear wall, away from	96dB	R	Coll '87
Technics SB-EX2 £180	Average- Average	Nicely presented, well built and decent size enclosure sounds solid but somewhat dull, thanks presumably to rather ordinary, low cost drivers	48 x 23.5 x 27cm stands clear of wall	86dB 20Hz (in room)		98
Technics SB-RX50 £650	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 40Hz	R	46
Townshend Glastonbury IIS* £1700	n/a Very Good	What? No bass? Actually, like the KEF 107, Glastonbury II goes down so low you might not notice how good it is. A truly remarkable performer. Superb	91.5 x 28 x 4.6 free standing in room	88dB 27Hz	R	65
Townshend Glastonbury Tor £1495	Average - Very Good	Prodigious bass extension, stunning stereo focus and low cabinet coloration, but limited loudness from low sensitivity and power handling	99 x 26.5 x 33cm well clear of walls	82dB below 20Hz	R	90
Vandersteen Model One £1000	Average + Average +	This compact American floorstander's elegant staggered baffle arrangement contributes to a refreshing freedom from boxiness, but the price is quite high	100 x 30.7 x 25.6cm floor clear of walls	87dB 23Hz (in room)		86
Vecteur Premiere £695	Average Good	Expensive for its material content, this pretty French compact nevertheless has a beguiling sound quality that indicates painstaking development	34 x 19.5 x 25cm light stands clear of wall	88dB 48Hz (in room)		98
Videotone Minimax 2 £80	Poor Average -	Cheap in build and QC as well as price, but cheerful (if coarse) with it - if a little too cheerful after extended listening	27.5 x 17 x 20cm near rear wall	84dB 90Hz	R	74
Visonik David 6001 £173	Average - Poor	Sharp styling a classy looking miniature makes, but the complex grillework worsens a sound which starts off with too much top and not enough bottom	20 x 12 x 13cm against rear wall	87dB 130Hz		74
Wharfedale 410 £130	Good Average-	One step up from the Diamond, this attractive and sensitive small bookshelf model sounds smoother but is also rather bland and uninvolved	34.5 x 22 x 22.5cm stand against wall	89dB 45Hz (in room)		94
Wharfedale 505.2M £260	Average+ Good-	Luxury red mahogany finish version of 505.2, confirms that this well balanced design remains fully competitive nearly three years after the original	44 x 25.5 x 25.5cm stands in free space	87dB 45Hz (in room)	R	98
Wharfedale 505/2 £190	Average Good	This lively Wharfedale provides plenty of speaker with unusual refinement for the money, and should be fairly tolerant of room siting	44 x 25.5 x 24cm stands 1ft from wall	86dB 55Hz	BB	66
Wharfedale 515 £260	Good Good	Effectively a technical update on the continuing 505 theme, this is still more evenhanded, with better bass extension and smoother treble.	40 x 25.5 x 30cm stands clear of walls	85dB 28Hz (in room)	R	106

LOUDSPEAKERS

■ MODEL ■ PRICE	■ LAB ■ SOUND	■ COMMENTS	■ SIZE ■ PLACEMENT	■ SENSITIVITY ■ BASS FROM	■ VALUE	■ ISSUE
Wharfedale 517 £400	Good Average	Similar to the 515 but half as big again, the hefty 517 should offer an improvement, but somehow has a less effective overall subjective balance	53 x 26.5 x 34 stands clear of wall	86dB 25Hz		110
Wharfedale Coleridge C £600	Good Good	Very prettily dressed and sounds pretty good as well, though whether enough to justify the £600 pricetag is open to debate. Well balanced, smooth and a little dull.	48x25.5x25.5cm stands clear of wall	86dB 30Hz (in room)		102
Wharfedale Delta 30.2 £100	Average- Average	This hundred pounder has a bigger main driver than many of its rivals, and so packs a bit more welly and loudness. Coloration is rather obvious, but timing is good	38 x 22 x 17cm stands close to wall	88dB 48Hz (in room)	BB	98
Wharfedale Diamond IV £109	Good Average +	Thanks to a new metal dome tweeter, the new Diamond is much more civilised than its predecessors, with an attractive lively bounce but some boxiness	27 x 18 x 18.5cm stands close to wall	86dB 48Hz	R	90
Yamaha NS 1000M £900	Good Good +	Living up to its monitor label, and tonally well suited to digital material, the NS 1000M is superbly crafted and capable of high levels	67.5 x 37.5 x 32.5cm 30cm from wall, stan	90dB 40Hz	R	46
Zyp A1 £199	Average Average+	Cute metal cased micro-miniature is quite coloured but great fun, with surprising dynamics and fine wall-loaded room balance	22.5 x 14.5 x 13 close to wall	85dB 30Hz	R	110

LOUDSPEAKERS - SATELLITE AND SUBWOOFER SYSTEMS

Satellite and subwoofer systems, sometimes referred to as three way systems, consist of a small pair of speakers (the satellites) and an extra box (or two) to handle the low frequencies.

Most systems use a single sub-woofer to supply low bass output, although stereo sub-woofer systems are available. By freeing the main speakers of the necessity of generating deep bass they can be made much smaller than a standard design and as a result sat and

sub systems are usually visually unobtrusive.

Positioning of the sub-woofer is usually not as critical as the positioning of a conventional speaker and as a result the largest part of the system can be hidden away entirely, although please refer to the placement notes below as this does not apply to every system.

In general the sonic performance of these systems will fall below the performance of a good, comparably priced, conventional speaker. The value ratings given below are judged in the

context of sat and sub woofer systems only and are not judged by the same criteria as the main speakers, thus a Recommended sat and sub system probably won't sound as good as a Recommended traditional speaker.

If you are prepared to compromise slightly in terms of sound quality then a satellite and sub-woofer system might represent a good solution for those situations where the loudspeaker should be heard but not seen.

LOUDSPEAKERS - SATELLITE AND SUBWOOFER SYSTEMS

■ MODEL ■ PRICE	■ LAB ■ SOUND	■ COMMENTS	■ SIZE (cm) ■ PLACEMENT	■ SENSITIVITY ■ BASS FROM	■ VALUE	■ ISSUE
Allison MS 205 £420	Average Good -	Tasty high quality satellites give this quite pricey 3-box system a touch of class. Subwoofer is very compact and only slightly boomy.	25.5x14.5x15 + 29x 29x36 stands close to wall	86dB 30Hz	R	104
Bose Acoustimass AM3 £289	Average Average	Ultra compact 3-box is well balanced though limited in loudness and bass. Tiny satellites are a bit fierce, and grilles unhelpful	9x11x11 + 20x37x19 close to wall	85dB 48Hz		104
Bose Acoustimass AM5 £569	Average + Average +	Pricey but cleverly engineered 3-box system is well balanced and uses tiny twin-driver satellites to good effect	16x7.7x12 + 36x19x48 sats at wall, sub 2ft from wall	85dB 40Hz	R	104
Heco Libero £375	Average Average	Attractive 3-box package uses neat metal satellites with versatile mounting accessories, but subwoofer is boomy in the midbass	18x11x12 + 21x55x 31.5 uncritical	85dB 45Hz		104
Jamo SW/SAT300 £300	Average Average	Attractively finished 3-box package has 'tunable' subwoofer that allows boom to be minimised and a good balance achieved	21x15x8 + 21x48x34.5 uncritical	85dB 40Hz	R	104
RSS Solid/Bass Station £550	Average Average	Multi-driver macho subwoofer adds mucho muscle to Solid satellites, but it's much more midbass than serious extension	24x12x12 + 47x 48 x 20 sub at wall, sats in free space	91dB 45Hz		104
Wharfedale 2130 £300	Average Average +	3-box system marred by indifferent boomy subwoofer but rescued by novel wide-dispersion satellites that give an open sound	14x24x11 + 19x32x 50 sub away from wall	86dB 48Hz	R	104

PERSONAL STEREOS

Whilst not exactly hi-fi components, personal stereos probably play more music to more ears than all manner of domestic systems and as such demand some attention.

Now that personal CD players have joined the ubiquitous Walkman in the market, the variety and standard of sound quality is huge, with obscurely named cassette players practically falling out of your cornflakes packet and the top Discmen going for £300 or more.

Despite their diminutive size personals attempt to incorporate as many gimmicks and features as possible, cassette players often incorporating tuners, Dolby noise reduction or

even graphic equalisers

CD players are 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.

Sound quality on the cassette front seems to have a proportional relationship to price and

integrity of construction – wow and flutter being quite obvious on the cheaper models.

CD players become less noisy as they get dearer and also reduce in size; one drawback of the latter seems to be that immunity to shock suffers as a consequence, although newer models are starting to buck this trend. Cassette players do, on the whole, seem better suited to the outdoor life than their digital counterparts, as does the software. Bear in mind that the sound and lab ratings given below cannot realistically be compared to those in other categories or between cassette and CD personals

PERSONAL CASSETTES

■ MODEL ■ PRICE	■ SOUND	■ COMMENTS	■ FEATURES	■ VALUE	■ ISSUE
Aiwa HS P505MkII £70	Good	Very good clutch of features and accessories plus good sound at a reasonable price. Could be more user friendly	Remote control, rechargeable battery and charger	BB	102
Aiwa HS-PL707 £135	Very Good	Has a precise, attractive sound, if a little clinical and cold. This player might be ideal for the user who will listen to mostly classical music. Somewhat fiddly to use	Remote control, BBE sound enhancer, charger & battery	R	102
Aiwa HS-JX705 £220	Good	Rather expensive radio-equipped player. Sound quality on tape playback didn't match up to the Aiwa HS-PL707	FM/AM tuner, recording mic remote control, charger		102
Panasonic RQS15 £85	Good	Considerable power and immediacy to the music though with some raggedness. Good features and accessories. Well designed and easy to use	Remote control, rechargeable battery and charger	R	102
Panasonic RQV520 £100	Good	Features an onboard radio without sacrificing sound quality on tape playback. You lose out on accessories, though (no battery charger)	Radio, remote control, bass enhancer		102
Panasonic RQS65 £130	Good+	Solid, warm sound plus a good selection of features and accessories all combined in a stylish and very user friendly package. Comes with one of the better remote controls	Remote control, rechargeable battery and charger	R	102
Sanyo MGR401D £40	Average-	Easy to use budget model with a radio and some useful features (including a simplified remote control). Sound quality on tape isn't great but is helped by the bass enhancer	Radio, remote control, bass enhancer with graphic equaliser		102

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PERSONAL CASSETTES

MODEL PRICE	SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Sanyo MGR580 £50	Poor	A more sophisticated radio than on Sanyo's 401D but the feature count is low and the tape playback unexceptional	Radio 'digital tuner', auto reverse		102
Sanyo SPT1000 £40	Average	Despite outlandish colourful trim and features completely unrelated to audio enjoyment (a 'Pedometer' for monitoring jogging) this has a better basic sound than the other Sanyos	Bass enhancer		102
Sharp JC-510 £30	Average	Serviceable sound quality and some decent features at a low price	Radio, bass enhancer, auto reverse		102
Sharp JC-K99 £160	Good-	Sharp's 'extremely lightweight' model. Well made, elegant and it certainly doesn't weigh a lot. Pleasant sound, marred on the test sample by some distortion	Remote, rechargeable battery and charger, bass enhancer		102
Sony WM DD33 £90	Good-	Well built and resistant to vibration on the move but comes with very limited features and accessories for the price	Bass enhancer		102
Sony WM EX80 £150	Good	User friendly Sony with a good remote control and high quality, accurate sound. Comes with all the extras	Remote control, rechargeable battery and charger	R	102
Sony WM DD99 £240	Good-	Mixed bag of accessories (nice headphone storage system, but no remote control) with variable sound quality at a steep price. But it does have Dolby B&C, good build quality and ergonomics	Dolby B&C, rechargeable battery and charger, auto reverse		102
Sony Walkman Pro £249	Very Good	One of the finest sounding cassette decks on the market today. A mandatory Best Buy, it takes other personals to the cleaners (except on weight and power consumption)	Dolby B, C, types I, II & IV, record, line in/out, varispeed	BB	52/56

PERSONAL CDS

MODEL PRICE	SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Aiwa XP-6 £150	Good	Punchy sound both via headphones and when used in a system but transport lets the side down a bit - not one to take out jogging	Digital output, mains adaptor, remote, headphones	R	106
Denon DCP-100 £250	Good	Solidly constructed and nicely finished in the slightly impractical Velvex, almost walkable, competent if uninspiring sound quality	Remote, mains adaptor, no earphones, rechargeable batts		94 Supp.
Denon DCP-50 £180	Average +	Not very walkable, but lightweight and nicely finished in a nextel like grey. Sound through a system is a tad unexciting but not too bad	No headphones, remote, mains adaptor		94 Supp.
Goodmans GCD-10 £120	Average -	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	Mains adaptor, headphones		66
Kenwood DPC-41 £130	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 headphones		94 Supp.
Kenwood DPC-81 £200	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 charger and batts, digital output		94 Supp.
Philips AZ6897 £200	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, headphones	BB	94 Supp.
Philips AZ6819 £300	Excellent	Unusual looking machine with interesting radio headphones. Excellent sound quality but not one to walk with, superb styling	Radio headphones, rechargeables, plinth, infra-red remote	BB	106
Samsung MY-CD2 £110	Poor	Cheap and not particularly cheerful, minimum of facilities and naff sound quality, could suit those on a very tight budget	Headphones, mains adaptor		106
Sanyo CP-12 £260	Good +	Sonically amongst the more enjoyable CD players and capable of revealing the musical aspects of a disc in an interesting and entertaining fashion	Wired remote, headphones main adaptor	R	66
Sony D-11 £135	Average -	Chunky player with old fashioned styling, a rather lightweight sound and limited dynamic range.	Headphones, AC adaptor bass boost		106
Sony D-202 £160	Average +	Good sound quality twinned with relatively good portability accounts for the recommendation, can also sound OK in a main system. Nice entry level machine	Headphones, AC adaptor rechargeables, remote, digital out	R	106
Sony D-303 £280	Excellent	Tidy design with adequate features but not as cluttered as the D-350. Excellent sound quality and will even serve as a CD transport	Headphones, AC adaptor rechargeables, remote, digital out	BB	106
Sony D-350 £300	Good	More buttons and widgets than any of the others but not the sound quality or walkability to go with it	Mains adaptor, clock, rechargeable batteries		94 Supp.
Sony D-66 £180	Average +	One of the few walkable CD players on the market, sound quality is a little muddled but not offensive	Mains adaptor, rechargeable battery pack	R	94 Supp.
Technics SL-XP1 £140	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, headphones	BB	94 Supp.
Technics SL-XP505 £180	Average -	Excellent transport makes this one of the most stable players on the market and the infra-red remote control is a nice bonus. Sound quality leaves a little to be desired	Headphones, AC adaptor rechargeables, infra-red remote		106
Technics SL-XPS900 £280	Excellent	Great sound quality both via phones and in the home backed up with an impressive array of accessories. Transport is not up to use on the move	Headphones, AC adaptor rechargeables, infra-red remote	R	106

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. For more information on choosing and aerial see the feature in issue 108

Tuners come in two basic types. Analogue

models tune gradually (and usually manually) across the bands, and can have analogue or digital displays; they are often preferred for sound quality, and are certainly best for AM bands. Digital tuners offer convenient automatic tune facilities and hold many station positions in pre-set memories. (The Lab and Sound results for models tested in issue No. 65 refer to FM only. For AM results see under Comments.)

TUNERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Aiwa XT-003 £105	Average	Economically designed and built in the UK, but trade-offs have a marked influence on FM and AM sound quality.	FM/AM digital, 30 presets, no signal strength meters.		93 Supp.
Akai AT-56L £170	Good	Listenable, but not exciting, was the overall verdict - it had no gross flaws but failed to capture the imagination	FM/MW/LW digital, 20 presets, 2 aerial sockets, switchable IF bandwidth		108
Akai AT-93L £250	Good +	By AM standards presentable (good) while FM delivers the goods	All bands, aerial switch	R	65

TUNERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Arcam Alpha 2 £185	Good	Re-styled to blend in with the Alpha system, Arcam's cheapest tuner makes up for its lack of features with a sensitive front-end and mellow sound.	FM/AM analogue, no presets, manual tuning + AFC	R	93 Supp.
Arcam Delta 80 £340	Very Good	Hi-fi sound on FM, good on AM, a dependable British all-rounder	6AM, 6FM presets. FM/MW/LW display, manual tune	BB	55
Aura TU-50 £230	Good	Tonally neutral, but with rather poor imaging and a certain woodenness to the sound.	FM digital, 16 presets		109
Creek T40s3 £220	Average+	Creek's FM-only analogue tuner is now in series 3 form, though the aesthetics remain unchanged. Ours was hampered by an obvious bass 'hump' though production units are said to be cured.	FM-only analogue, no presets, manual tuning + AFC		93 Supp.
Denon TU-260L £100	Very Good	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.
Denon TU-660L £190	Good	Not so successful under 'ideal' conditions, the '660 nevertheless made a fair fist of real reception, if a little muddled and lacking life.	FM/MW/LW digital, 30 presets, switchable IF bandwidth, remote	R	108
Harman Kardon Citation 23 £600	Good	Fine performance, interesting features and ease of use are this tuner's forté, and the sound quality is top notch	FM/AM seek/manual adjustment muting 16 presets remote control	R	60
Harman Kardon TU9200 £170	Average	The listening panel appreciated its liveliness, but found it a little muddled. Excessive pilot tone breakthrough may be distressing to listeners under 30 and indicates some design slip-up.	FM/MW digital, 16 + 16 presets		109
Harman Kardon TU9400 £250	Good	Striking in appearance and with a sound to match, this new digital tuner comfortably exceeded our expectations. On stereo FM it's HK's best yet.	FM/AM digital, 24 presets, auto-tuning, signal strength meter	R	93 Supp.
Harman Kardon TU9600 £299	Average	Good bass and detail, and good - perhaps slightly 'enhanced' - dynamics, but measured performance is odd in normal mode and poor in 'Active Tracking' mode.	FM/MW digital, remote control, 24 presets, 2 aerial sockets		109
Linx Theta £475	Good	A Magnum Dynalab on the cheap with the hallmark styling of this small British newcomer. Some of the best midrange from any tuner	Manual analogue tuning, no presets, signal strength meter	R	72
Magnum Dynalab FT101 £599	Good	Although expensive for its fairly minimum set of facilities, its excellent sound makes up for what it lacks elsewhere	Analogue manual tuning, no presets, signal strength meter	R	72
Marantz ST-40L £140	Average +	A little slow to tune but once accomplished it provides a meaty and dynamic sound on FM. AM too has a little extra bite to its performance	FM/AM digital, 30 presets, manual/auto tuning	R	93 Supp.
Meridian 204 £660	Good +	Pleasant sounding with a fine finish but does not make the grade at this price	FM only, auto scan, digital, remote, timer		55
Naim NAT 01 £1377	Very Good	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
NAD 4225 £160	Good	Slightly edgy at times and a tad coloured too, but the sound is so free and open that the tuner must be regarded as one of the most enjoyable models of its type.	FM/MW digital, 14 presets.	BB	108
Nakamichi Tuner 2 £350	Good	Generally a believable sound with good detail in complex music, but imaging is not 100%.	FM digital, 30 presets, switchable IF bandwidth		109
Nakamichi ST-7E £765	Good +	Exceptionally good for weak-signal areas, and good all round	16 AM/FM presets, auto time digital		55
Pioneer F-676 £200	Good +	Pioneer's extensive homework on the design seems to have paid off in a tuner that's detailed and clean-sounding. Perhaps a little bright, but not unpleasant.	FM/MW digital, 36 presets, switchable IF bandwidth, 2 aerial sockets	R	108
Pioneer F91 £360	Excellent	Easy to use, this model has excellent RF performance and scored very high ratings on the listening tests	FM/AM 24 presets	R	60
Quad FM4 £399	Very Good	Fine sound, excellent ease of use, good build and finish and a more than satisfactory technical performance	7 presets. Digital	R	50
Revox B260 £1120	Excellent	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
Rotel RT-930AX £150	Good	A competent rather than exciting performer, with low audible interference though slightly compressed and muddled sound.	FM/MW/LW digital, 20 presets	R	108
SAE T-102 £449	Good +	Expensive for all the radio you get, but sounds interesting. AM - poor	FM/MW only	R	65
Sony ST-S530ES £200	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.
Sony ST-S570ES £200	Good	A host of features, but the sound is muddled, compressed and lacking in frequency extremes	FM/MW/LW digital, 30 presets, RDS, switchable IF bandwidth		109
Technics ST-G70L £200	Good+	Another very polite and refined-sounding tuner but one that does retain just enough sparkle to keep your interest. Plenty of widgets to play with too...	FM/AM digital, 39 presets, selectable RF/IF + fine tuning, signal str. mtr.	R	93 Supp.
Yamaha TX-950 £260	Good +	Very clean and civilised - a bit too much so for one listener. But tonal balance, detail and clarity are all very good; lots of useful features add to its value.	FM/MW digital, up to 40 presets, switchable IF bandwidth, 2 aerial sockets	R	108

TURNTABLES - CARTRIDGES

Very much the 'slave' of turntable and tonearm and to some extent undermined by the supply of free 'starter' cartridges on many turntables, 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 records - and the cartridge also plays a significant role in determining the system balance.

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 MM 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.

TURNTABLES - CARTRIDGES

MODEL PRICE	LAB SOUND	COMMENTS	ARM EFFECTIVE MASS OUTPUT/TYPE	VALUE	ISSUE
Arcam C77 £22	Average +	A sensible moving magnet package with good bounce at a competitive price	6-16g Normal, MM	BB	48
Arcam C77Mg £30	Average -	Punchy sound quality with plenty of extra energy to liven things up. The solid body seems well worth the extra £10	4-8g Normal, MM	BB	67
Arcam E77Mg £50	Average	Our sample had a disappointing stylus, but gave a coherent, rich and laid back sound, with good 'scale'	3-8gN Normal, MM	R	48
Arcam P77Mg £60	Average +	Cautiously recommended, the P77Mg was preferred to its cheaper partner by virtue of a better tip. Channel balance could have been better	4-9g Normal, MM	R	48
Arcam PMX10 £100	Good +	Not the very clearest in complex high-frequency sounds, but lively and exciting, good transients	5-11g Low, MC	R	85

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TURNTABLES - CARTRIDGES

MODEL PRICE	LAB SOUND	COMMENTS	ARM EFFECTIVE MASS OUTPUT/TYPE	VALUE	ISSUE
Audio Note I02VDH £1295	Good Very Good	One of the best, giving 'an extraordinarily relaxing midrange clarity', needs a transformer	8-18g Very low, MC	R	43
Audio-Technica ART1 £800	Good + Very Good	This is a delicate and very fluid-sounding MC that tracks well, offers very low distortion and exceptionally good stereo separation	9-18g Low, MC	R	72
Audio-Technica AT-420E £35	Average Average	Better suited to pop recordings, this MM bears some of the sonic hallmarks of the Linn K5	7-14g (damp) Normal, MM	R	67
Audio-Technica AT-95E £19	Average - Average	Clear, dynamic if richly balanced, the magnetic '95E is a definite Best Buy	8-14g Normal, MM	BB	48
Audio-Technica OC-10 £307	Good + Good +	Good treble and good detail too, but some congestion and coloration reduces its informativeness.	4-12g Low/MC	R	103
Audio-Technica OC-5 £123	Good + Good	For the price, it's unusually effortless and detailed, but it tends to become rather relentless and tiring after a while.	5-14g Low/MC	R	103
Audioquest AQ 404i-L £400	Very Good Good +	Slight harshness detracted from the performance of this otherwise clear-sounding and detailed cartridge	8-16g Low, MC		84
Audioquest AQ 7000 £1200	Good Good +	Stunning stereo imaging and good detail at low levels are spoiled by less-than-perfect tracking and high sensitivity to arms.	6-20g Low, MC		91
Audioquest MC5 £220	Average Average	Offers high-output benefits but the drooping frequency response and severe VTA error preclude recommendation	10-20g Normal, MC		54
Cello Chorale £750	Average + Good	Now available through a new distributor at a saving of some £300, the Chorale is still blessed with a delicate but highly detailed treble. Arm matching is a problem	3-9g Low, MC		72
Denon DL103 £99	Good Average +	An oldie but in many ways a goodie, the 103's good performance in bass and general 'life' is seriously let down by its spherical stylus which kills subtle details.	9-22g Low/MC		103
Denon DL110 £69	Good Good	Firmly recommended as a fine all-rounder, this high-output moving coil model is likely to perform well in nearly all circumstances	6-16g Normal, MC	BB	48
Denon DL160 £89	Average + Good	Although listeners just preferred the 110, its brother here proved a twin in lab tests and is still "thoroughly competent"	6-16g Normal, MC		43
Denon DL304 £200	Very Good Excellent	Uncoloured, detailed, neutral, superb tracking; top notch altogether, and a top notch bargain too.	4-12g Low/MC	R	103
Dynavector 17D2 £280	Very Good Very Good	Clear, detailed, neutral and generally very informative - excellent.	6-18g Low, MC	R	91
Dynavector DV-50X £99	Good Average	A high-output MC model with impressive lab performance, but whose tip and sound quality both disappointed	6-14g Normal, MC	R	48
Dynavector DV10X IV £125	Average Average +	Fine sounding and realistically priced, damping is recommended to ensure successful tracking ability	8-18g (damping) Normal, MC	R	48
Dynavector DV23RS £230	Average + Good	Sound quality was described as "shut-in", lacking energy and sparkle but with some "edginess" in high frequencies	10-22g Low, MC		28
Dynavector XX-1 £680	Very Good Good +	Good, but not immensely competitive at the price, and not helped by comparison with the low output version	7-15g Normal, MC		84
Dynavector XX-1L £680	Very Good Very Good	Very clear, very detailed, no troubles with tracking; response lift around 20kHz seems to do no harm	7-13g Low, MC	R	84
Empire Benz Micro MC-Gold £130	Good + Good	Nothing is obviously wrong, but nothing is stunningly right either and tracking isn't perfect. Safe, but perhaps a little too safe	7-17g Low/MC		103
Empire Benz Micro MC-Silver £130	Good Good	High output MC that though ultimately not the peer of the MCGold is more appropriate to the sort of equipment it's likely to be partnered with	8-18g Normal/MC	R	103
Empire Benz-Micro MC-2 £699	Average Good +	Similar to both the Empire MC1000 and vdH MC2 in design, the Benz offers a warmer and very transparent account of the music. Its tracking prowess is slightly limited	5-12g Low, MC	R	72
Glanz GMC-10EH £50	Good Good	The rising HF trend of this high o/p MC may cause problems in certain systems but with a favourable wind its seductive qualities will win out	8-14g Normal, MC	R	67
Glanz GMC-10LX £80	Average + Average +	Bearing some of the hallmarks of the '10EH, the '10LX is still less competitive in the sonic stakes	7-15g Low, MC		67
Glanz GMC-20E £129	Good + Good +	Very good tracking, smooth sound and good detail. Very slight surface noise enhancement	5-10g Low, MC	R	91
Glanz MFG-110EX £25	Average Average	A little bright but giving detailed bass and clear treble, this was competitive at the price	6-16g Normal, MM	R	43
Glanz MFG-310LX £50	Good + Very Good	Detail and treble outstanding for sub-£100 cartridge. Slight coloration may be due to body resonance	6-10g Normal, MF	BB	85
Glanz MFG-610LX £90	Good + Good +	Similar to cheaper '310 but slightly clearer transients and bass. Benefits from lowish impedance loading	3-10g Normal, MF	R	85
Goldmund Clearaudio £1500	Average + Very Good	Something of a mixed bag overall, its sonic character bears a strong resemblance to the Pradikat though it shares some of the hallmarks of the more expensive Accurate	5-12g Low, MC		60
Goldring 1012 £50	Good + Good	Slightly harsh sound but plenty of life and quite good detail. Some very high frequency coloration apparent	6-12g Normal, MM	R	85
Goldring 1022 £70	Good + Good	As with 1012, a touch harsh; detail and transient purity improved, though, and it goes well with electric guitar!	5-11g Normal, MM	R	85
Goldring 1042 £90	Good + Good	Not terribly subtle, and not such good value alongside 1012 and 1022. Quite lively, though	7-12g Normal, MM		91
Goldring Elan £20	Average + Average	A lightweight and frisky-sounding MM that appears to be based upon the same body as the Nagaoka mm4	7-15g Normal, MM	R	67
Goldring Elite £200	Good + Good	The basics are right, and the Elite will cheerfully tackle any source material, but its sound possesses a certain dirtiness which can irritate.	8-18g Low/MC		103
Goldring Epic II £32	Average Average +	An excellent budget choice though the limitations of the stylus are rather obvious at higher frequencies	5-12g Normal, MM	R	67
Goldring Eroica H £105	Good Good -	More confused and coloured than its low-output sibling - high output less of an issue in these days of cheap MC-compatible amplifiers	8-15g Normal, MC		84
Goldring Eroica LX £120	Good + Good	Not the most subtle cartridge in the world; can sound edgy at times, but lively and informative	8-14g Low, MC	R	84
Goldring Excel £549	Average + Good	Goldring's most expensive cartridge to date errs on the warm and heavy side of neutral. Strong bass lines are its forte though its ability to resolve subtle treble details is weaker	6-13g Low, MC		72
Goldring Excel GS £600	Very Good Good +	The Excel has some true high end quality in its lack of annoying colorations, but tracking seems indifferent and high levels tend to sound rough and edgy.	9-20g Low/MC		103
Grado ZF3E + * £47.50	Average - Average	Downtilting balance disguises the brightness of this cartridge; bit of a mixed bag at this price	9-20g (damping) Normal, MM		54
Grado ZTE +1 £26.50	Average - Average	Bass and treble are a trifle coloured but the midband proved highly enjoyable. Ideal for budget systems	6-13g (damping) Normal, MM	R	54

TURNTABLES - CARTRIDGES

MODEL PRICE	LAB SOUND	COMMENTS	ARM EFFECTIVE MASS OUTPUT/TYPE	VALUE	ISSUE
Kiseki Blackheart £1795	Good Good	This cartridge demonstrated refined poise and a delicate but at once potent security, however, the price did seem a little on the high side compared to other Kisekis	6-16g Low, MC		60
Kiseki Blue Goldspot £450	Very Good Good +	Good bass and imaging, but hints of spit and coloration let the side down slightly	8-15g Low, MC		84
Kiseki Lapis Lazuli £4000	Good Very Good	Combining very sensible design concepts at a silly price, the Lapis Lazuli is best thought of as combining the detail of the MC3000 and the fluidity of the Clearaudios	4-12g Low, MC		60
Kiseki Purpleheart Sapphire £799	Good + Good +	Rare, beautiful to look at and sweet to listen to, our review of this high-flyer conjured up images of Japanese art	5-14g Low, MC		48
Koetsu Black S £612	Average Good +	The S is an OEM design built to Koetsu's blueprint. It features a sturdier fixing plate and offers a brighter, faster and more tactile sound than the earlier K	8-15g Low, MC	R	72
Linn Asaka £373	Good + Good +	Disciples of Linn who are trying to realise their true "Karma" may find that saving money is not a short cut to heaven	9-18g Low, MC	R	Coll. '86
Linn K5 £39	Average Average +	Not as crisply focused as the costlier Linn magnetics, the K5 offers a smoother presentation	7-16g Normal, MM	R	67
Linn K9 £89	Average Good	Linn threw this model into the leading pack by beefing up the Basik's bodywork, adding a super stylus, and keeping the price fair	6-15g Normal, MM	BB	Coll. '86
Linn Karma £564	Very Good Very Good	A specialist which is strongly recommended for Linn-based systems; results may be less predictable in more general application	9-18g Low, MC	R	Coll. '86
Linn Troika £798	Very Good Good +	Good all-rounder, but still some hint of unhappiness at very high levels. Good imaging and bass.	6-18g Low, MC		91
London Maroon £149	Average Average +	Now manufactured under the London brandname this Decca cartridge is as iconeclastic as ever	9-20g (damping) Normal, MM		67
London Super Gold £300	Poor Average -	Immediate and (in the midrange at least) detailed, but very coloured, very nonlinear and questionable effect on records. Devotees swear by it	9-15g (damping) Normal, fixed stylus MM		84
Milltek Aurora £249	Good + Good +	An overall feeling of relaxed ease characterised this clear and atmospheric Kiseki-built cartridge	8-16g Normal, MC	R	Coll. '86
Milltek Olympia £349	Average + Good +	Warm and detailed sound - packs the punch of the best MCs with high output as a bonus	12-20g, (damping) Normal, MC	R	54
Nagaoka MP10 £18	Average Average	High frequencies sounded "shut-in" with this spherical-stylus model, but mid and mass were energetic, bouncy and punchy	5-13g Normal, MM	R	48
Nagaoka MP11 Boron £40	Average Average +	Responding well overall in PM's equipment and listening room, this model was mildly criticised for low level and dynamic limitations	5-13g Normal, MM	BB	48
Nagaoka MP11 Gold £47	Average - Average +	There were mild criticisms directed at most areas, but in general the sound was clear, open and even	3-8g Normal, MM	R	48
Ortofon 510 £30	Good Good +	For the price, a good blend of virtues - weight, clarity and neutrality.	3-11g Normal, MM	BB	85
Ortofon 520 £50	Average Average +	Very sensitive to load capacitance this new Ortofon maintains the company tradition for a lively, effervescent SQ	7-16g Normal, MM	R	67
Ortofon 530 £80	Good + Good +	Very clean and assured sound; transients not quite perfectly pure but plenty of detail.	4-11g Normal, MM	R	85
Ortofon 540 £100	Average - Average	Graced with an advanced FG11 stylus our sample possessed too high a compliance for broad arm matching. It could also sound a little unforgiving	3-8g Normal, MM		67
Ortofon MC10 Super £70	Average Good	"What a delightfully sweet-sounding cartridge this is . . ." we said	5-15g Low, MC	BB	48
Ortofon MC15 Super £100	Good + Very Good	A good all-rounder, with outstanding performance in detail retrieval, even if it can be very slightly bright and close-up at times.	10-24g Low/MC	BB	103
Ortofon MC20 Super £200	Average + Good +	An "inviting" sound quality; polite rather than exciting it approaches much more expensive models, but does not better them	6-15g Low, MC	R	Coll. '86
Ortofon MC3 Turbo £100	Average + Good	Not terribly subtle, but it obviously doesn't aim at that. The 3 Turbo is bright, cheerful and bouncy - take it as it comes!	10-24g Normal/MC	R	103
Ortofon MC30 Super £270	Very Good Good +	Beautifully engineered and well-balanced, it was slightly criticised as bland, though some may appreciate the lack of rough edges	5-14g Low, MC		Coll. '87
Ortofon MC3000 MkII £850	Very Good Excellent	Low levels of body resonance are a real ear-opener. Nothing to criticise elsewhere; one of the very best	9-16g Low, MC	R	84
Ortofon MC5000 £1500	Good + Good	Review sample could not be fully run-in, which might explain limited tracking ability and bright and forward sound, though imaging is excellent. Fussy about s.	12-20g Low, MC		91
Ortofon Quartz £120	Good + Good	Lively, quite detailed, and a touch bright, the Quartz has many qualities of the much dearer Quasar	3-12g Low, MC	R	91
Ortofon Quasar £300	Very Good Very Good	Many of the qualities of the MC3000, although a touch bright. Good detail and delicacy	8-15g Low, MC	R	84
Ortofon Quattro £200	Good + Good +	Undoubtedly a competent performer, the Quattro however seems a less obvious choice than the other Qs. Generally neutral, but can be edgy and bright in loud passages	6-18g Low/MC		103
RATA RP20 £22	Average - Average	Good integration, a clear dynamic midrange and the beginnings of fine stereo imagery merits clear recommendation	6-14g Normal, MM	R	48
RATA RP40 £44	Average Average +	The '40 did a good job of sorting out the layers and complexity of the mix, with good focus, excellent stereo spread and fine scale	6-15g Normal, MM	R	48
RATA RP70 £77*	Average Average +	Clearer and sweeter than the '40 this also seemed heavier and less lively. For £99 you can have a van den Hul stylus	6-14g Normal, MM		43
Rega Bias £34	Average Average +	Difficult to mount in some arms due to its shallow build, the bias offers a gentile, refined SQ that certainly makes it worthy of audition	4-10g Normal, MM		67
Rega Elys £74	Good Good	Clearly superior to the Bias, despite their common heritage, the Elys is both more detailed, accurate and musically convincing	8-15g Normal, MM	R	67
Revolver £20	Average + Average	This modified AT-95E enjoys a very lively mid and treble even if the bass is somewhat 'slower' in comparison. A firm budget buy	8-16g Normal, MM	BB	67
Roksan Corus Black £110	Good + Good	Recognisably related to Corus Blue, but distinctly more civilised and smoother.	7-12g Normal, MM	R	91
Roksan Corus Blue £65	Good + Good	Roksan-specified modified Goldring 1012; slight harshness detracts from otherwise good sound.	7-11g Normal, MM		91
Shure M104E £36	Average - Average	Capable in many ways, but giving no substantial improvement over the 92E in our view	5-15g Normal, MM		38
Shure M105E £49	Average Average -	A slightly 'pitty' 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

TURNTABLES - CARTRIDGES

MODEL PRICE	LAB SOUND	COMMENTS	ARM EFFECTIVE MASS OUTPUT/TYPE	VALUE	ISSUE
Shure M110HE £60	Average	Sound quality was thought eminently presentable, but not exciting; smooth clear high frequencies, but a loss of bass definition	5-10g Normal, MM		38 Summ
Shure M111HE £72	Average	Early reviews of this cartridge complained principally of the price - which has since come down	5-10g Normal, MM		38 Summ
Shure M92E £17	Average - Average	Though lacking depth, the overall sound quality was competent, but treble was not its forte	10-15g Normal, MM		43
Shure M99E £29	Average - Average -	Sister to the 92E this is a solid but not particularly exciting cartridge	5-10g Normal, MM		38 Summ
Shure ME75ED £26.50	Average Average -	Rather bright and splashy in the high frequencies but nevertheless a competent model	5-10g Normal, MM		38
Shure ME97HE £49	Average Average +	It won't turn a sow's ear of a turntable into a silk purse, but will at least keep going and produce an acceptable result	8-20g Normal, MM	R	48
Shure ML120HE £95	Average + Average +	Quite decent sound quality and a generally fine balanced performance	6-18g Normal, MM		48
Shure ML140HE £120	Average + Good	Qualitatively the treble of this well-balanced moving magnet model was a match for many moving coil cartridges	6-16g Normal, MM		43
Shure Ultra 500 £499	Good Good	There was no doubting the accomplishments of what could well be the finest moving magnet cartridge around	6-14g Normal, MM		48
Shure V15 VMR £215	Good Average +	Initial listening gave promising results, but extended familiarity gave the feeling of a lack of energy and a "shut-in" sound	5-12g Normal, MM		38
Shure VST V £173	Very Good Very Good	Quite exceptional assurance with difficult material; very stable and clear sound. One of the best. Dynamic Stabilizer actually works!	4-11g Normal, MM	R	85
van den Hul MC One £699	Good Very Good	This extended all the positive qualities of the '10 but added greater authority and scale - worth it for the extra money	6-12g Low, MC	R	60
van den Hul MC Two £899	Good Very Good	Connected directly to any standard MM input the vdH MC Two rewards with a highly detailed yet fluid and musically convincing portrayal	6-13g Normal, MC	R	72
van den Hul MC1 Super £799	Very Good Very Good	Slight softening effect on transients was the only real flaw, but it didn't quite seem to have that special touch one expects for the money	8-15g Low, MC		84
van den Hul MC10 £599	Good Good +	A neutral balanced performer giving transparent midrange, fine depth and focus with firm extended bass. Gosh!	5-10g Low, MC	R	60
van den Hul MM1 £200	Good + Very Good	If its wooden-sounding midrange coloration could be tamed, the excellent imaging and admirable all-round security of the MM1 would make it an excellent performer.	7-15g Low/MC	R	103

TURNTABLES

The schizophrenic split between consumer electronics and 'real hi-fi' is most obvious amongst turntables. The former are supplied simply as a means of playing vinyl in a system context. Cheaply manufactured in the Far East, these are complete 'record players' with a variety of automatic facilities, sometimes tied into a system remote control. But engineering compromises usually severely limit sound quality, cartridge choice may be P-mount restricted, and nowadays such machines are rarely stocked by specialist hi-fi dealers

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 components, but 'naturally sympathetic' combinations exist, and a good dealer can help. Listed separately as integrated players and

as motor units and tonearms, our sound quality rating is based on results achieved using a high quality system - but in point of fact the deck is usually the limiting factor soundwise in any system.

Lab performance rating summarises the speed stability, vibration generation and environmental isolation of turntables, along with the friction, alignment and adjustment of tonearms. The tonearm's physical characteristics also define a range of compatible cartridges.

TURNTABLES - INTEGRATED

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES ARM EFF. MASS	VALUE	ISSUE
Acoustic Research EB-101 £230	Good Good	This genuine high fidelity product offers an impressive package at a competitive price	Subchassis, manual, 13.5g	BB	48
Alphason Sonata/HR-100S MCS/Atlas £835/£550/£400	Very Good Very Good	Good sound in all areas - bass, clarity and neutrality all in the top class and bettered by very few decks. Atlas PSU expensive but worthwhile	Belt drive, suspended, optional PSU, 13g	R	79.
Ariston Pro £160	Good Good	Remarkably clear and detailed for the price, very neutral. Benefits from cartridge upgrade	Manual, belt drive. 12g, cart.	BB	91
Ariston Pro Maxim/RB250 £210	Average Fair	Warm, full sound with a deep bass and solidity is partly offset by lack of fine detail in mid and top. On a suitable surface, with a crisp sounding cartridge, it easily qualifies for shortlisting	Solid plinth, belt drive, manual, 11.5g		103
Ariston Q-Deck £180	Good Average +	Well engineered and good sounding low cost package which is both easy to set up and to use	Semi-auto, belt drive, solid, inc. cart	BB	67
Dual CS-505-4 £170	Average Average	Easy to set up and to use, this is a consistent sounding and well isolated turntable with a long pedigree. It is slightly lacking in balls, but compensates with a consistently unmodulated presentation and good stereo focus perspectives.	Auto-arm lift, interlocked cueing, 2 speed, pitch control	R	103
Dual CS-750 £300	Average- Average-	Attractive but lazy performance from a deck with many good ideas and which is a pleasure to use. Cartridge is past it's sell by date. Has 78rpm facility	Solid plinth, belt drive, cart. 3-speed, quartz referenced, auto lift		103
Dual CS430 £100	Average Average -	Ragged, sometimes unpleasant cartridge mixes with a modest pleasing player in a very sharply priced package	Belt drive, with cartridge, auto return, 5g	R	67
Dual CS5000 £230	Average Average +	The rare 78 facility may give grandma's collection a new lease of life but the player did not merit recommendation on price vs sound	Electronic, belt drive, subchassis, 10g		48
Dual CS-503-2 £145	Good - Average	Not wholly inspiring; generally coarse and woolly sound is at least not offensive, but easily bettered by the CS505-4. Good value in material terms	Semi auto, belt drive, 10g	R	91
Goldmund ST4 £4589	Very Good Excellent	The Studio turntable takes on a cheaper tonearm than the T3F, yet provides a similar reference standard performance at £2,000 less, in a neatly integrated though bulky package	Solid subchassis, direct drive, parallel arm, detachable h/shell	R	60
Goldring Excelda 1 £160	Poor Poor	Unlucky, resonant sound, narrow effective dynamic range and lack of tracking security. The cartridge (the only authentic Goldring part) is quite nice	Manual integrated arm, synchronous motor, auto-start/stop		103
Heybrook TT2 turntable & arm £469/£269	Average Good +	A gradual process of informed evolution and a sensibly designed arm combine to make this a good sounding middle of the road package. Well supported by dealers	Manual subchassis motor with arm, R belt drive, 14g		67
JVC AL-FQ555 £170	Average - Poor	Clear midband sound but woolly bass and crude treble. Ease of use however ranks highly, and there's little to go out of adjustment	Auto, direct drive, 5.5g		67

TURNTABLES - INTEGRATED

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES ARM EFF. MASS	VALUE	ISSUE
Kuzma Stabi/Stogi Reference £995/£899	Very Good Very Good	Beautifully made in a solid oak plinth, the Stabi also sounds very clear, detailed and extended. Stogi Reference is also most capable.	Manual, belt drive, subchassis.12g	R	91
Linn Axis/Akito £443	Good - Average +	A neat, attractive and well-made package which delivers a rather harsh sound with a 'one-note' effect in the bass, but it's well suited to mid market systems	Belt drive, semi-suspended, electronic PSU, 10g	R	79
Linn Basik £250	Good Average+	Strong midband analysis and imagery, clean if sharp treble is matched to a good if occasionally wooden bass. Good at the price, and requires no complex setting up or fine tuning in service	Solid plinth, inc cartridge, manual speed change	R	103
Linn LP12 Basik/Akito £599/£137	Very Good Good	Familiar Linn virtues and vices - plenty of the former though and few of the latter. Trails the full LP12 significantly, but pace, rhythm, timing etc. still in top class, and bass tauter than of old	Suspended subchassis, belt drive, single speed, 45rpm adaptor	R	103
Linn LP12-Lingo/Ekos/Troika £1168/£1097/£798	Good + Good +	The classic reference is improved (at a price) by the Lingo but character remains the same - not as detailed or neutral as the best. Ekos arm, though pricey, is well made and suited to many decks	Manual, subchassis, belt drive, 9g	R	91
Manticore Mantra/Musician £340/£170	Good + Good +	Well engineered deck with satisfying sound. The arm is particularly fine and very good value	Belt drive, suspended, 15g	R	79
Marantz TT400 £160	Average - Poor	Everything one hopes a budget deck won't be; coarse, confused, muddled and woolly. Construction isn't wonderful, either	Manual, belt drive 16g	R	91
NAD 5120 £90	Average Average	A number of running improvements have given this player a range and tautness denied its lazier sounding antecedents.	Semi-auto belt drive, detachable armtube/weight, 9g	BB	67
Opus 3 Continuo/Decca London International (Revise) £599/£99	Poor Good	Heavyweight motor unit with many fine properties, but which needs further development. The idiosyncratic arm is a suitable (though not ideal) platform for the Decca cartridge. For all its faults though, the whole transcends the sum of the parts	Belt-drive manual, damped unipivot arm, 12g	R	67
Rational Audio Aura 01 £189	Poor Good	Poor lab results reflect bad rumble, but midrange and treble are very pure and clean; idiosyncratic sound and styling should be tried!	Manual, belt drive, linear tracking arm 10g	R	91
Rega Planar 2 £185	Average + Good	A remarkable product at the price, surprisingly articulate and confident	Manual, 11.5g	BB	48
Rega Planar 3 £250	Good Good	A long time leader in its price category, the '3 (with its excellent RB300 arm) sounded nicely 'musical' in a balanced and coherent manner	Manual, 11.5g	BB	48
Revolver Rebel £185	Average Good -	Quite lively and detailed but not the strongest on subtlety, with slightly lumpy bass. Motor breakthrough audible, and watch for bent motor shaft on delivery!	Manual, belt drive, semi-suspended 12g	R	91
Revox B291* £892	Average - Average -	Sound quality ranks as below average. Subjective bandwidth is narrow and the music lacks grace and energy. Ease of use however is unrivalled	Automatic, remote controllable, direct drive parallel arm, cart	R	55
Roksan Radius/Tabriz zi £635	Good Good	Truly modern turntable in appearance. The design is subtle, refined and easy on the eye. Musically it offers exceptional performance with a minimum of setting up and operational fuss	Semi-suspended, belt drive, mains plug PSU.	R	103
Roksan Xerxes 33/Tabriz zi £550/£255	Good Good	Good but not exceptional sound quality from expensive package. At its optimum with a relatively inexpensive arm/cartridge unless upgrade to full Xerxes is contemplated. XPSII PSU adds 45rpm and much to sound quality	Semi-suspended, belt drive, 33rpm only, mains plug PSU, one piece arm tube, 'intelligent' counterweight	R	103
Roksan Xerxes/Artemiz /Artaxerxes £785/£655/£559	Excellent Excellent	Superb though costly record playing hardware, highly integrated and synergistic in nature, but suitable for use with any good MC cartridge. Will not suit all tastes, however	Semi-suspended, belt drive, quartz locked 2 speed PSU	R	103
Rotel RP-855 £200	Good Good	Great sound for the money - detailed and clear with good bass and no irritating nasties	Belt drive, solid, speed adjust, 9g	BB	79
Systemdek 1/900 £188	Poor Average-	The motor unit is derivative of the Rega Planar 2, but sounds inferior by virtue of insufficient structural integrity. Pitch stability is also far from acceptable	Solid plinth, manual speed change, no cartridge	R	103
Technics SL-DD33 £120	Average Average	As with the QD33 though better value	Automatic, direct drive, solid plinth, 7.5g, P-mount	BB	48
Technics SL-L20 £120	Poor Average -	A rather lightweight parallel tracker achieving a poor overall rating, with little to recommend it unless you dig facilities	Electronic, solid plinth, 5g, P-mount	R	48
Technics SL-QD33 £150	Average Average	The quartz speed controlled version of the DD is short on sound quality but not features. But it did have fair focus and some depth	Automatic, Quartz, direct drive, solid plinth, 7.5g, P-mount	R	48
Technics SLBD-22 £100	Average - Average -	Not bad for the price and a great improvement on the L20, it performs reasonably when not stretched	Semi automatic, solid plinth, electronic, 6g P-mount	R	48
Thorens TD 166 Mk V £240	Good Good	Classic suspended-subchassis deck with clear, stable sound of no particular character. Unlikely to make enemies	Belt drive, suspended, 12g	BB	79
Thorens TD 280 Mk II £190	Good - Good -	Legendary Thorens build quality on the cheap - slightly unsubtle sound but eminently liveable-with and very good value	Belt drive, solid, electronic PSU, 12g	BB	79
Thorens TD 316 Mk II £250	Good Good -	Very solid deck with neat split-chassis construction. Sound is a bit insecure in the bass, but it could suit classical music lovers well	Belt drive, suspended, electronic PSU, 12g	R	79
Thorens TD-3001/TP90SF £850	Very Good Good	Excellent middle ranking esoterica, with strong all round abilities rather than excellence in particular areas. Engineering content is particularly high	Suspended subchassis, belt drive, available w/o arm	R	103
Thorens TD166 VI/UK/RB250 £270	Good Average-	Refined and articulate sound with well focused imagery, suitable for use with good MM and budget MC cartridges. The Rega arm is the best at its price, a good purist deck	Manual, belt drive, suspended, 11.5g	BB	103
Thorens TD2001 £650	Good Good -	Similar to TD320 but much dearer - why? Sound is comfortable but not very detailed	Semi-auto, belt drive, subchassis 15g	R	91
Thorens TD280 II/UK £189	Average Average	Excellent value for money from a built to last player which is also easy to use. Will benefit from a cartridge upgrade in due course, but has an energetic and detailed sound	Solid plinth 2-speed player, inc cartridge	BB	103
Thorens TD320 Mk II £400	Good Good	Good, consistent sounding deck with much improved (but not ideal) arm. A little expensive for performance offered	Semi-auto two speed belt drive, 14g	R	67
Townshend Rock Reference/Excalibur £2295/£745	Excellent Excellent	Overall the closest reproduction to master tape we've yet heard, with stunning real bass and excellent neutrality. Front end damping trough improves LF detail significantly	Belt drive, suspended, electronic PSU, front-end damping, 12g	R	79
Voyd Reference/Helios Cyaleon £5414/£1350	n/a Excellent	Voyd's flagship is equipped with three of the biggest motors in the business, a Lexan platter and a real brute of a power supply (it dwarfs most power amps!). A strong contender for best turntable in the known universe	Belt drive, 3 motors, subchassis, outboard PSU, 12/14g	R	Coll. '90
Well Tempered WTAT £1690	Average Very Good	Intriguing and challenging design. Musically it is not ideal, but it has a limpid quality and a lack of artificiality that sets standards as well as turning the ear, though it's not completely uncoloured. A charmer yet mainstream enough in its virtues to be viable	Manual 2-speed, damped, suspended arm, 7.5g	R	67
Zarathustra S4/Pluto 5A Prestige/PSU £1500/£2500/£500	n/a Excellent	The very well made and finished heavy platter S4 with the superb Pluto arm make a devastating combination ranking up there with the very best	Subchassis, manual, available without PSU	R	72

MOTOR UNITS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
CEC ST930 £599	Good Very Good	A rarity - a serious hi-fi product that loses nothing to budget rivals in finish or convenience. Good clean sound, very stable and assured	Belt drive, external PSU, 78 speed inc.	R	79
CS Audio Resan kit for Rega £90	Good - Good	After-market kit to convert Rega 2 or 3 to semi-suspended subchassis style. Looks good and sounds tidier than original. Feedback is much reduced	Conversion kit, all work reversible	R	79

MOTOR UNITS

■ MODEL ■ PRICE	■ LAB ■ SOUND	■ COMMENTS	■ FEATURES	■ VALUE	■ ISSUE
Michell Gyrodec £595	Good Good	Sweet and natural sounding player, well exploited by the Rega RB300 arm. Aesthetics, and the acres of acrylic, are unique	Manual, belt drive, suspended motor unit		55
Michell Syncro £265	Good Good	A happy blend of qualities endows the Synchro with a blend of subtlety and force - the mailed fist in the velvet glove. Easy on the ear in the best sense.	Manual, belt drive, suspended motor unit	R	67
NVA Senior £450	Good - Average	Very high sensitivity to low-frequency vibration, especially on NVA stand, gives strange subjective bass response and confused sound. Looks are unusual but pleasing	Belt drive, electronic PSU, two-part plinth		79
Oracle Paris £695	Good - Average	Looks good but sounds coarse, confused and uneven, with bass liable to thump	Belt drive, semi-suspended, electronic		91
Origin Live Oasis A £495	Good - Average	Rather coarse sound with lack of detail resolution - but lively presentation may appeal. Appearance is industrial	Belt drive, external mains filter, 33rpm only, suspended		79
Origin Live Oasis B £199	Average Average +	Aesthetics are not its strong point, but its lively and articulate - if idiosyncratic - sound will please some tastes. Highly resonant construction is very sensitive to feedback	Belt drive, 33Gy1/3Gyrpm only, solid plinth/subchassis		79
Oxford Acoustics Crystal Reference £2495	Very Good Excellent	This big, open and powerful sounding turntable works beautifully with Airtangent arm to give superb 3-D imagery. Recently updated to mk.II form	Manual, belt drive, subchassis, stand	R	60
Pink Triangle Anniversary £1175	Excellent Excellent	Possibly the most detailed, clear, neutral and therefore accurate deck around. Likeness to master tape is almost uncanny	Suspended, belt drive, electronic, motor on subchassis	R	91
Pink Triangle Export £676	Very Good Excellent	Basically a PT TOO with built-in power supply. Retains features of great transparency and neutrality. Review sample had highish motor noise - presumed untypical	Suspended, belt drive, electronic	R	91
Pink Triangle Little Pink Thing £392	Good + Very Good	Leads the field for clarity and neutrality at this price or a good bit more. It also looks very smart! Excellent value. Arm cut-out suits Rega or Linn style	Belt drive, semi-suspended, electronic PSU	R	79
Revolver £150	Average Average	Nicely balanced, but unimpressive timing and lightweight bass made this deck rather average for the price. Manufacturer has since made several changes, but not re-submitted for review	Manual, belt drive, solid plinth		48
Systemdek IIX/900 £200	Good Good	The Systemdek IIX is a high performance, low cost turntable which is particularly strong in the areas of fine detail resolution and imagery. Tested with Rega RB250	Suspended subchassis, metal armboard, glass platter, 2 speed	BB	103
Systemdek IIXE/900AP £358	Good Good+	A development of the IIXE/900, with a comparably detailed sound reinforced by better frequency extremes, timing etc. Needs careful setting up.	Suspended subchassis, metal armboard, acrylic platter, PSU	R	103
Systemdek IV £495	Good Very Good	The level of wow is a theoretical concern at least, but elsewhere this player shines, combining euphony, information and imaging in a polished, untemperamental package	Two-speed manual belt drive	R	67
Voyd 0.5 £3062	n/a Excellent	Based on the standard 3-motor Voyd but with upgrade options (better bearing, platter, etc) which take it half way to a Voyd Reference. Superb build and finish; colourful, dramatic performance.	Belt drive, 3 motors, subchassis, outboard PSU	R	72
Voyd Valdi £868	Good - Very Good	Recent power supply upgrade has resulted in allround improvements. This Perspex plattered, two motor deck is remarkably competent, revealing and neutral	Belt drive, suspended subchassis, electronic PSU		79
VPI HW-19Mk3 £1600	Very Good Very Good	Built to accommodate parallel tracking arms, this large but elegant deck produced clean, smooth sound when fitted with an SME arm. Good bass	Belt drive, suspended subchassis	R	79

TONEARMS

■ MODEL ■ PRICE	■ LAB ■ SOUND	■ COMMENTS	■ ARM EFF, MAS	■ VALUE	■ ISSUE
Airtangent 1B £1990	n/a Excellent	A complex but superbly built arm for high quality systems, giving excellent stereo and resolution	7.5g (vertical)	R	60
Alphason Delta £230	Good Average +	A highly competent design from Alphason gives good sound quality but with slight blurring and treble fizz	16g	R	48
Alphason HR100S £490	Very Good Very Good	This S-shaped arm sounds smooth, but nevertheless reproduces transients with fine attack	10g	R	Coll. '86
Alphason Xenon £286	Good Good +	A trimmed down HR100S, the Xenon has inferior bearings and a simpler finish, but sounds crisp and coherent. Fits any Linn cutout	12.75g	R	55
Audio-Technica AT-1130 £186	Good Good	Well suited to most cartridges including high compliance ones, the AT is smooth and tonally neutral, if slightly lacking in 'balls'	8.5g	R	67
Decca London International £49	Average + Average +	This uni-pivot design gives a rather rich tonal balance and some bass muddling. Could be good with Decca cartridges, but not well built	12g		48 Summ
Eminent Technology £1000	Good + Very Good	One of the best sounding tonearms around, the linear tracking Eminent delivers impressive stereo imagery, focus and transparent sound	9g (vertical)	R	Coll. '86
Goldmund T3F arm £4400	Excellent Excellent	This complex parallel tracker created an "ear-opening" experience when tested with a (since updated) Goldmund Studio turntable	16.5g	R	Coll. '87
Kuzma Stogi Reference £899	Very Good Very Good	A large, solid and well-made arm that holds the cartridge firmly, giving exceptionally clear sound with just a hint of brightness	12g	R	79
Linn Ekos £1097	Very Good Very Good	Superb, state of the art design which builds significantly on Ittok's strengths	9g	R	67
Moth Arm £95	Good Good +	The ultimate budget arm? Refined, detailed, sweet and natural - performance improves in line with the rest of the system	12g	BB	60
Naim Aro £752	Good Good -	Designed for use on the Linn LP12 turntable and Troika cartridge, the Aro is a little bright and congested.	10.5g		91
Rega RB300 £139	Very Good Very Good	Despite its modest price this sets exceptional performance standards and could be used on a number of high-quality turntables	10-11g	BB	60
Roksan Artemiz £655	Average Good	Interesting design which works a treat on the Xerxes deck. Fits Rega cut-out.	8g		67
Roksan Tabriz £165	Good Good +	Though obviously targetted at Roksan's own Xerxes, it is also a good alternative to the Rega arms in many applications. A trifle bright.	9g	R	91
SME 3009 Series III £253	Good Average +	Comprehensively adjustable and very well made, suited to MM and high compliance MC cartridges	5g		48
SME 3009 Series IIIS £182	Good Average +	A simplified less flexible (as regards adjustment) Series III with a similarly 'soft' sonic character	5g		48
SME 3009R £335	Average + Average +	A higher mass version of the Series III designed for low compliance MC cartridges	12g		48
SME 309 £568	Very Good Very Good	Beautifully made, finished and presented, this arm is fully and easily adjustable and a highly neutral performer	10g	R	79
SME Series IV £828	Excellent Very Good	Superb engineering and finish with a finely balanced sound giving impressive stereo focus and low coloration	10.5g	R	60
SME Series V £1232	Excellent Very Good	Excellent in terms of design engineering and sound quality, this arm arguably sets a new reference standard regardless of price	10.5g	R	60

Personal Messages

With the nights starting to draw in, chances are the hi-fi is going to start coming in for increasing use. Or will do if it still sounds as good as it did last winter.

Getting good performance from a hi-fi system in the first place is one objective. Keeping it working just as well year in and out tends to be a rather different proposition. Styli and rubber drive belts (in cassette decks as well as turntables) are about the only things that need regular renewal, but the better the system, the more sensitive it is to the state of tune or set-up. Unless some sensible precautionary regime is followed, performance slips from its pinnacle; disinterest duly sets in, followed, if left untreated, by disuse.

It's a message I've preached before, but make no apologies for this reiteration, simply because I keep getting myself caught out over some little thing or another. And if I haven't managed to learn the lesson properly after umpteen years in the game, it's certainly one that begs repetition.

The better the hi-fi, the more responsive it is to care. Paul Messenger reflects on the need for constant vigilance.

It sneaked up on me this time at a most inconvenient period, just during the run up to the blind listening tests conducted for this month's loudspeaker reviews. I knew things weren't quite right, but couldn't put a finger on what was wrong, partly because a lot of different system changes had been going on. And at least two regular visiting panellists commented that things weren't quite what they should be, which did very little for my *sang froid* on the occasion.

Things continued to get worse, reaching a peak early the following week when John Burns from Pear Audio visited to see how I was getting on with the Shahinian Arcs. No speaker could be persuaded to sound good that day, especially something as revealing — and potentially as sweet — as the Arc. We tried several different cartridges, and all sounded as though they were mistracking (which they weren't).

Later that night, entirely by chance, I started to dismantle the system, primarily in order to weigh the different components. (No, I'm not going to explain why; not this month, at any rate.) And it was the disconnection and reconnection of the heavy umbilical lead that links my Naim NAC 52 preamplifier with its massive multiple external power supply unit that did the trick.

With hindsight it's blindingly obvious, of course. During my reviewing work, most of the connections in my system get plugged and unplugged pretty regularly, a procedure that incidentally (and rather imperfectly) keeps the contacts reasonably clean. But 'most' as distinct from 'all' is crucial here, the chain being only as strong as its weakest link. The NAC 52 owner leaves it permanently powered up as a matter of course, because this keeps everything operating at optimum stability and performance. I suspect that the umbilical lead — a massive multi-pin device borrowed from the computer industry — may not

have been removed once in the eighteen months since I'd purchased and installed the units.

Eighteen months is certainly much too long for any contacts to remain undisturbed, and the results were immediately apparent in an almost alarming rise in the background noise from the system (something to which the Tannoy *Westminster Royal* horns are inordinately sensitive). By the next morning everything had settled down again; background noise was its usual innocuous self — and the system was magically playing music again.

I still haven't found the time for a complete end-to-end session with *Kontak* cleaning fluid, a relentlessly tedious job that requires several hours and a pedantic frame of mind. But I did find time to give the mains plugs and sockets a good tightening up the other day, and was gratified to discover I could get an extra quarter turn on most of the (MK) plugs' hot terminals, without snapping any of them off in the process.

Did this make a difference? To be honest, I'm not certain. But if I hadn't done it (again for the first time in over a year), one or another would eventually have turned round and bitten me and the system on the bum.

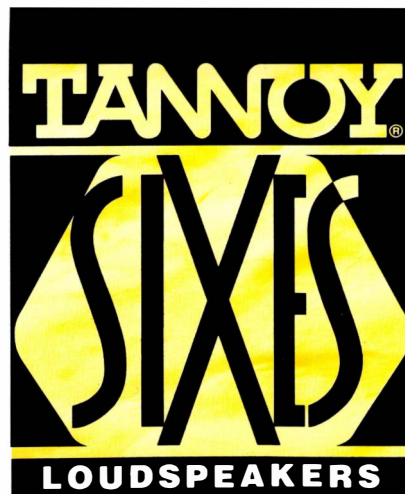
The moral of this tale is that all decent hi-fi systems need regular annual checkups, in which all plug/socket contacts on both mains and signal chains are at least removed and replaced, and preferably thoroughly cleaned and tightened if appropriate. And while you're at it, it's also worth checking the locknuts on any support furniture spikes (especially speaker stands), as well as the tightness of any screws or bolts holding the drive units into the loudspeakers.

The committed enthusiast might feel able to tackle these operations for his or herself, and may indeed have been doing so for years. But those prepared to have a go are only a tiny minority, and many such DIY attempts do end in disaster through inexperience. Frankly, in my opinion this regular check-up procedure is a service that the truly professional specialist dealer ought to be offering to any customer for whom he has undertaken the original system sale and installation, simply in the interests of maintaining long term customer satisfaction.

However, precious few seem to have got their act together yet. Derek Whittington at Sound Advice in Loughborough does regular home installation servicing, quoting a £25 per hour fee which has to include travelling time, a complex but passive system needing at least an hour and a half's work. And having criticised some of the industry repercussions of Linn Products' much discussed 'dealer contract' a few months back, I now understand that this particular aspect of after-sales service is high on Linn's agenda for improving dealer professionalism, a point with which I agree wholeheartedly.

It's depressingly ironic that Dixons Stores Group makes much of its profits from selling service contracts on brown and white goods that are now so reliable and uncritical that they need very little in the way of service. Meanwhile, ultra-sensitive hi-fi systems that respond so well to regular tender loving care are often ignored and allowed to atrophy slowly but surely from the moment the initial installation is finished.

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