

# HI-FI CHOICE

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

APRIL 1991 £2.95

## Cassette Decks

WE'VE GOT IT TAPED - FULL  
REVIEWS ON 20 CASSETTE DECKS

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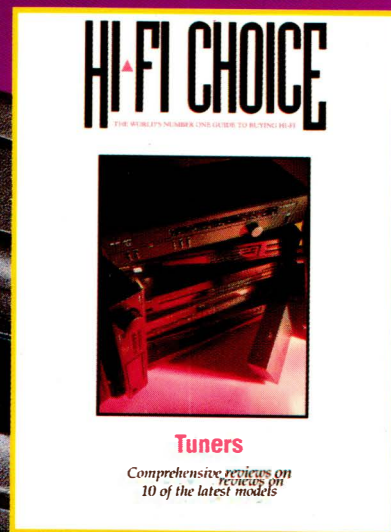
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GREAT TAPE DEBATE -  
CAN A C90 BE WORTH £13?



ISSN 0955-1115



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EDITOR  
Andy Benham

CONSULTANT EDITOR  
Paul Messenger

ART EDITOR  
Andrew Ryan

REVIEWS EDITOR  
Jason Kennedy

PRODUCTION EDITOR  
Janet Moorhouse

NEWS EDITOR  
Dan Houston

CHIEF SUB  
Nuala Harvey

CONTRIBUTORS  
Barry Fox, Alvin Gold, Paul Miller, John Seabury, Stan Vincent

PHOTOGRAPHY  
Chris Richardson

ADVERTISEMENT MANAGER  
Rob Debenham

ASSISTANT ADVERTISEMENT MANAGER  
Miriam Young

CLASSIFIED SALES EXECUTIVE  
Jane Woolner

PRODUCTION MANAGER  
Judith Middleton

ADVERTISEMENT PRODUCTION MANAGER  
Lisa Nickson

SUBSCRIPTION MANAGER  
June Smith

NEWSTRADE CIRCULATION MANAGER  
Sean Farmer

PUBLISHING DIRECTOR  
Marianne McNicholas

ADVERTISEMENT DIRECTOR  
Alistair Ramsay

MANAGING DIRECTOR  
Colin Crawford

CHAIRMAN  
Felix Dennis

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# Menu

It's been quite a while since *Hi-Fi Choice* had a look at tuners so, hopefully, the supplement you'll find enclosed with this issue will help to answer any questions you may have been saving up on the topic.

One question that did arise during the course of the reviews was the provision, or otherwise, of longwave. Most of us are probably quite content to stick to FM. However, the Gulf crisis, which kicked off just as we were starting our listening tests, threw up an obvious problem with having an FM-only tuner, namely the fact that Radio 4 still broadcasts certain programmes only on the longwave.

The reason for this, as Radio 4 explained, is that the good old BBC has not yet managed to get FM coverage to the furthest flung corners of the UK; Scotland and Wales being particularly badly served in this respect.

When the powers that be decided to create a 24 hour a day new station devoted almost exclusively to the Gulf, they decided that it was best to put the news service on Radio 4 FM, while normal programmes were put out on the longwave. Thus the normal programmes would theoretically be available to everyone rather than just those privileged enough to live in areas covered by FM transmitters.

The outcome of all the above, at least until this September, when the BBC expects to have FM coverage throughout the country, is that *Archers'* fans should think long and hard before investing in a tuner which can't tune into the longwave.

Moving away from the radio and onto the other main subject of this issue, cassette decks, it was interesting to learn, just as we were going to press, that Arcam has finally taken the plunge and decided to become the first British company to manufacture a domestic tape deck since the mid Seventies. Even more interesting news was that the proposed deck, the £800 *HP-17* will also feature Sony's new single chip implementation of the Dolby S noise reduction system.

Dolby S has been imminent for so long now that a lot of people have almost given up hope of ever seeing a domestic cassette deck featuring the elusive chip. Arcam promises that the new deck will be in the shops by the end of this year, so although you won't be able to buy it tomorrow, Dolby S might finally have arrived.

*Andy Benham*



Photography by  
Chris Richardson



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*All this could be yours for a mere £4000. Revox H-Line, the ultimate communicator?*





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*Yours for a mere £37. Are 'megametals' worth the extra money?*

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At the last count we had 1009 entries (go on then - count 'em) and it even includes the results from this issue and the tuner supplement.

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PM never could keep a secret so you can read all about Naim's new speaker. He seems a little excited.



# Update



## PRODUCTS

### CD on a platter

Pioneer's new range of CD turntables is expected to reach these shores by Springtime. Already causing a stir in Japan, (where in December's *Stereo* magazine the PD-107 beat more expensive competition hands down in a comparative test), the 'turntables' offer a new approach to CD playback.

In these players, the CD is placed label-side down on a rubber mat in the central drawer mechanism. The CD is then clamped, and the laser reads it from above while the direct drive 'turntable platter' spins.

Apart from the obvious advantages of making your discs less prone to scratching, and of protecting the laser lens from falling dust, Pioneer says the system offers better soundstaging, clarity, focus and bass response.

The idea behind the platter is partly due to Pioneer's (and particularly MD, Kimihiko Sugano's) research into light emission through the reflective layer of a CD. It was Sugano, who five years ago proposed painting the label sides of discs - or colouring their edges with a felt pen to prevent refracted light bouncing around inside the drawer mechanism.

By positioning the drawer in the centre, Pioneer has been able to separate the stereo channels and these players offer twin-mono



*Expected: Pioneer's CD turntable turns CD upside down*

construction through the digital-to-analogue domains. Internally, everything is copper shielded.

Copper, it was decided after comparison, provides better sound quality. It also looks great if you're the sort of audiophile who likes to take the lid off equipment and inspect the innards.

For the British models, Pioneer is apparently developing a new DAC to replace the present Philips-sourced PDM digital to analogue system, but otherwise the players remain the same.

The price of such innovation? From around £200 says Pioneer GB, rising to just over £1,100 for the PD-107 equivalent.

Pioneer says its flagship PD93 CD player will continue to be sold, but also states unequivocally that the new generation players sound much better than 'conventional technology'.

On another note, Pioneer has launched a pre and

power amplifier combination following a similar design ethos to the highly acclaimed A400. The C73 (control) preamp and M73 (main) stereo power amp are priced at £450 and £550 respectively. Both amps are reported to offer short signal paths, clean grounding and super linear circuitry.

The preamp offers no less than ten audio inputs - including switchable MM and MC phono, while the power amp also has two direct line inputs to give enhanced sound quality.

### 6060 sound

Creek has launched the £450 CAS 6060 integrated amplifier. Replacing the CAS 5050, the 6060 has a higher output and some new features.

Rated at 65W into 8ohms, the 6060 has a larger toroidal transformer and greater heat sink area than its predecessor to cope with the extra power it's capable of delivering into

lower impedances. Elsewhere, attention has been paid to passive and active components.

Unusually, air spaced chokes have been fitted on the speaker outputs terminals to improve immunity from RF and comply with the forthcoming EEC regulations on electro-magnetic compatibility.

### Back in black

Audiolab, not content to rest on its laurels, has been upgrading and repainting (black) its amplifiers. The 8000A integrated and 8000C preamp now have an extra input labelled video which will cater for any line source, and a third tape output. Features which must make them the most comprehensively equipped British amps around.

The 8000P power amp has a new CAD based circuit board, a line output for bi-amping and extra cable terminals to allow bi-wiring. Prices are now £399 for the 60W 8000A, and £365/£525 for the 8000C/P combo.

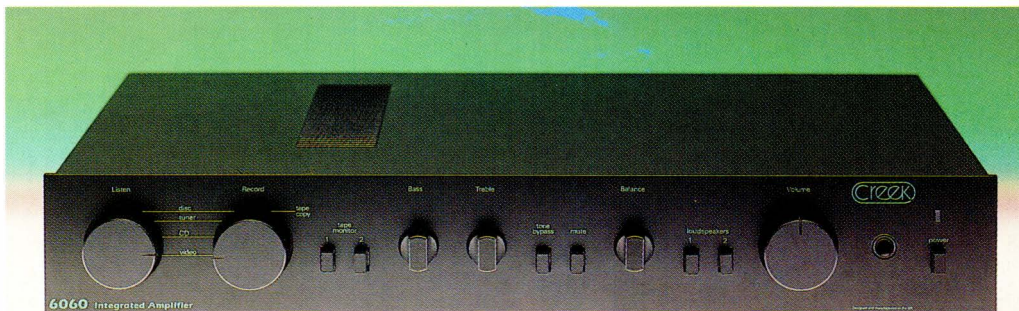
### DIY NICAM

Maplin, the nationwide electronics store chain, has just introduced a NICAM decoding kit for £139.

Even though prices of NICAM (stereo) televisions and video recorders are falling fast, a standalone decoder is one of the cheapest ways of upgrading your hi-fi to be able to handle your television's sound.

If you're not afraid of a bit of electrical DIY, then the kit is the cheapest way of converting to NICAM we have come across. The LP19V is a standalone tuning unit which includes the decoder and TV tuner in an aluminium case with instructions for assembly.

The system uses the Toshiba set of three ICs or 'chips' to produce a line level stereo signal which is suitable for most amplifiers.



*The Creek CAS 6060, built to comply with electro-magnetic compatibility regulations.*



## Budget JBL

JBL has announced the next step in its 'quest for universal appeal' with a new range of loudspeakers called XE. Built in the company's Danish plant, the six model range uses soft dome tweeters coupled with a single mid/bass driver in the £110 XE1, through to the three-way plus passive bass radiator complement of the XE5 and 6, the latter retailing for £450.

The range is designed to throw off the 'California sound' image that the company feels it's burdened with in the UK, and try to establish an impression of greater neutrality.

## The name game

An agreement with Roksan has enabled Moth Group to offer the Tabriz tonearm as a Moth own-label product. The as yet unnamed arm will retail at £149 and will be available from all current Moth stockists.

To christen the product, Moth Group is offering a free arm to the person who comes up with the best name. Entries to: Moth Group, 10 Dane Lane, Wilstead, Bedford MK45 3HT. TEL: (0234) 741152



Not for Californians: JBL's XE speakers aim at neutrality.



Audiolab's new black finish pre and power combination.

## Walktape arriveth

Sony has introduced a pair of blank cassette tapes specifically for the outdoor life. Personal stereo users can now boogie to the beat with Walkman ferric (C90 initial offer £1.25, eventual price £1.49) and chrome tapes (C90 - £1.55/ £1.79), which have short leaders, cases with rounded edges and ultrasonically welded shells.

Drivers, on the other hand, now have the option of cruising to sounds recorded on UX turbo chrome tape (C90 - £1.75/ £2.29). This features such automobile oriented mod cons as a heat resistant shell and case, non-slip side identification ridges and heat resistant high visibility labels.

## Digging digital

Bastion of long-playing record lovers and rich vinyl junkies, the Swiss aspirational

turntable company Goldmund has released a digital product. The *Mimesis*

This is what they've done about it, and it's a very good, sophisticated tool."



Easy on your pocket: Walktapes are for personal use.

10, £4,000 worth of outboard digital-to-analogue convertor, will hook onto an existing head unit such as a CD player or DAT machine.

The '10 is modular in construction, allowing for future developments to be incorporated easily and ensuring a degree of longevity. A switching module built into the unit allows up to six digital inputs (plus a couple of tape loops) and can run up to eight rooms from its outputs. The feature is enhanced by the *Mimesis 10* having an optional volume and balance control so converting it to a fully remote control digital preamplifier.

Ricardo Frannassovici, whose company Absolute Sounds is importing the *Mimesis 10*, told *Choice*: "Basically, they're recognising that vinyl is dead and they can't just sit there and look at the world in ecstasy.

## German engineering

New from Germany comes a range of loudspeakers and valve amplifiers from Kammerzelt Audio Labs. KAL apparently already has a few dealers in the south of England who are stocking its mid to high-end range.

Four speaker models include the £450 *Mini Reference*, £650 *Compact Reference*, £950 transmission line *Tower Reference* and £1,500 *Trans Double*.

Sensitivity of the loudspeakers is high, the *Mini* and *Tower Reference* models promising 88dB and 91dB respectively, while amplifier matching allows a wide range of possibilities. Other features include gold-plate bi-wire connection terminals and the use of one-inch (or less) Supranyl, rather than metal dome tweeters.



The amplifier range consists of two preamps innovatively dubbed *Preamp One* and *Preamp Two*, which retail for £930 and £1,500 respectively. A valve power amplifier to match is called *Amp One* and will set you back £1,600.

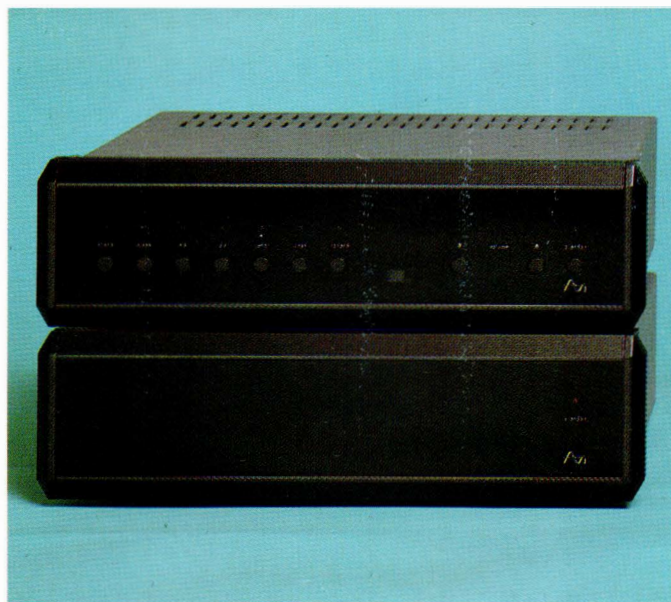
The KAL range is hand-built and guaranteed for five years. Further details from KAL, Schwetzingen Strasse 64, D-6832 Hockenheim, Germany. TEL: 010 49 6205 5964.

## Bitstreamlined players

Harman Kardon has launched a range of three CD players promising as smooth performance internally as their exterior suggests. *HD7450*, *HD7500II* and *HD7600II* are priced at £300, £350 and £430, respectively. Fully remote controlled, the new players use a PWM bitstream digital-to-analogue convertor. Display defeat facilities for those who don't like to watch what they are listening to is also included.

The two more expensive players feature new circuitry designed to minimise HF noise within the player. Damping around the DAC and better mechanical isolation in the drawer mechanism further improve performance according to HK.

The *7600II* also features a remotely motorised volume control on the front panel and



Keeping it simple, at least externally: AVI's amplifiers

features both optical and digital outputs.

## AV International pre/power combo

AV International has brought out a relatively affordable pre/power combination called the *Series 2000 Midi*. It comprises the *S2000MP* remote control preamp and *S2000MA* 60watt power amp. They cost £499 apiece.

The preamp which has a motorised ALPS volume pot, sealed reed relays and discrete signal circuitry, isn't supplied with a remote control as such - you'll need to buy an intelligent remote and have it programmed by the dealer.

It features an MC phono and five line level inputs. The power amp also uses all discrete circuitry, is unconditionally stable and fully protected.

## Crucial power

Studio Power is delivering two more models in its range of loudspeakers to the shops this month. The *CD300* and *CD500* models are taller and slightly more elegant than the rest of the SP lineup. Both models are described as four-way designs, and both are floorstanding.

The taller £299 *CD500* measures a metre high (by 32cm wide), while the £229 *CD300* measures 87cm high and is similarly proportioned. The smaller of the pair, the *CD300* uses a couple of eight-inch bass drive units, a three-inch midrange unit and one-inch tweeter while the 300W *CD500* uses a brace of ten-inch woofers, aided and abetted by a five-inch mid unit and the ubiquitous one-inch tweeter.

Both models are twin-reflex ported designs.

In a bid to appeal to the more discerning audiophile, Studio Power has toned down the striking silver-coloured go-faster tweeter directional fins; they are painted black on the new models.

## Taking the strain

Musical Fidelity's new stereo power amplifier arrives promising a pedigree of design similar to the highly regarded *A370.2*. The £799 *P180* uses five pairs of MOSFETS per channel to give 100watt performance which can instantly cope with current peaks of up to 50 amps. On paper at least, it looks as if it should take the strain out of any system.

The *P180* is also 'bridgeable' to mono use by means of a simple switch - a move which doubles the peak performance. This useful feature means you can buy and use the amplifier in stereo mode while saving up for the awesome dynamics of a stereo pair.

Further design salients of the *P180* include its external power supply, which, according to the makers, effectively minimises electro-magnetic field interference.

Musical Fidelity is also offering an alternative and, in its opinion, superior 'choke regulated' power supply for £499 extra. The price tag is enough to make the non-audiophile choke when he realises that for ultimate performance he should use two of these 'extras'. But choke has a different meaning for MF: "This," says MF boss Antony Michaelson, "gives a very clean power supply to the amplifier and gets rid of the nasty peaks and troughs which are usually evident in power supply 'noise'. It gives you a more secure sound stage and better tone quality, and you get better music quality, which is what we're all about."

## Michell's Head

Turntable specialist, Michell Engineering, has branched out into electronics with a £380 phono stage called *Iso*. It's been designed by Tom Evans, the man behind the *Finestra* preamp, and provides the necessary gain and equalisation to bring the output of primarily moving coil cartridges up to line level. Moving magnets can be catered for on special order and, for a small fee, loading can be adjusted to suit specific cartridges. For more details watch out for a review to be published in a forthcoming issue.

## Acoustic Alchemy

Dramatically angled, brass plated front panels are not something you see everyday in the heady world of hi-fi,



Beautiful bevelling makes HK's CD players easy to dust!



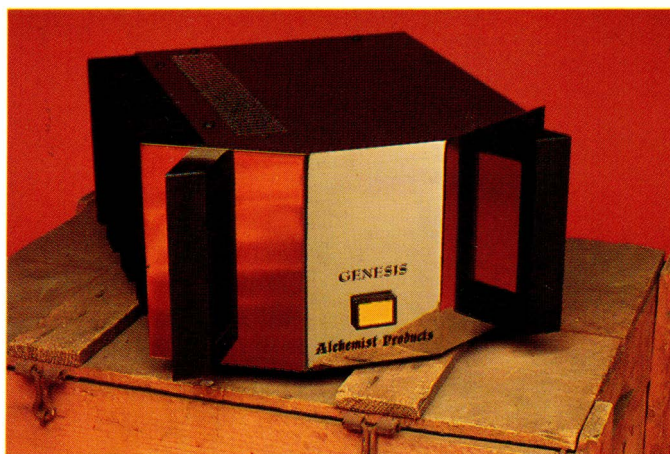
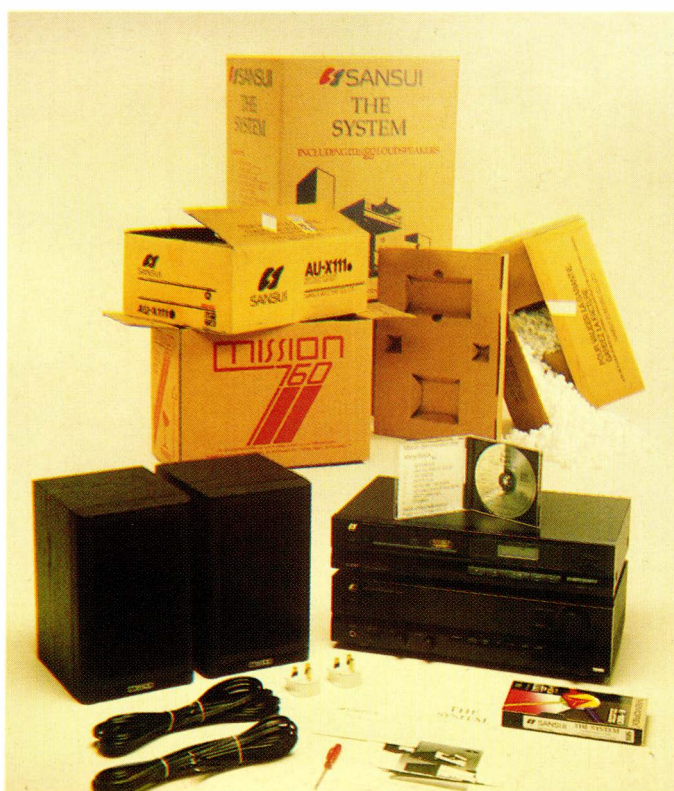
and this is possibly why Alchemy Products decided to use them on its first model: the *APD1 Genesis* monoblok power amp. This half width bi-polar amp offers 85watts per channel, features two sets of binding posts, wired for high/mid and low frequencies, and uses just one capacitor in the signal path. A pair of these beastettes retails for £1,495. A matching line preamp, phono stage and stereo power amp are on the way. As is a full review of the *Genesis* which will be in next month's *Choice*. For more information, call Julian Ashley on (071) 476 5288.

### Not only, but also

Sansui Mission has put together a complete system package, and complete is the operative word. For £380 you get a Sansui *X111* series amplifier and CD player, a pair of Mission *760* loudspeakers, 10 metres of 'high quality' speaker cable, two mains plugs and a screw-driver! You even get a Mary Black CD to play and a video to show you how to set the whole lot up. The latter including such information as good and bad places to put the speakers and the maximum volume setting.

Designed as an entry level

**Boxing clever:** Sansui Mission's starter kit includes free CD



**A golden sound producer?** Alchemist's *Genesis* valve power amp sits atop some highly original packaging.

package for the first time buyer, *The System*, as it's called, represents more than a £20 saving over buying the components separately.

### Decoupled box

Due for launch at the Bristol Hi-Fi Show, Naim's new loudspeaker is a serious high-end contender. Priced 'around £6K' at the time of going to press, the Naim *DBL* is a three-way system with all units decoupled from each other.

The 1.25 metre high *DBL* (which Naim staff jokingly refer to as the *Damn Big Loudspeaker*) uses a 19mm tweeter decoupled in a similar way to the company's smaller *IBL* unit. The five-inch midrange unit is attached to the baffle, while the 15-inch bass driver is

decoupled from the cabinet in a similar fashion to the *SBL*.

Naim promises some capable measurements with its new speaker. The frequency range is cited from 17Hz to 20kHz though Julian Vereker, the firm's MD, assured it would 'go down lower', well into the inaudible ranges. Sensitivity is a high 92 to 93dB - very little amplifier power is needed to drive it. (See also *Personal Messages*, page 136).

### Smaller Spendor

Speaker specialist Spendor has launched a compact monitor loudspeaker to complement the company's flagship model, the *S100*.

The new *S20* is described as a quality small speaker and is derived from technology used in the Spendor *S100* and *SP2/2*. Its bass/midrange drive unit, for instance, is a tweaked version of that developed for the larger *S100*. Promising top performance from a little box, the *S20* retails at £500.

### Competition winners

In the December issue, we ran a Voyd/Audio Innovations competition. And the five lucky winners are as follows. First prize, a Voyd *Valdi* turntable with Moth tonearm goes to M. Cadogan of Reading; the second prize, an Audio Innovations *Series 500* integrated amp has been won by C. L. Dunn of Maldon. Runner-up prizes of one metre pairs of Audio Note *ANA* interconnect go to Mark Wilson of Chester-le-street, D. Lettin of Doncaster and M. J. Flood of West Drayton.

### In Brief

**A**rcam has announced that it is due to launch a British-made cassette deck. The £800 *HP-J7*, the first British cassette deck since Neal's model in the Seventies, will be one of the first commercially available cassette decks to use Sony's single chip implementation of the Dolby S noise reduction system. The new cassette deck should be available in time for the autumn season.

**L**inn products has reduced the price of its *Intek* amplifier from £548 to £398. The introduction of new robotics at Linn's factory has led to improved production of the *Intek*, allowing the price to be reduced, according to the firm. However Linn dealers will be pleased to have a product to sell to first system buyers as a cheaper hi-fi entry product.

**A**lready becoming established, video karaoke looks set to further boost the singalong-and-don't-care medium in the UK. The Singing Machine Company, of Hayes, Middlesex, has introduced a £325 video karaoke mixer (with microphone) to convert your hi-fi, TV and video recorder into a party ice-breaker. You have been warned.

**A**s part of its sponsorship of the Aldeburgh Foundation - which runs the Aldeburgh Festival every summer in Suffolk, Ipswich-based loudspeaker manufacturer Celestion has equipped the Festival's Snape Maltings concert hall with a sound reinforcement system.



WHAT HI-FI? DOUBLE AWARD WINNER.  
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## PIONEER A-400

A-300 — "NO OTHER BUDGET AMP IN MY EXPERIENCE  
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FROM THIS AMP"

Audiophile October 1990

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

What Hi-Fi? November 1990





REFERENCE  
POINT



*Integrated Stereo Amplifier*  
SUPER LINEAR CIRCUIT

VOLUME CONTROL

OFF SOURCE  
TAPE 1  
TAPE 2  
SELECTOR

CD PHONO  
TAPES 1  
TAPES 2  
INPUT SELECTOR

PHONO  
SELECTOR  
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A-400  
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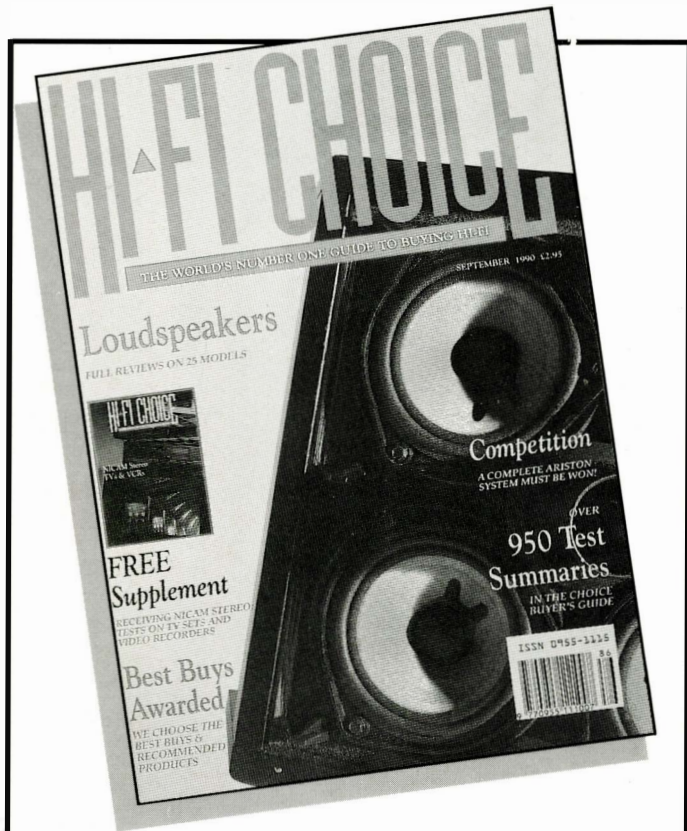
## LOUDSPEAKERS ON TEST

We review the latest models from Arcam, B&W, Jamo, JRT, Mission and many more. PLUS... A report on Hi-Fi '91, the *Hi-Fi Choice* sponsored Bristol show. AND... a FREE supplement on digital personal stereos.

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

# HI-FI CHOICE

MAY ISSUE ON SALE  
APRIL 12th



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<b>BEDFORDSHIRE</b>		
Hypertec 66/68 St Loyes Street Bedford	0234 325066	
<b>BERKSHIRE</b>		
B & B Hi-Fi 18 Kings Street Maidenhead	0628 73420	
Frasers Hi-Fi & Video 4 Park Street Slough	0753 20244	
Frasers Hi-Fi & Video 9 Peach Street Wokingham	0734 794998	
B & B Hi-Fi 11/12 Market Place Reading	0734 583730	
B & B Hi-Fi 62 North Brook Street Newbury	0635 32474	
B & B Hi-Fi The Pavilion Princess Square Bracknell	0344 424556	
<b>BUCKINGHAMSHIRE</b>		
B & B Hi-Fi 4 Priory Road High Wycombe	0494 35910	
<b>CAMBRIDGESHIRE</b>		
University Audio 1/2 Peas Hill Cambridge	0223 354237	
Cambridge Hi-Fi 1 Hawthorn Way Cambridge	0223 67773	
Hi-Fi People 42 Cowgate Peterborough	0733 41755	
Hi-Fi Choice 4 The Broadway St Ives	0480 66676	
<b>CHESHIRE</b>		
Car & Home Stereo 42 Sunderland Street Macclesfield	0625 32707	
Cobalt Hi-Fi Centre 106 Bridge Street Warrington	0925 36215	
Tomorrow Studios 30 Northgate Street Chester	0244 320414	
<b>CORNWALL</b>		
Truro Hi-Fi 25 King Street Truro	0872 79809	
<b>CUMBRIA</b>		
Kenneth Gardner 70 Dalton Road Barrow in Furness	0229 820308	
<b>DERBYSHIRE</b>		
Active Audio 12 & 16 Osmaston Road The Spot Derby	0332 380385	
Stuart Westmoreland Limited 2C Albert Street Derby	0322 372494	
<b>DEVON</b>		
Bernard Smith 107 High Street Barnstaple	0271 43503	
Upton Electronics 3 Torquay Road Paignton	0803 551329	
Radford Hi-Fi 107 Cornwall Street Plymouth	0752 226011	
Radford Hi-Fi 28 Cowick Street St Thomas Exeter	0392 218895	
<b>ESSEX</b>		
Peter Foulkes 122 High Street Colchester	0206 767428	
Chew & Osborne 148 High Street Epping	0378 74242	
Waters & Stanton 18/20 Main Road Hockley	0702 206835/204965	
Waters & Stanton 12 North Street Hornchurch	04024 44765	
Chew & Osborne 26 King Street Saffron Walden	0799 23728	
KA Cheeseman Sir Isaacs Walk Colchester	0206 46808	
Peter Foulkes 104 High Street Maldon	0621 853148	
Woolfmans		
Upper Mall Eastgate Shopping Centre Basildon	0268 285922	
ACL Radio Services 1 North Mall Grays	0375 374666	
Peter Foulkes 20 Exchange Way Chelmsford	0245 491479	
<b>GLOUCESTERSHIRE</b>		
Hutchinsons 295A High Street Cheltenham	0242 573012	
<b>HAMPSHIRE</b>		
Bryants Hi-Fi 81 High Street Aldershot	0252 20728	

Sinclair Youngs 9/11 Church Street Basingstoke	0256 28623	
Now That's Hi-Fi 24 Arundel Way Portsmouth	0705 811230	
Southampton Hi-Fi Centre		
37 Bedford Place Southampton	0703 228434	
R Uphields		
6 Locks Heath Centre Locks Heath Southampton	0489 885122	
Now That's Hi-Fi 174 Fratton Road Portsmouth	0705 811230	
Cristavision		
7 Thackery Mall Fareham Shopping Centre Fareham		
<b>HERTFORDSHIRE</b>		
Hypertec 6 Bancroft Hitchin	0462 452248	
Hypertec 4 Park Place Stevenage	0438 318218	
Chew & Osborne 70 South Street Bishop's Stortford	0279 56401	
Herts Hi-Fi 93A/93B High Street Hoddesdon	0992 441172	
<b>HUMBERSIDE</b>		
Superfi 4 Oock Street Hull	0482 24051	
<b>ISLE OF WIGHT</b>		
Russells 40 Upper St James Street Newport	0983 523864	
<b>JERSEY</b>		
Fotosound (Jersey) Limited 5 Charing Cross St Helier	0534 59990	
<b>KENT</b>		
Kimberley Hi-Fi 193 Broadway Bexleyheath	081 304 3272	
Panatec Sound & Vision 83B High Street Gillingham	0634 573141	
KAC Electronics Limited		
53/57 Camden Road Tunbridge Wells	0892 23242	
VJ Hi-Fi 29 Guildhall Street Folkestone	0303 56860	
VJ Hi-Fi 119 High Street Margate	0303 56860	
<b>LANCASHIRE</b>		
Clearstone 235 Blackburn Road Bolton	0204 31423	
Wigan Hi-Fi Centre 13 Centre Arcade Wigan	0942 37977	
Romers Hi-Fi Limited		
94/96 High Street Rishton Blackburn	0254 885382	
Kenneth Gardner 30/32 New Street Lancaster	0524 64328	
<b>LEICESTERSHIRE</b>		
Mays Hi-Fi 27 Church Gate Leicester	0533 625625	
Stuart Westmoreland Limited 2 High Street Oakham	0572 755600	
Stuart Westmoreland Limited		
9/10 Cheapside Melton Mowbray	0664 411511	
Stuart Westmoreland Limited		
58 Castle Street Hinckley	0455 637605	
Hi-Fi Choice 10 St Mary's Road Market Harborough	0858 433601	
Hi-Fi Choice 5 Town Square Melton Road Syston	0533 696996	
Parker High Fidelity 49 Baxter Gate Loughborough	0509 269888	
<b>LINCOLNSHIRE</b>		
Superfi 271A High Street Lincoln	0522 520265	
Stuart Westmoreland Limited 49 High Street Grantham	0476 78108	
<b>LONDON</b>		
Covent Garden Records 84 Charing Cross Road	071 379 7427	
Kamla Electronics 251 Tottenham Court Road	071 636 4611	
Hi Way Hi-Fi 315 Edgware Road	071 723 5251	
Hi Spek Electronics		
344/346 Regents Park Road Finchley Central	081 349 1166	
Light & Sound 166 High Street North East Ham	081 472 1373	
Babber Electronics 158 Uxbridge Road West Ealing	081 579 6315	
Spatial Audio 29 Tottenham Court Road	071 637 8702	
Myers Audio 6 Central Parade Hoe Street	081 520 7277	
Stereo Regent Street 245 Regent Street	071 491 7922	
Brians Hi-Fi 19 Tottenham Court Road	071 631 1109	
The Studio 133 Tottenham Lane NB	081 340 7775	
<b>MERSEYSIDE</b>		
Beaver Hi-Fi 20-22 Whitechapel Liverpool	051 709 9898	
Tisdalls 76 Tulketh Street Southport	0704 531500	
<b>MIDDLESEX</b>		
Heathrow Hi-Fi Limited 90 Staines Road Hounslow	081 572 1135	
<b>NORFOLK</b>		
Martins Hi-Fi 85/87 Ber Street Norwich	0603 627010	
Adcock & Sons Limited 30/34 High Street Watton	0953 881248	
Martins Hi-Fi 5 High Street King's Lynn	0553 761683	
<b>NORTHAMPTONSHIRE</b>		
HG Rapkin 11 Kettering Road Northampton	0604 37515	
<b>NOTTINGHAMSHIRE</b>		

600/602 Mansfield Road Nottingham	0602 622150	
Superfi 15 Market Street Nottingham	0602 412137	
Parker High Fidelity 70 Long Row Nottingham		
<b>OXFORDSHIRE</b>		
Witney Audio Centre 28 High Street Witney	0993 702414	
<b>SOMERSET</b>		
Telefringe 2/3 King Street Frome	0373 62598	
Paul Roberts 32 North Street Taunton	0823 270000	
Yeovil Audio Limited 1 Glovers Walk Yeovil	0935 25430	
<b>STAFFORDSHIRE</b>		
Active Audio 29 Market Street Tamworth	0827 53355	
Active Audio 95 Stafford Street Hanley	0782 214994	
<b>STOKE ON TRENT</b>		
Parkiss Hi-Fi 51/53 Piccadilly Hanley	0782 265010	
<b>SUFFOLK</b>		
Peter Watts 1B St John's Street Bury St Edmunds	0284 703045	
System Sound 91 North Street Sudbury	0787 72348	
<b>SURREY</b>		
Cosmic 244/256 Station Road Addlestone 0932 854522/851753		
Tru-Fi 10 Church Street Leatherhead	0372 378780	
Tru-Fi 2 Central Parade Redhill	0737 766128	
<b>SUSSEX EAST</b>		
Smythe & Barrie 31 Langney Road Eastbourne	0323 29192	
Sunderland Electronics		
52 Norfolk Square Western Road Brighton	0273 774113	
<b>SUSSEX WEST</b>		
Sussex Audio 163/165 Church Road Burgess Hill	0444 242 336	
Sunderland Electronics		
43 Broadwater Street West Worthing	0903 201187	
Cristavision 60 East Street Chichester	0243 775444	
<b>TYNE AND WEAR</b>		
Bill Hutchinson Limited		
87A Clayton Street Newcastle Upon Tyne	091 230 3600	
<b>WARWICKSHIRE</b>		
Carvells of Rugby Limited 3/7 Bank Street Rugby	0788 541341	
<b>WEST MIDLANDS</b>		
Bridge Hi-Fi Tudor House Bridge Street Walsall	0922 640456	
Naam Hi-Fi Vision 122/123 New Street Birmingham	021 633 4944	
Superfi 67 Smallbrook Queensway Birmingham	021 631 2675	
Coventry Hi-Fi Church Lane Walsgrave Road Coventry	0203 440529	
Naam Hi-Fi Vision Lower Precinct Coventry	0203 632086	
<b>WILTSHIRE</b>		
In-Phase Audio		
21/23 Faringdon Road Swindon	0793 520948/526393	
PR Sounds 58 Castle Street Trowbridge	0225 777795	
<b>WORCESTERSHIRE</b>		
David Waring Cameras & Hi-Fi		
Marmion House High Street Worcester	0905 27551	
<b>YORKSHIRE SOUTH</b>		
Superfi 1 Rockingham Gate Sheffield	0242 723768	
<b>YORKSHIRE WEST</b>		
Amrik Electronics Co Limited 57 Otley Road Leeds	0532 752285	
Superfi 7 King Edward Street Leeds	0532 449075	
Amrik Electronics Co Limited		
57/59 North Parade Bradford	0274 722530	
<b>S C O T L A N D</b>		
<b>GRAMPIAN</b>		
Autosonic 168 Holburn Street Aberdeen	0224 573777	
<b>MID LOTHIAN</b>		
Bill Hutchinson Limited		
43 South Clerk Street Edinburgh	031 667 2877	
<b>STRATHCLYDE</b>		
Bill Hutchinson Limited 43 Hope Street Glasgow	041 248 2857	
<b>W A L E S</b>		
<b>CLWYD</b>		
Owens Colwyn Centre Colwyn Bay	0492 530982	
Lloyds TV, Video & Hi-Fi 30 Lord Street Wrexham	0978 364168	
<b>GLAMORGAN</b>		
Tele Electrical Services		
9 The Brackla Street Centre Bridgend	0656 654156	
<b>GWENT</b>		
Hi-Fi Western Limited 52 Cambrian Road Newport	0633 262790	
<b>GWYNNEDD</b>		
Owens The Mall Wellfield Shopping Centre Bangor	0248 362951	







*Galactic traveller Douglas Adams talks to Dan Houston about hi-fi, music, the universe and everything. Photographs by Chris Richardson.*

## The hitchhiker's guide to hi-fi

**M**ost people would associate the novelist Douglas Adams with sci-fi rather than hi-fi. His novels *The Hitchhiker's Guide to the Galaxy*, and *The Restaurant at the End of the Universe* set the tone for a whole genre of comic science fiction, poking fun at man's attempts to conquer space. But as a self-confessed 'gadget freak', he owns a sound system of which many a committed audiophile would be proud - with names like Goldmund, Microseiki, Audio Research and Magneplanar in the lineup.

A quick glance in his record collection

and Mozart being favourites, and a larger collection of rock music spans the likes of Elvis Costello, Joe Cocker and Bob Dylan. He also makes music, with an attic studio full of Yamaha keyboards and effects equipment, which he can then digitally edit using a powerful computer system. Left-handed guitars are scattered about. He uses a couple of resin-backed Ovation, a Fender *Stratocaster*, and a Martin *D28*.

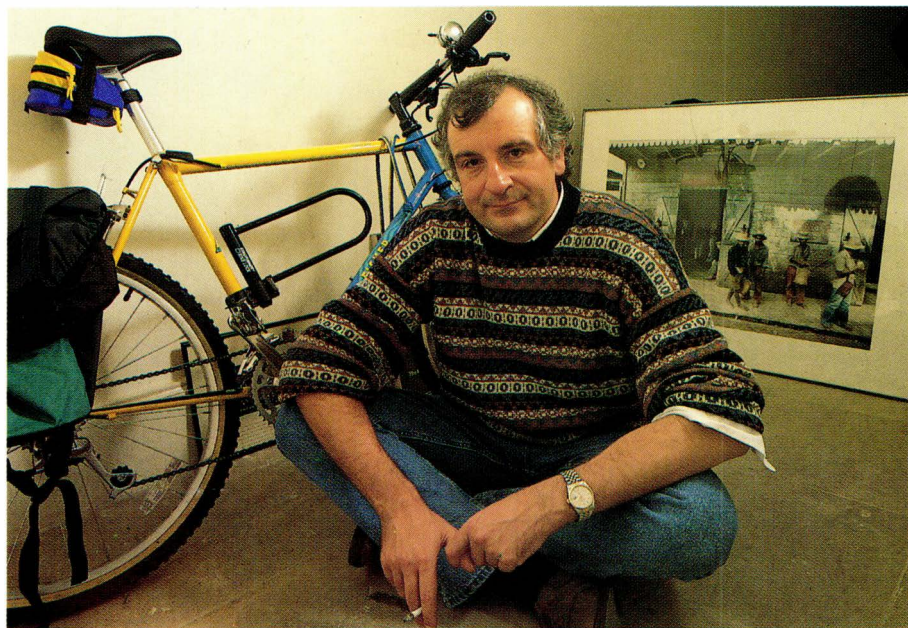
### Home sweet home

Douglas Adams' home in Islington, North London is a tall spacious terrace house built in 1834. Inside, the staircases have

been stripped to the bare stone flags while plain white walls and high ceilings bring in an expansive sense of light. The two largest rooms downstairs have been knocked through to accommodate just a dining table and grand piano. One wall is lined with books, while a cluttered side table looks curiously out of place in the monastic surroundings. It's the same on the first floor: a box of Maltesers and some photographs in the 'me-with-so-and-so' ilk, standing like islands of junk in the minimal sea. The huge pastel sofas, long enough for the reclining six-foot-four-odd Adams frame are equally plain.



*I sometimes wonder if it is all worthwhile. I find myself not listening to the music so much as the sound of the system.*



*Seasoned traveller Adams feels like he's camping out even when he's at home.*

agination. Greeting me with a bone-crushing handshake, he dashes the theory: "I moved in with a girlfriend when I bought the place three years ago and we were going to get married and have kids, but then we split up. I just haven't got round to moving in properly yet, and it's so bloody big that it feels like I'm camping out in it. We've virtually rebuilt the house from the inside. When I bought it you could see daylight through the roof from the ground floor."

**The system**

The two rooms on the first floor, joined together by an archway, are where the hi-fi is housed. All that is on show is a pair of Magneplanar *Timpany IV* ribbon loudspeakers. These have been modified, with the cloth covers removed and painted gloss black, so that they bear no resemblance to the original and are more like 'Japanese screens', as our host refers to them. The speaker cable has all been lain under the floorboards so there are noughty coils lying about. The system was origi-

nally bought from Subjective Audio, North London's specialist high-end dealer, which has since gone out of business. It was set-up here by the Robert Taussig company which specialises in much the same equipment and type of installation. Mark Vanderpump, from RT, customised the speakers and ran the cabling.

Most of the equipment sits in purpose-built shelving in its own walk-through 'cupboard' where the doorway to the front of the two rooms used to be. It can be approached from either that side or from the landing. The hi-fi equipment is end of the universe stuff, or certainly end of the upgrading-path stuff. Cognoscenti will recognise it as being almost a pure Absolute Sounds system. One half of the cupboard houses a Goldmund turntable, Audio Research preamplifier, Revox cassette deck, Meridian tuner and Microseiki CD player. A pair of Audio Research valve monoblocks are hidden away in a small cubby hole directly above the system, accessible from the second floor from where the loudspeaker cable is taken back down to the colloquially-known 'Maggies'. A bonus here is that the Sony



*Spot the speaker: the Maggies look more like Japanese screens.*

The layout suggests that Douglas has designed it so, with a few points of focus in otherwise spartan rooms where a writer can relax with few diversions to the im-





*The end of the universe system stays at home. Adams travels with a Sony Discman.*

Trinitron television, Pioneer laserdisc player and video recorder are all wired through the amplifiers and speakers. These A/V components sit in front of the fireplace between the Magneplanars which would give stunning sound to any film. The laserdisc player is preferred, he told me, because it is an NTSC format machine, and there are many more film titles available.

The other half of the system cupboard contains drawers full of Douglas' burgeoning CD collection. The vinyl record collection stands in a tall purpose-made case beside his listening sofa.

### Life beyond our planet

With such a superb record deck as the Goldmund *Studio I* was surprised to hear Douglas say that he preferred using CDs now. "I probably play CDs 90 per cent of the time, though I have to admit that when listening to both CD and vinyl I prefer the sound quality of the record. But CDs are simply easier to use, so out of laziness I use them. And I must admit, they do sound pretty good, and my CD collection is now larger than my record collection.

"Whenever I speak to Ricardo (the boss of Absolute Sounds) he tells me to seriously upgrade my CD player and wants to take £10,000 off me, but the problem is I have had little use out of the system over the three years that I have had it. I can't quite justify that kind of money when I'm not using it that much. I would be away for two months and then home for just two weeks; I should have had a little Sony midi system!"

Adams fans will know that since his last sci-fi novel *The Long Dark Tea-time of the Soul*, he has been working on *Last*

*Chance to See*, a travelogue in five parts examining the fate of five of the world's most endangered species which was published last autumn.

The book was co-written by the zoologist Mark Carwardine, but contains as much of Adams' wry humour about the people and places they visited, as about the animals themselves. The interest in conservation came relatively late in life, and followed an earlier article on a rare lima, the aye-aye, that the pair wrote for *The Observer's* colour magazine in 1985. After a decade of writing about fictitious life beyond our planet, why the sudden change? "I suddenly discovered the real world was quite interesting. I hadn't realised that before," he explained. As for the often irreverent tone of the book, which laughs rather than despairs at man's view

of the world as both an endless resource and rubbish tip, Douglas says he wanted to write something "more fun than a lot of the stuff about ecology or conservation which beats you around the head".

Nor did he miss music on his travels. "I took along a Sony Discman with a pair of active speakers (Sony SRS55s). When you're in a new place night after night you want something that tells you it's home," he

said. "I could get that little system set up in 30 seconds, and the sound really was amazing from something that you could put in the side pocket of a shoulder bag."

His travelling CDs included such stock favourites as Mozart's *23rd Piano Concerto* and *Flute and Harp Concertos* as well as the aptly-named *Trouble in Paradise* and *Land of Dreams* albums by Randy Newman. His eyes glazed with a faraway look for a moment as he recalled the effect of sitting on the prow of a steamboat going up the Amazon in the evening while listening through headphones to John Lennon's *Imagine* album.

### The great debate

You get the feeling that he almost prefers listening to music like that than sitting in front of his thousands-of-pounds-worth system at home.

"One of the drawbacks of a system like



*The guitar has had to make way for the keyboard in Adams' music room.*



this," he agreed, "is that you can get sucked into the technology of it all. And the slightest thing that goes wrong starts you getting really paranoid. I sometimes wonder if it is all worth while, because I find myself not listening to the music so much as the sound of the system. The hi-fi still needs a final tweak I think, and I'm always moving the loudspeakers around to find the best position."

With these caveats from our host, it is still a system that ranks among the best we've heard. Joe Cocker's *Civilised Man* album really brought the guitarist to life with the excellently recorded *Long Drag of a Cigarette* track suspending our conversation. Playing Dire Straits on the system he found the boogie factor irresistible and started imitating Mark Knopfler with a left handed guitar composed entirely of air. And he also shuffled off in time with the music looking for his third or fourth Rothmans cigarette, twisting out of the room on his heel. He's the sort of person you'd make way for in a discotheque!

### A single song

For Douglas Adams, hi-fi and music are used as a method of relaxing while working. He works in the attic two floors above the listening room and sometimes breaks for an hour of music, keeping the amplifiers on all the time while he's home. "I never play music while I'm writing but occasionally I write while I'm playing music," he qualified. "And if I'm working very hard I will have a particular piece of music which I play over and over again - absolutely all the time, and I go to sleep listening to music."

The method of listening to one album or even one song helps him to concentrate during the final stages of writing a novel he says. "When I was writing *Restaurant at the End of the Universe*, I locked myself into a friend's flat with *One Trick Pony*, by Paul Simon. That's all I had and I used it on the system in the house. It was the same with *So Long*, and *Thanks for All the Fish*, I was listening to *Tunnel of Love*, by Dire Straits. The music almost becomes like a Mantra when you play it like that. It seems to take me about a year to produce a book, but the actual writing is fairly intensive and takes around six weeks; the rest of the time I'm usually just worrying about it. I always wish I could spread it out more easily, but I've never been able to do that."

Douglas has been upgrading his hi-fi since university days in the early Seventies when he used his 21st birthday money to buy a Pioneer *PL12D* turntable, Cam-

**I** prefer the sound quality of the record, but CDs are simply easier to use, so out of laziness I use them.



The hidden Audio Research valve monoblocks are heard but not seen.

bridge amplifier and KEF *Cadenza* loudspeakers which he'd been 'ogling' in shop windows. He later upgraded through a Quad based system, which he still uses in his writing studio, to a Linn-Naim set-up in 1981 of which he was 'very fond' before upgrading to the present set-up six or seven years later.

His interest in playing music has lasted over the same period, and he says he was quite a good guitarist at one time, 'though now it feels as though I am slapping sausages onto the strings'. Instead he composes keyboard music in his computerised studio using a direct to disc recording system which he can dub onto a Sony *Pro Walkman* to use downstairs. He's never played publicly or published any of his recordings and says he just does it for fun, but adds: "I would like to find a spare six months to sit down and do something serious, but at the moment I'm getting down little bits all the time which I may be able to use later."

Meanwhile he is able to enjoy the compositions of others, on a hi-fi system which can do justice to the best recordings.

However, the publishing schedule

means that having promised himself some more travelling while researching the next novel, he'll probably be hearing more of the *Discman*.

### Looking at the stars

Oh, one last question: how did he come up with the title for *Hitchhiker's Guide to the Galaxy*? "There used to be a handbook while I was student called *Hitchhiker's Guide to Europe*, by Ken Walsh. I was lying drunk in a field in Innsbruck one night, and looking at the stars when the title came to me, and I wrote it from that."

### The System:

Goldmund *Studio* turntable  
Audio Research *SP11* preamplifier  
Audio Research *M300* power amplifiers  
Magneplanar *Timpany IV* loudspeakers  
Meridian tuner  
Revox cassette deck  
Stax *SRMT1/Lambda Signature* headphones

**System installed by:** Robert Taussig Hi-Fi Consultants, 1 Formosa Street, London W9 1EE. Tel: (071) 286 1728.



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Hi-Fi? Magazine thinks we are onto something. They say our B1 inte-

"This is the stuff of big amplifiers. The B1 is perfectly capable of emulating £1000 power stations."

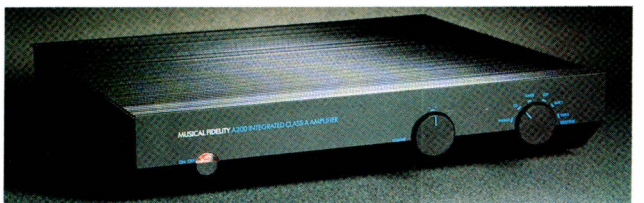
What Hi-Fi Magazine

grated amplifier is "the very essence of a good budget amplifier" and it won their "Best Budget Amplifier" Award in 1989. When word of this revolution reached distant shores, overseas hi-fi buyers flocked



to our door. When they heard the open and natural sound of its low feedback circuit, they rejoiced. Further cries of delight

greeted the matching T1 stereo tuner which, says High Fidelity Magazine, is "informative and involving to listen to." As is our A200 integrated amplifier, which delivers 60 watts per



channel. In fact, we make a wide range of hi-fi separates and loudspeakers that are sold around the world, especially in the Far East where they know a thing or two about hi-fi. Our hi-fi is also available in the UK. To hear it for yourself, simply make the short journey to a Musical Fidelity stockist. Where you will discover why *hearing is believing*.

MUSICAL FIDELITY



*This month we visit Graham Bank, the man responsible for Celestion's innovative*





1000 Series loudspeakers.

Words by Dan Houston with pics by Chris Richardson.

# Ribbons of silver

The resources of the company are enormous compared with the majority of British loudspeaker manufacturers. Celestion has 95,000 square feet of Ipswich factory to knock about in. And when a loudspeaker meets the light of day from here it has half a million cubic feet of warehouse in which to find a temporary home. Celestion is the only *Craftsman* so far to employ fork lift truck drivers, and to have a canteen.

## The French connection

Founded in 1926 by three French brothers, Celestion is one of the oldest companies in the hi-fi business along with such names as the generic Tannoy. At first the company was based in Surrey, at Kingston and then Thames Ditton.

It was taken over by Rola in the Forties, by which time its original activity in light engineering (with some loudspeakers on the side) had shifted to mainly making speakers for televisions, radios and the War Department along with drivers for early amplification systems to go with the first electric guitars. The latter is now big business for Celestion, and Provan claims over 60 per cent of guitar speakers sold around the world have Celestion drivers. Marshall, Mesa Boogie and Yamaha use them, among others.

## Brand awareness

In 1968 the company moved, initially to two sites in Ipswich, but it now operates from one 13.5 acre freehold plot. Soon afterwards, Celestion went public and was merged with Truevox, run by Dan Prens, the enigmatic 86 year old who is still the titular head. It's not all hi-fi either - five sister factories in the Midlands manufacture lingerie and underwear supplying Marks and Spencer, among others.

The late Sixties had seen the birth of Celestion hi-fi speakers, with the *Ditton* (of Thames Ditton) achieving world fame. The company still makes a *Ditton* loud-

**C**elestion, a company with a £14.5 million turnover, 300 employees and 80 per cent exports doesn't seem, on the face of it, to be a suitable subject for our *Craftsman* feature. Not only does the man at the top, Gordon Provan, profess ignorance of technical matters, but also the process of loudspeaker production involves a whole gamut of people beginning with computer designers and anechoic chamber engineers, and finishing with mass assembly on a factory production line.

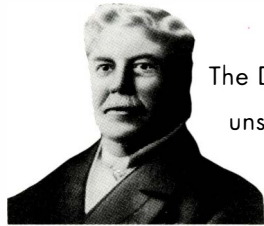
But within such massive corporate operations there are individuals who are operating in much the same way as the small guy out on his own - coming up with the ideas and the will to see them through to production.

*Left: Graham Bank, the man behind Celestion's ribbon tweeters. And above: the 12 micron thick ribbons being crinkled.*





# *a sound education*



The Denon brand has long been synonymous with unsurpassed high fidelity and reliability, making it the choice of the most demanding professionals and consumers world-wide. This superiority began with turntables, phono cartridges, cassette decks and amplifiers, and has grown to encompass state-of-the-art compact disc players, digital audio tape recorders and audio-visual equipment.



Founded in 1910 Denon is one of Japan's oldest audio manufacturers. Denon is unique in its position as a manufacturer of both hardware and software.

The same engineers who design Denon professional audio design Denon HiFi.

The same ears that guide Denon's award-winning recording sessions evaluate the sound of Denon's playback equipment.



The same technology that wins critical acclaim for Denon's top-of-the-line components appears in Denon's most affordable domestic and in-car products.

Denon products must satisfy not only domestic customers but also professionals in broadcasting and recording studios all over the world. What's more Denon believes that the first time buyer is entitled to the same consideration and quality as the dedicated audiophile. Denon products may cover a wide range of prices but they represent a single standard of quality.



**DENON** Home HiFi, Lifestyle Products, Car Audio, CD Portables, CD Software and Professional Broadcast Equipment.



speaker for the French market where the name can realise more brand loyalty than Celestion itself.

Gordon Provan joined in 1987 having set up Akai UK for the Japanese and with 11 years in the Rank Organisation before that. 1987 also saw the birth of Celestion's third main area of business - sound reinforcement systems for pubs, clubs and discos - in fact, wherever Bose hadn't got there first. You can find Celestion PA systems in Norwich Cathedral, being lugged about by one of Rick Wakeman's roadies or being dusted off for the Aldeburgh Festival.

Gordon Provan says his first job was to establish a product development plan, re-jig the company's market image with a new logo and 'brand awareness' and shake up the management of the overseas subsidiaries in Germany, France and the United States.

## A juggling act

Three years down the road, he says he is on his way. Celestion claims to have doubled its exports to 80 per cent of production, and at the same time established itself as the UK number one brand. Significant losses, he says, have been turned to very good profits.

Disproving the adage that you can't take coals to Newcastle, Provan has maintained Celestion's success in Japan, winning the Japanese magazine *Stereo Sound's* Component of the Year Award six times. This year alone,

he proudly points out, the company has received nine awards from around the world.

Provan admits it's a juggling act to supply a range of hi-fi loudspeakers to suit differing tastes in different countries, but says mechanically, and in terms of performance, the loudspeakers are exactly the same for every market.

There are four ranges in the current line-up giving customers a total of 15 models to choose from. Each range overlaps the others in terms of price; the mod-



*Celestion's 300 strong workforce produces 15 loudspeaker models, 80 per cent of which go abroad. Last year, the company's designs won nine awards from around the world.*

els are bracketed in terms of engineering approach rather than straight tier pricing. One begins with the bookshelf 3 and 5 loudspeakers, before moving up to the four models of the DL range (4, 6, 8 and 12) which come with optional dedicated stands. There are five models in the SL range culminating with Celestion's most expensive product, the £2,500 System 6000. There is also the 1000 Series, with the 3000, 5000 and 7000 being offered as something completely different again.

Each of the three models is a hybrid loudspeaker, using a ribbon tweeter down the length of one of its pentagonal sides, supported by bass drivers in a separate enclosure. The range is also unique to the

British hi-fi industry

and we don't know of any other British manufacturers producing such a hybrid (though in the United States, ribbon loudspeakers are more common). Prices are competitive as far as ribbon speakers go; the models (from the 3000 up) retail at £769, £839 and £1,299.

The man who did the bulk of the design work is Graham Bank, Celestion's Research Director, who oversees a couple of research engineers. This team works

solely on the development of hi-fi speakers, and is situated in the top floor R & D department.

Graham Bank is a bearded 43 year old who joined Celestion in 1977 after a three-year spell at Wharfedale, before which he gained a masters degree at Bradford University. After another two-year period with Wharfedale, from 1983-85, he returned - through the revolving door as he says - to be Research Director and has been responsible for Celestion's hi-fi range of loudspeakers since then.

## Different reactions

The idea of producing a ribbon loudspeaker was originally suggested by an acquaintance, Carl Pinfold, as Bank explained. "He had a business in Merseyside and he had used our laser system to help him make a flat diaphragm loudspeaker. He phoned me up about three years ago and said he was playing with this ribbon and although he couldn't develop it further, he felt it had an interesting quality. Anyway, we took him on as a consultant to come and work with us on the project - partly because we don't believe in the 'not invented here' syndrome.

"The aspect that is most attractive about a ribbon is that when a loudspeaker is in a room, both the room and the loudspeaker are reacting to quite a large degree. We wondered if we could make a loudspeaker which reacted differently. If a loudspeaker reacts a lot in a room, it will change in nature from room to room.

"I feel sorry for the poor customer who has bought a loudspeaker having heard it in a dealer's demonstration room and then listens to it at home in a room with different dimensions where it sounds completely different.

"We wanted to change that. I had listened to American ribbons and I found

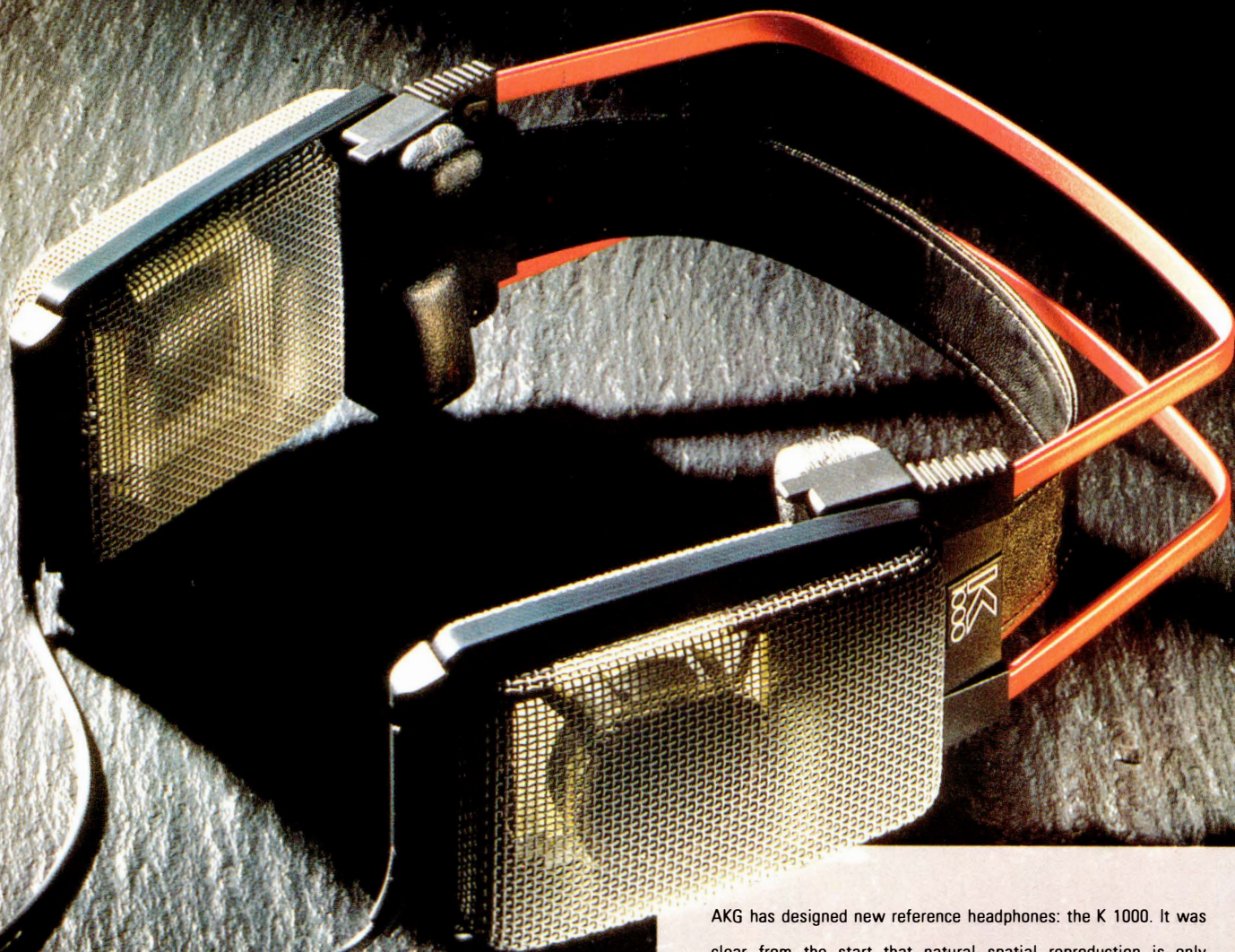




# AKG

ACOUSTICS

## A New Reference: The AKG K 1000



AKG has designed new reference headphones: the K 1000. It was clear from the start that natural spatial reproduction is only possible without any ear cushions that would change the sound. This was the idea.

Based on unbiased studies of all transducer types, AKG chose the proven dynamic transducer. However, AKG has updated this concept by developing a new type of magnet assembly called the VDL (Ventilated Linear Dynamic) magnet, using laser interferometry, and coating the diaphragm with an organic violin varnish formulation that has been in use for centuries.

The way in which state-of-the-art audio technology has been put to work in carrying out a revolutionary idea placed the K 1000 in the "Reference" class in all reviews that appeared to date. Listen to the Reference at the selected K 1000 dealer nearest you.

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AKG ACOUSTICS LTD.,  
Vienna Court, Lammas Road, Godalming, Surrey GU7  
1JG/GREAT BRITAIN  
Tel: (4868) 25 702, Telex: 859013 akgmic g, Fax: (4868) 28 967





that all the US types are panel or open-backed. Since as much sound leaves the back of the ribbon as leaves the front, we have to worry as much about what happens behind the loudspeaker as we do about what happens in front of it. Carl had designed the ribbon with the idea of using it like that, but I didn't like having twice the problem.

## A closed backed ribbon

"I wanted to make it a closed backed design to make the loudspeaker cabinet easier to deal with. Most ribbons have to be out in the middle of the room - which is fine for Americans with huge living rooms but wouldn't have worked well for the UK.

"The problem was that the ribbon tweeter moves air to the back as well as to the front. If you put it in a box, the sound will bounce off the back of the box and then come back through the tiny gaps (necessary for movement) either side of the ribbon. That will happen no matter how much damping you put in the enclosure. We played around with the idea for a while and I guess it took about six months to find the solution.

"What we did was to put a rear wall at a 45 degree angle to create a transmission line through the cabinet." Graham drew a diagram for me - imagine looking down through the speaker with an oblong chamber, one corner of which is cut across to hold the vertical tweeter ribbon. Sound from the rear of the tweeter hits the rear baffle at 45 degrees and bounces to the front baffle and back again down the length of the cabinet.

Graham says the cabinet was designed so that the sound waves would never make it back up the transmission line to interfere with sound from the front of the ribbon.

"After that it was just a case of building the mid and bass range drivers into another enclosure behind the tweeter," he said.

The speaker is therefore an irregular pentagon in shape with the directional tweeter facing the listener and the bass and midrange drivers firing (again at a 45 degree angle) to the side.

## Side effect

"An interesting side effect of the arrangement," continued Graham, "was that we virtually solved the problems of diffraction. The tweeter itself is on the corner of the cabinet and the nearest sharp edges to it are well down on either side. We bevelled the tweeter assembly edges to reduce problems there.

"Being a Yorkshireman, I liked the idea

of having two things for the price of one and as soon as we had sawn the boards up in our workshop I knocked it all together. Once you have an idea like that you can't wait to make it up and listen to the damn thing. There's nothing so soul destroying or gratifying as finding out whether it works or not.

"But as soon as we had made it and listened to it, we smiled at each other because we knew that that was how to do it. From then on it was a case of taking that concept and then engineering it into a product."

The computer programmes used for developing conventional loudspeakers were of little use to them when it came to pioneering the new project, Graham added.

From this point, the factory's product manager Roger Poet was brought in to see the ribbons through to production. They are made in a separate area of the factory in a series of workshops geared to the delicate aspects of Celestion's engineering such as the metal dome tweeter presses. Everything but the speaker cabinet is made at the factory, including the 24 inch woofers and the moulded baskets for supporting all the driver assemblies.

## Kit Kat wrapper

The ribbons are cut from a sheet of aluminium foil just twelve microns thick. "Imagine it as a Kit Kat wrapper. It's not even as thick as baking foil. Have you ever tried to straighten out a Kit Kat wrapper?" Graham asked, vouching the difficulty of the task.

"We had to sort out a system whereby we could make it crinkle, so we had to make a ribbon jig. And we also had to make it manufacturable. By that I mean that girls on the factory floor had to be able to make it, without needing to be artisans.

"I remember when I first told Roger about it. I said 'it's half a thousandth of an inch thick, half a metre long and eleven millimetres wide, and you're not allowed to touch it with your fingers during manufacture'. He looked at me with dazed eyes but we felt, nevertheless, that there was a possibility."

## Look, no hands

Needless to say the ribbons are now smoothly produced with a series of manufacturing processes, crinkling them, glueing them to an aluminium frame and finally, bolting on the magnets which run the length of the ribbon. And not touching them once. The ribbon is glued to a cross wire in four places. This allows it to be tweaked to keep it straight and also allows the gap between the ribbon and magnet to be extremely small - just half a millimetre each side.

"I remember saying to Carl we couldn't mathematically model the ribbon on a computer and try to predict what the optimum size or shape was, so much of it was trial and error.

"Sadly, he died of lung cancer before we launched the product at CES in 1989, but it sounds the way he wanted it to sound. It's a shame he never saw the final model."



Half a metre of 11mm wide wafer thin aluminium ribbon is handcrafted onto its jig.





## Choice Sessions

*Things we hear. This month, Aiwa marks the golden age of the personal stereo; Rothwell's flexible valve preamp; and a transportable music system from Cambridge Soundworks that's fit for 007.*

### As good as gold

*Aiwa has given the Midas touch to the HS-JX2000 in celebration of the tenth anniversary of the personal stereo. But is Janet Moorhouse a gold-digger?*

The HS-JX2000 impresses on first sight. Gift boxed in gold, set off against a red velvety background, it is certainly eye-catching, and when in use it will bring envious glances from fellow commuters or joggers alike. I know, I've been there!

It was released to mark the tenth anniversary of the personal stereo, and in terms of how many features can be packed into a 2.7x10.6x7.6cm cassette recorder it is undoubtedly state-of-the-art. All manner of gadgetry is provided, not just a comprehensive remote control, but also a battery charger and external microphone. All in a matching gold finish. Aiwa's styling department has surpassed itself with the carrying pouch, though, thankfully

*Dressed to impress: Aiwa's HS-JX2000 will be the envy of fellow commuters.*

it's not gold, but a very tasteful soft black leather and it bears more than a passing resemblance to a tiny Filofax.

### Bleep, bleep, bleep

Flashy presentation aside, though, some of the usual personal stereo niggles were present, the worst culprit being that immensely irritating bleep sound. It bleeps to tell you that play back, rewind or fast forward buttons have just been pressed, it bleeps anything up to five times to tell you which preset radio station you've tuned into, and it bleeps constantly during manual tuning. The headphones presented another slight irritation by way of their refusal to actually stay in my ears for any length of time. Perhaps that is just my personal problem, although I hadn't realised my ears were deformed.

In spite of its compact size - it is little bigger than a tape box and fairly lightweight - it has a long list of features, including an AM/FM radio which can be tuned in almost anywhere in the world. Funds were not available for me to test this feature, however. The tuner holds up to ten preset stations, and a time display for five different clocks, which, by my reckoning, is four more than most people are ever likely to use. Handy for travellers, though.

Presetting both the clocks and the radio is fairly simple, much the same as setting a digital watch. You do have to follow the instructions the first time, however, which means finding your way through an illogically laid out array of sections, six languages and rather difficult to follow illustrations. Still, nothing new there.

The Aiwa also has the ability to record, which is unusual in a personal stereo, and



its external microphone is tiny enough to allow the possibility of bootlegging at gigs, although being a law-abiding citizen I didn't test this theory out.

One of the handiest features is the timer, which allows you to preset the time you want to start listening to, or indeed recording, the radio. The timer also functions as an alarm, and has a 'sleep button' which automatically cuts off the sound at the set time. This feature only works with the radio, however.

But, of course, the main feature of any personal stereo, however clever it may be, is how well it can cope with the humble prerecorded cassette. And this is the Aiwa's forté. The sound is rich and extremely detailed for a personal stereo, if a little over bright at times. It did not cut out all background noise when tube or train travelling, but then again, what does? It worked dangerously well in the street, though, causing this intrepid reviewer to have a number of near misses when crossing the road.

It has to be said that £280 is a lot of money to spend on a personal, however good it sounds, but the *HS-JX 2000* would make a perfect present for the person in your life who has everything. Especially if they like showing off on trains.

### **The multibit preamp!**

*Fear not, this isn't a digital FX box, but a three-part valve preamp with unusual flexibility. Jason Kennedy checks it out.*

Rothwell Electronics will be a new name to all but the most ardent followers of hi-

fi press small ads, as it's a relatively new company with only three products to its credit. I first came across the man behind the name, Andrew Rothwell, at a hi-fi show last year; two of his products were tucked away on a shelf in the Alphason room. Which was no coincidence, as Andrew re-designed the Alphason pre/power amps and designed the *Apollo* integrated amp for that company.

His own creations are somewhat different. They consist of a passive preamp, a valve RIAA phono stage and a moving coil step-up transformer. A collection of components which, when used together, make up a preamplifier. The advantage in having them in separate boxes is that you only need to buy what you require as and when you require it. In these increasingly digital days, fewer and fewer people need a phono stage and even those that do may use a moving coil cartridge. The obvious drawback, of course, is that two extra pairs of interconnects are necessary if the full set-up is used, but that is largely outweighed by the flexibility and cost effectiveness of the approach, not to mention the fact that MC-ready tube preamps are as rare as, er, very rare things!

### **The 67 steps**

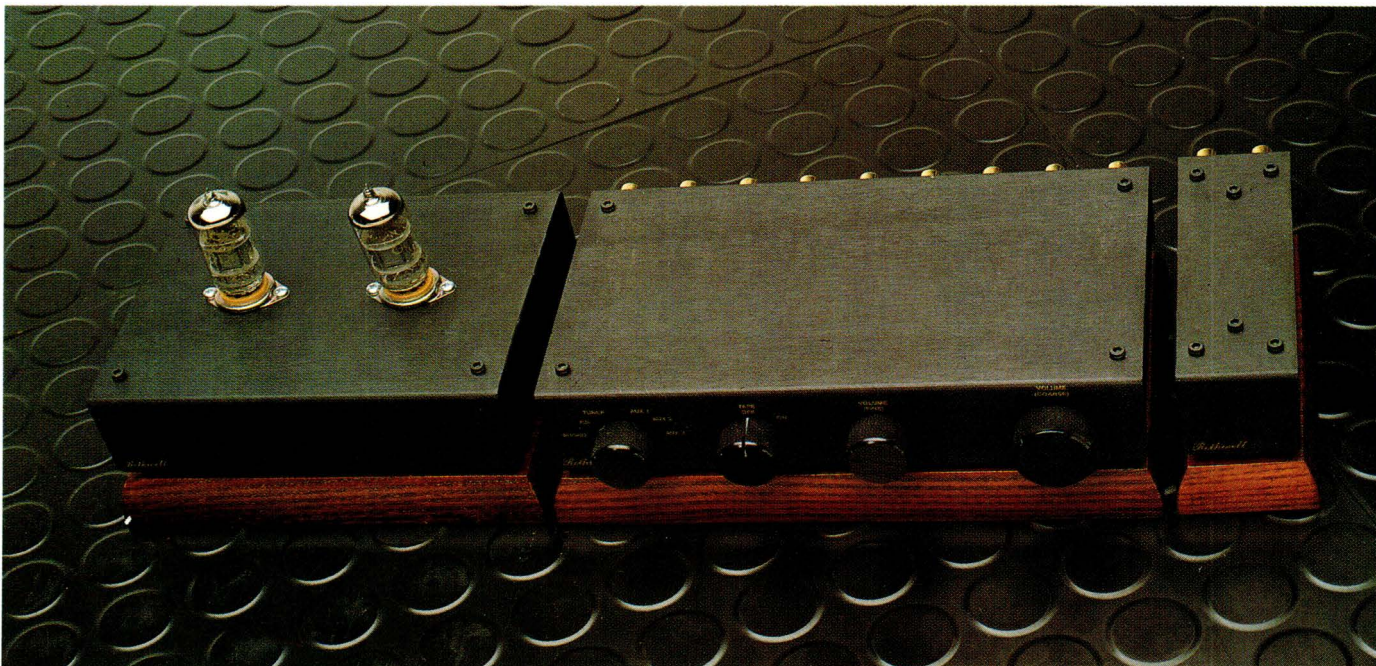
Cost-wise, the Rothwell set-up looks competitive. The passive preamp, which is equipped with an impressive six inputs and a tape loop with separate listen/record potential, weighs in at £199. It has

*The Rothwell combo offers flexibility and good sounds at a competitive price.*

one oddity, however, in that volume is controlled by two switched attenuators, one marked coarse, the other fine. In use this is less inconvenient than one might expect, but the clicks that some power amps produce as the knobs are turned can be a little alarming. Although switched attenuators are considered to be sonically superior to carbon track and scraping contact alternatives, switches with enough steps to create a usable volume range are very expensive. The Rothwell preamp gets around this by combining twelve and six step attenuators to achieve an effective 67 levels without incurring the high cost associated with a single 67 step device.

The two valve phono stage is powered by a separate supply that's fitted with an IEC socket for mains connection and costs £375. When you consider the price of an entire Croft *Micro* preamp, that may seem quite a lot, but there's more to it than meets the eye. Apart from being a standalone tube head amp, a rare enough beast in itself, it also has adjustable capacitive and resistive loading, which is nigh on unheard of in sub £1,000 products. Such a feature is of little use unless you use a moving magnet cartridge, but if you do it's very worthwhile and, in itself, could well be a good enough reason to buy the phono stage.

The step-up transformer is just that, a passive device containing two transformers which raise the output voltage of moving coil cartridges up to the level expected by a moving magnet phono stage. Like the rest of the Rothwell products, the transformer sits a few millimetres above a







*It's in the bag: Model Eleven is the name of this mobile sound system.*

wooden plinth, making it look less like a black box and providing a degree of isolation. But it also means that the preamp, which weighs very little, has a tendency to slide around if it's on a smooth surface - nothing that a few blobs of Blu-tack wouldn't cure though.

### The great impedance match

In use, the set-up looks a bit wire bound but is reasonably practical. The knobs on the preamp could be further apart (though this would necessitate a bigger box and destroy the 19inch width of all three components) and in my case it would have been useful to have had an earth between phono stage and power supply. Sonically, the passive preamp didn't prove a good match for the transistor power amps I used with it (JDI and Alchemy *Genesis*), it created a small rather anaemic sound that was distinctly lacking in appeal. But there is a reason for this mismatch. The high output impedance of any passive preamp is only suited to power amps with high input impedances, which includes virtually all valve amps but only the minority of transistor designs.

The 'Innovations *Second Audio* monoblocks on the other hand got on famously with the Rothwell gear, and revealed results that were not that far from what I remember of the *Series 1000* preamp from the same company, although that was going on six months ago and audio memory is a notoriously unreliable animal. Compared to some solid state

preamps, it's quite a warm sounding device. The bottom end has a degree of bloom, but not to the extent that it stands out all the time. Clarity is very good for a product of this price, it concedes only the subtlest of low level details and makes both records and CDs sound open and musical when partnered with suitable power amplification.

With CD, the passive preamp gave the JDI a good run for its money but lost out on absolute detail. It was, however, on a par with Audio Innovation's £250 passive which uses an operationally more fluent Noble pot. The step-up didn't have as much gain as the alternative on hand and was perhaps a little less dynamic and ebullient in comparison, but the latter (AI *Series 1000*) is approximately twice the price.

All in all, the Rothwell combo is well made, very flexible and sonically competitive. If you appreciate moving magnet cartridges and valve power amps it has got to be on your shortlist.

To get further information contact the distributor Zeus Audio on telephone number: (0232) 332522.

### Suitable Sound

*Roving reporter and ace jetsetter Stan Vincent has been coming to grips with Cambridge Soundworks' mail order musical luggage.*

If James Bond was more interested in

music than mindless bimbos, chances are he'd ask Q for a Cambridge Soundworks *Model Eleven*. This is not a pencil-sized sonic lance, nor is it just the attache case which, at first sight, the *Model Eleven* resembles.

Indeed, no. Flip open the four heavy-duty catches, lift the lid, and inside is the neatest transportable amplifier, subwoofer and satellite system you'll ever set eyes upon. And though there are no secret compartments or hidden weapons, the *Model Eleven* must represent the concept of mobile sound being taken to its logical conclusion.

### The case is altered

The system comprises a miniature three-channel amplifier, two tiny satellite speakers and a subwoofer system - whose enclosure doubles up as the suitcase itself.

All of the components sit in separate compartments, neatly divided by foam, with the loose parts held in by retaining straps. There's even space for you to store your personal cassette or CD player (with which the *Model Eleven* is intended to be used), and just about room for a couple of tins of Pâté de Foie Gras or Beluga caviar, too.

The circuits of the amplifier (which stands just three inches high) are sturdily housed within 3mm aluminium plate. Ideal for the jetsetting secret agent who never knows where he'll be next, the amp can be run from just about any power source known to man. It'll accept AC mains at 110 or 230 volts, or 12V DC from a supplied cigarette lighter adaptor. The *Model Eleven* even includes a 9V output socket which can be used to feed your personal CD player, tape deck or tie-pin radio transceiver.

The amp has three separate channels, one for each speaker. Each channel has, apparently, been tailored to the speaker it is powering, thus obviating the need for an extensive crossover. There are three inputs - for aux, tape and CD - plus volume, source selection, balance, treble and bass controls. No ejector seat, though.

The satellite speakers are tiny: just 140mm high. They're fashioned from heavy ABS, and contain a 19mm copolymer dome tweeter, plus three inch mid driver. The subwoofer - for which the cross-braced, damped luggage-grade plastic case itself acts as an acoustic suspension enclosure - makes use of a seven inch driver.

In use, the *Model Eleven* is able to put its money where its mouth is - and its bass



output is certainly capable of rendering your Vodka Martini shaken, not stirred. Though the amp is rated only at 36watts, the "suitcase" and satellites pump out impressive levels of trouser-flapping though not obese bass, and this is rendered alongside detailed and well-separated high frequencies. This subwoofer system certainly didn't sound half as muddy as some I've heard.

The *Model Eleven*, sadly, is not cheap. It'll cost you the princely sum of £499. However, CambridgeSoundworks claims that if it was not being sold directly to the public (just 'phone 0800 622862 or 0800 622286 to place an order), the same quality of manufacture – impressive, admittedly – would cost much more. And even James Bond couldn't say fairer than a 30-day money back guarantee. My name's *Eleven*. *Model Eleven*, to be precise . . .

## Surveying the scene

As promised in our February issue, John Bamford reports on the blind listening tests conducted in the Hi-Fi Choice room at the Northern Ireland Hi-Fi Show.

It was back in November last that the *Choice* team played a major part in the activities at the Northern Ireland Hi-Fi Show, sponsored as usual by leading Belfast retailer Zeus Audio. While our newshound Dan Houston rushed around the corridors of the Stormont Hotel look-

ing for the latest hot hi-fi products (with photographer Chris Richardson scurrying behind him), I was having some fun conducting a series of experimental blind listening tests in the *Hi-Fi Choice* room.

With a 'modest' system set up in the room, the equipment comprising Mission *Cyrus One* amplifier (£199), Celestion '3 loudspeakers (£109), a good pair of stands and some Sonic Link speaker cable (£18 per metre), I was playing CDs on a choice of Marantz *CD50SE* (multibit) and Rotel *RCD 865* (1-bit) CD players. Visitors to the room (we could accommodate ten seated listeners at a time) were asked to listen to a selection of musical excerpts - ranging from Kraftwerk electronic synth pop to Philips' recording of Mitsuko Uchida playing Debussy's *12 Etudes* - and tick the boxes on a simple questionnaire form which we provided. I would play the music, make a change to the system, and play it again; then I would change the system back to its original form and play the music a third time. The listeners - who had no idea what change I was making to the system - were asked on the form, 'Did you hear a difference?' (yes or no). A second question asked, 'If your answer is yes, do you regard the difference as significant or subtle?'

The changes I was making to the system (as the mood took me) were as follows: 1) Changing the mains polarity to the Marantz *CD50SE*.

2) Swapping from the Marantz *CD50SE* to

the Rotel *RCD 865*.

3) Ditto with the two CD players, but in reverse order.

4) No change whatsoever, just to see how many 'blind' listeners could be fooled into thinking they heard a difference!

Having totted up all the ticks and crosses on the listeners' forms we find that 90 per cent of our audience(s) perceived a difference in sound quality between the multibit and 1-bit CD players. Note, we didn't ask listeners to say which they preferred, simply whether they heard a difference. Of the 90 per cent who did say that they heard a difference, 81 per cent thought it was a *significant* difference. Interesting . . .

As for reversing the mains polarity to the Marantz CD player, 76 per cent of listeners *did* think they perceived a difference, of whom approximately half thought it significant, the other half saying it was just a subtle difference.

## Fooled you!

During the weekend I tried to catch out 28 listeners by fiddling around, pretending to make a change to the system, when in fact all I'd done was take the disc out of the CD player and then put it back! Perhaps somewhat alarming is the fact that 71 per cent of these 28 'guinea pigs' convinced themselves that they'd heard a change in the sound, 65 per cent of them regarding it a significant change.

Let's not get too serious about this. In no way could these sessions be described as 'scientifically controlled' tests. Indeed, volumes have been written about the significance (or otherwise) of blind listening tests and the procedures thereof. No, we conducted this series of tests on visitors to the Belfast hi-fi show purely for our own - and your - entertainment, and we've no doubt it will give you something to discuss amongst your audiophile friends.

As for the 71 per cent of listeners who thought they heard a difference when I hadn't changed anything in the system (and blushed when they were later informed they'd been fooled), they should console themselves with the fact that I too sometimes thought I perceived a change in the sound, despite knowing that I hadn't changed a damn thing. Is this a sign of ensuing madness? Well, I've suspected for some time - as indeed have other reviewers - that simply opening and shutting the drawer of a CD player, especially an inexpensive model, can alter the sound quality. Now there's something for you to discuss!



Ex-editor in action: John Bamford conducting tests at the Northern Ireland Show.



**A**s bitstream decoding became an established feature of Meridian's digital audio gear, so it was clear that the company's DAC-equipped D600 active speaker would eventually have to go over from multibit to single-bit D/A conversion. That time has arrived, and all the D600s shipped from the factory now contain bitstream convertors rather than the 16-bit circuitry previously fitted.

I talked about the speaker in its 16-bit guise just over a year ago, and have been listening to the new version for several weeks now. At one extreme, the D600 can form the heart of a complex multi-room installation majoring on digital audio, while at the other it can serve simply as an active speaker to round off a traditional analogue system - with the added bonus of remote control over volume, balance and tone.

### Signal processing

The speaker itself is a three-way active design with in-built preamp. The preamp includes two line-level analogue inputs and three digital inputs - a pair of phonos and one optical. The digital inputs accept the datastream from a CD transport which the D600's D/A convertors turn into an analogue signal. This is then handled by the preamplifier in the normal way. We're not talking about *all* the signal processing being done in the digital domain - Meridian does have such a beast, but that speaker costs a whole lot more.

The D600 is microprocessor-controlled and can talk to other Meridian units, so the supplied 609 handset can control a wholesystem of Meridian gear. You could start with a 200 CD transport (using digital transmission), then add a 204 tuner (with analogue interconnects). The 201 preamp would expand facilities, and a 201 or preamp-equipped 208 CD player is vital if you need tape dubbing facilities. Vinyl junkies are catered for by the optional 215 phono module.

Of course, all the clever innards would be wasted if the sound quality was mediocre. But plenty of design effort has also gone into areas like power supplies, cabinet rigidity and component quality.

I used the updated speaker with the 200 CD transport, and ran the tuner (204), tape (faithful Aiwa AD1800 cassette deck) and vinyl (Linn LP12) sources to the D600's analogue inputs via the preamp section of a 207 CD player.

Setting up is relatively straightforward, provided you're not daisy-chaining speakers round the house! Meridian supplies the digital and network leads, though you have to supply your own analogue



## Statements

*Monitoring what's happening on the high-end scene. This month's Statements has a speaker bias, with Meridian's D600 and Monitor Audio's Studio 15. Meanwhile, JK has been checking out mods to Audio Innovations' triode amps.*

cables between preamp and speakers. I used Audioquest Quartz Hyperlitz cable, and was confident that it intruded little on the final sound.

### Fuss free matching

Three generously-rated 65watt amplifiers - sufficient for all but the most cavernous of homes - are built into each of the tall, slim enclosures. The spiked feet are de rigueur for audiophiles, and beneath the removable grille of this ported design you'll find a 25mm aluminium dome tweeter and two 160mm polypropylene drivers - one for bass/mid duties, the other for the bottom octaves. The neat glass display panel completes the front.

The Q, Bass and Tilt controls allow you to match speaker to room without fuss, and leaving the speaker in standby mode

(as I did) ensures it's always warmed up, ready to sound its best.

I wondered whether the company had seen fit to tweak the D600's design to suit the onboard PDM processing. "No," replied Meridian Audio's Sales Director, Steve Hopkins, "the speakers are not redesigned in any way; we've simply incorporated the bitstream circuitry as a running change in production."

In fact, outwardly you'd be hard put to tell there had been any change. The only indication is on the box.

Sonically, the bitstream D600 is a very confident and detailed performer, offering a pleasingly extended response at both ends of the spectrum. It lets recorded dynamics come through well and - like all top-notch speakers - displays a firmness and precision which allows the music to



speak for itself.

I could enjoy the speaker's ability to set up a spacious sound-stage or preserve instrumental timbre through complex passages, but I also became thoroughly absorbed in the music (and performance) itself.

*Ringing the changes: the Meridian D600 active loud-speaker, now equipped with bitstream converters, provides a versatile semi-digital package.*

With good design, the new technology gives a sharper, clearer and more focused sound with better control at the frequency extremes. The cleanliness of sound allows a crisper presentation without aggression.

The D600s cost £2,750 per pair, including handset, and the 200 costs £750. From what I've heard, I'd say that's a very fair price for an excellent sounding and versatile package. You don't have to use Meridian sources to enjoy the benefits of this speaker, but it's a shortcut to good sound.

What about those who already own D600s? Well, 16-bit models can be updated for £450, which is slightly less than the cost of the 203 standalone bitstream converter. Using the 203 with long runs of analogue cable would be rather inelegant, so the update looks a good option - provided you hear a new pair first, to ensure the extra crispness and control is to your liking.

And if you haven't brushed with the D600 yet, an audition is definitely in order, even if you're a hard-bitten analogue audiophile. The sound is first-class.

*John Seabury*

Those familiar with the ramblings of yours truly and the ex-editor (JB) may have noticed more than a few references to Audio Innovations *Second Audio Amplifiers*, a far too long winded name for the triode monobloks that we have been using for the past year or so. Despite their low output (15W) and general incompatibility with a lot of preamps (high sensitivity and high input impedance), these power amps have proved to be more enduring references than almost anything that has entertained us in that time. There have been a few distractions of course, the Audio Note *Ongaku* could so easily have taken their place if it weren't so ridiculously expensive, and JB was somewhat smitten by the Pioneer A400,

not least because it's so cheap. But the *Second Audios* have remained a constant factor in both systems, and more often than not were the amps we used for listening to music rather than hi-fi.

### Harping on

The point of this piece, however, is not to harp on about how wonderful these amps were, but to assess changes that have recently been made to them. And then harp on about how wonderful they are.

Apart from a slightly better matt black finish and transparent rather than black output valves, the *Second Audios* don't look any different. Apart from a valve change to 2A3s instead of 6B4Gs, necessitated by a shortage of the latter, all the modifications are internal and have been implemented to reduce noise, increase reliability and improve sound quality. The upgrades include separate cathode resistors, capacitors and power supply (for the heater) for each valve and a re-designed (hardwired) circuit layout. I can't vouch for reliability yet but hum has been reduced to an inaudible level at the listening seat.

The sonic effect of the modifications is quite impressive. Fundamentally, they make the *Second Audios* sound less like valve amplifiers. Which is no mean feat as they didn't really sound like valve amps in the first place, but putting the new and old amps side by side reveals a degree of definition and high frequency clarity in the modified version that makes the originals sound vague by comparison. Probably as a result of lessons learned from the *Ongaku*, the new *Second Audios* have gained some of that amp's ability to disappear, leaving little trace of their presence on the sound emanating from the

speakers. In short, to my ears they still have an edge on the competition, be it valve or transistor based and I'd urge those of you with the funds to give your ears the triode treat.

The funding required for a pair is £2,950, or if you already have a pair, £1,000 for the upgrade. Yes, it sounds a lot but when you consider that the job involves more than 24 technician hours it doesn't seem quite so rough.

*Jason Kennedy*

This piece is intended to introduce a costly but remarkable loudspeaker from Monitor Audio. Called the *Studio 15*, it is a stretched version of the *Studio 10*, which as you may or may not know was one of the first loudspeakers in recent times (ie since the *Leak Sandwich*) to feature a metal cone bass driver.

The *10* is a compact design, built and finished to a very high standard, but open to the charge of lacking wellie compared to other loudspeakers at the £1,000 price point. The *Studio 15* addresses the cubic capacity problem by using a cabinet of similar width and depth, but stretched downwards.

### Steady hand

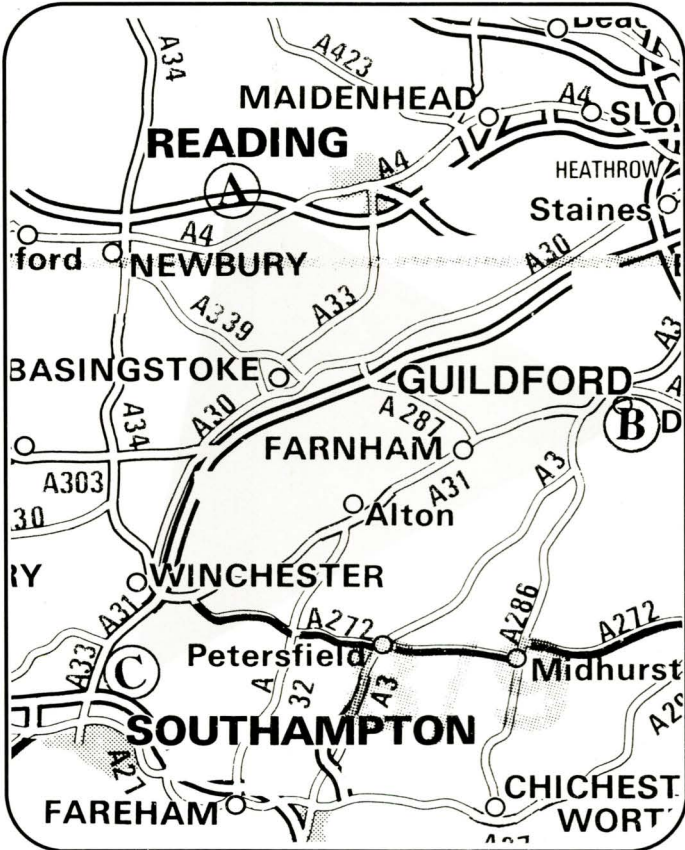
The same basic configuration as the *Studio 10* applies: that is MA's own gold anodised 25mm dome tweeter (nee Elac) and metal cone mid/bass driver, but the *15's* bass unit has a metal dust cap which allows certain improvements to be made to the crossover.

I found the *Studio 15* invaluable when



*Audio Innovations' Second Audio Amplifier has had a rather expensive upgrade.*





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I was privileged to have the use of an outstanding, and outstandingly costly amplifier called the Audio Note *Ongaku* (see *The Collection 90/91*) for which the transparency and steady hand of the *Studio 15* was particularly well suited.

But by way of prefacing any further remarks, I was fascinated and slightly puzzled by Paul

Messenger's experience of the *Studio 10*, and in particular the clear excess output in the LF region which as measured would certainly result in the 'thick, heavy

and slow' comments in the text of his review (Issue 90). He could have been unlucky with his review sample. Unfortunately, I didn't have a pair of *10s* available to compare to the *15* which might have been interesting. My measurements on the *15*, made in room from a distance of two metres, show that this bigger variant has no such problem. Indeed, it has one of the smoothest and most accurate response shapes I have measured, especially in the bass region, with only a modest output loss in the crossover region to detract from a textbook result. A family of plots made in slightly different positions demonstrated that the mild midband peakiness of the curve is due to the proximity of walls and record cabinets.

### Having a run-in

On audition there is certainly no suggestion of anything less than ideal integration between bass and midband. Indeed one of the key qualities of the *Studio 15* is its homogeneity. It impressed a range of visitors (mostly industry people), and no consistent criticisms were made, though some eyebrows were raised over pricing.

But this kind of quality doesn't happen straight from the box. It is not merely beneficial but essential to run these speakers in thoroughly. It's very difficult to put a number on these things, but if you twisted my arm, I'd plump for at least a week's run-in before they're properly ready. At the end of that period I found in the *15* a tool for reviewing that was almost completely neutral - I'd suggest coloration levels are in the BBC/Quad class which means that tonally at least there's nothing obviously remiss for the brain to lock onto. Yet the system has an analytical quality that is missing from most BBC designs and the current Quad *ESL63*

*Monitor Audio's Studio 15 provides a visual as well as a sonic treat, and gives two definitions to the phrase physical presence.*



(though its predecessor did have this attribute, along with some ghastly metallic colorations).

It is this analytical quality I find most precious. Lack of real belly churning bass meant that there were certain types of music that the *Studio 15* was less than wholly satisfactory for: the speaker shows a slightly foreshortened sense of image depth for example. Yet in every other respect the *15* excels. I found it particularly good at exploiting the range and variety of tonal colour in some of the more richly variegated styles of music: Ravel, Mahler, the bloke that wrote *Pines of Rome*, and so on. Music a la *Studio 15* also has a strongly physical presence, which I found remarkable in a speaker so detailed and refined - effete almost.

### Musical fireworks

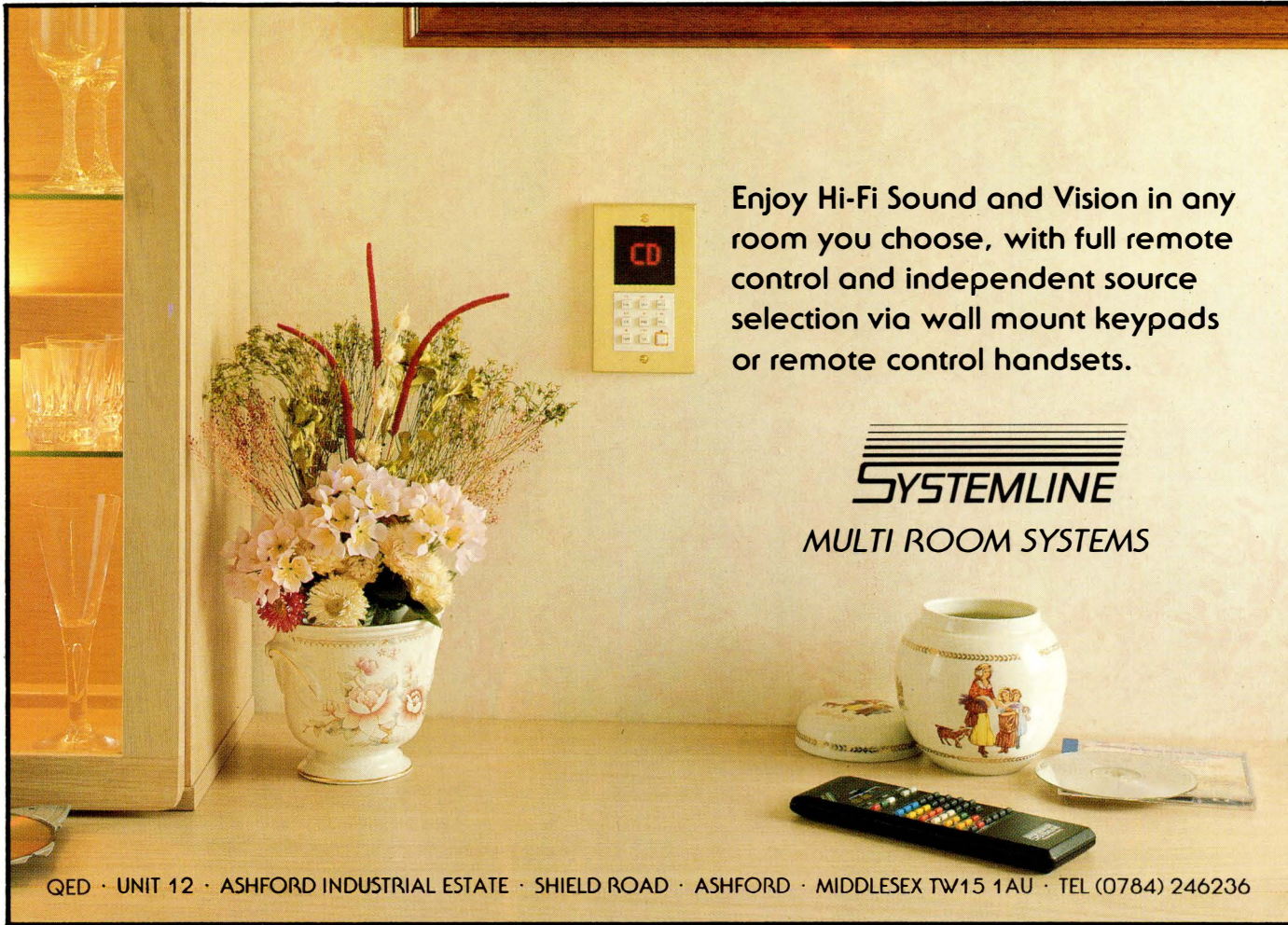
All these qualities come together in recordings like Mitsuko Uchida's recording of *Debussy Etudes*, a record I have only just acquired and which I found unexpectedly gripping (not least because Debussy is something of a graveyard for big name pianists). Using a good system driving the MA speakers, the result can be remarkably persuasive, the *15* being unusually capable of responding force-

fully and quickly to the initial transient, and dying away naturally thereafter. The musical fireworks that Debussy unleashes in many of these studies are paradigms of energy and clarity; the sound doesn't clog up when the going gets, er, going, yet the subtlest and softest playing has a pellucid translucency at all times. Apart from the sheer, physical presence of the sound, I could almost have been listening to a pair of fine electrostatic headphones. As a by-product of these attributes, I found the *Studio 15* unusually useful for exploring the differences that exist between amplifiers and source components. Compared to most loudspeakers, it tends to enhance the contrast that exists from one product to the next, but without any suggestion of exaggeration.

It would be unjust not to mention that the *Studio 15* is also a visual treat. It marks a departure for MA, who in the past have always concentrated on fine, and often quite exotic real wood veneers. This one is different. The finish is still veneered, but it is then blackened, and finished with a matt lacquer giving the surface a depth and lustre missing from normal polished enclosures. Gripping stuff.

*Alvin Gold*





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### The great wall mystery

It was 5.15pm on December 19th, I was innocently reading the *Personal Messages* column in issue 90, when suddenly (gobsmacked!) I found the solution to a mysterious problem that has been bugging me for ages.

I am in the unfortunate position of having two solid walls and one stud wall surrounding my speakers, a combination that creates a lopsided soundstage.

Up until now I have put this down to duff speakers or an off centre listening position. I even went so far as to get my ears cleaned out, but, like adjusting the system, this was to no avail.

My thanks are due to Paul Messenger and Roy Gandy for solving this baffling mystery, now all I have to do is figure out a way of curing the problem.  
M Williams, Dercham, Norfolk.

### No mistake!

I've always enjoyed music, from Pavarotti to Dire Straits, and have just spent a fortune on a Technics X9 midi system

with all the bits. Then I made a mistake, I bought a copy of *Hi-Fi Choice* and found out that I should have auditioned a 'proper' system with proper speakers cables, stands, mains purifiers, valve preamps etc.

However, compared to my old JVC and Aiwa music centres, the Technics is out of this world - loads of extra power and fantastic bass.

But what do I do now? I've already scrapped the bell wire supplied with the system and splashed out on some QED 79 Strand cable, and I'm sure my wall brackets will have to make way for a decent pair of sand filled stands. I'm in danger of spending another fortune upgrading, and need to know where to start. The question, however, is will I notice any difference?  
D P Drew, Droitwich Spa, Worcs.

*Basically the tweaks you mention are the ones that will make the biggest difference to the sound of your system, ie speaker cabling and stands. The latter are indispensable, as the relatively large three-way speakers that come with the Technics X9 work a lot better when sited well clear of both the rear and side walls. They also require lifting off the floor and should be placed on the firm foundation supplied by a decent stand.*

*Upgrading the interconnects on the source you use most frequently is certainly worthwhile, and getting a proper stand will help, but not to the extent of the aforementioned accessories.*

### It's a set-up

We would like to express our surprise and concern with the review of the Roksan Xerxes, Artemiz, ArtaXerxes in issue 91 of *Hi-Fi Choice*.

We would like to publicly state that at no time was Roksan contacted regarding the supply of the record player and was further not consulted, as others were, when results contrary to Roksan's printed specifica-



*For best results the Xerxes needs to be set up by qualified personnel.*

tion and previous reviews were obtained. The unit used for the review has subsequently been returned to the Roksan factory, where several errors in the set-up and alignment were found.

As I'm sure *Hi-Fi Choice* readers will appreciate, it's not wise for anybody to assume that a high-end record player that requires careful set-up and alignment, can be correctly measured or subjectively analysed without the unit being installed by a fully qualified factory trained retailer or Roksan representative with all the necessary information to hand to allow an informed objective appraisal of the product.

In this instance, the record player was supplied by a third party without any information regarding the product's design and intended performance. The Xerxes, Artemiz, ArtaXerxes was set-up by the reviewer, who, by his own admission, had never come into contact with the record player before.

In the five years since the record player was first demonstrated in public, it has been reviewed over 20 times with consistently excellent results, including previous reviews in *Hi-Fi Choice*.

If any readers would like to read unabridged copies of any of these reviews, reprints are available from Roksan Sales Information. In the meantime, we suggest that the review of the Xerxes, Artemiz, ArtaXerxes in issue 91 is ignored until a more

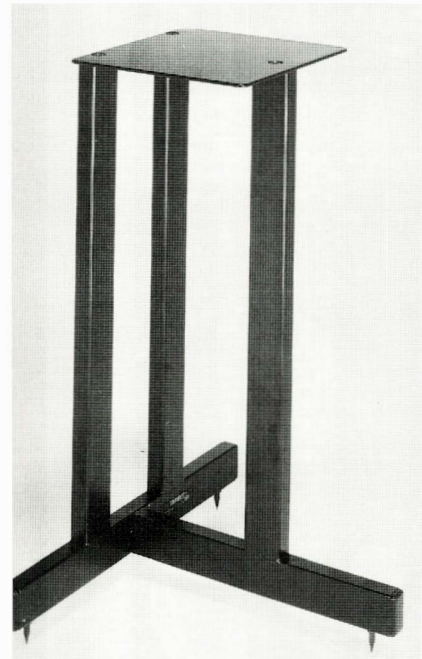
representative review is conducted by *Hi-Fi Choice* in the future, or better still visit your nearest Roksan retailer and review the product for yourself.  
Xavier Wilcox, Roksan Engineering plc.

*Due to a communications failure between Richard Black and Hi-Fi Choice during the course of the review, the Roksan Xerxes was indeed not obtained directly from the manufacturer, as is usually the case with products reviewed in the magazine.*

*As a result of this, it is possible that the deck which was reviewed in issue 91 was not properly set up. In particular the 14dB discrepancy in noise values for the ArtaXerxes indicates that this particular unit was not functioning properly, although fast approaching deadlines prevented Richard from taking up this obvious inconsistency with the manufacturer.*

*The question of decks being properly set up prior to the review is always a contentious one and in order to address this matter Hi-Fi Choice has invited several manufacturers, Roksan included, to participate in a high-end turntable review to be published later on this year.*

*All the decks in the review will be set up by the manufacturers and checked to ensure that they are giving of their best. Manufacturers will also be invited to contribute a technical piece explaining the theory behind their decks. All the decks will be auditioned blind by a panel of listeners. - Ed*



*Stands can make a marked improvement to sound quality.*



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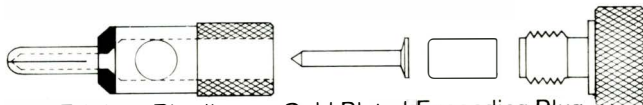
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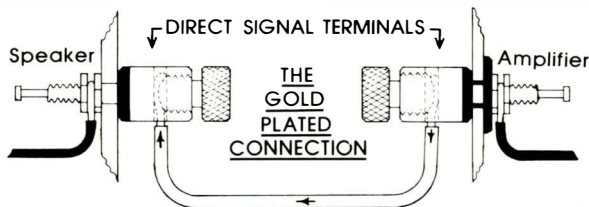
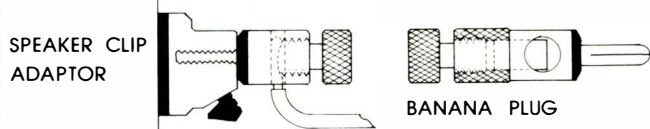
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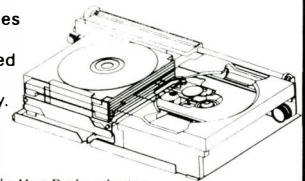
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*The LP12 - it may be difficult to set up but Linn is quick off the draw when it comes to sending out information!*

## Recession, what recession?

My interest in hi-fi has recently been rekindled after a lapse of some years. I have used *Hi-Fi Choice* to get up to date with current products and thinking in the industry, and have short-listed 17 companies in Britain whose equipment is of interest to me.

I wrote to those 17 companies, all of which were recently featured in or advertised in *Hi-Fi*

*Choice*, requesting data, prices and dealer lists. That was three weeks ago. So far I have received replies from only nine of them!

What recession?

Neil Adams, Aylesbury, Buckinghamshire.

PS Those who did respond: Ariston, Audiolab, Gamepath, Linn, Musical Fidelity, NAD, Naim & SEE.

## Fidelity to what?

I was most impressed with the review by Richard Black in issue 91, on record players.

I felt the way he approached the subject and explained the problems inherent in LP reproduction and various designer's approaches was excellent.

Therefore you can imagine my surprise at the amount of criticism I heard from my friends and a dealer I visited, (no names, no packdrill), about the aforementioned article. I have listened to many of the record players mentioned in the article, at length and in synergised systems, Mr Black, however, does not state the system he used. This is of no consequence as he used detail retrieval as his yardstick and not tonal aberrations. As he was using master tape as his reference, I respect his final conclusions.

Having said that, most people, myself included, don't have the luxury of a reference and make our decisions purely on what we hear and like in a dealer's demonstration room.

As a final observation I was wondering who actually set up the LP12, as this deck is notoriously difficult to set

up correctly. I only add this because having owned a Linn for about eight years, I have found that very few people are capable of the task. Thank you for such a quality publication. Rex Dunham, London SW18.

*It is true of virtually all hi-fi components that their performance is affected by the interaction with other components, and certain combinations seem to have a synergy that makes the end result greater than the sum of the component parts. However, when testing products a reference system has to be maintained in order for objective impressions to be made.*

*Richard outlined the system he used for the turntable tests in Tech Talk, basically it was a Harman/Kardon H/K 6500 amp with a Moth 30 Series phono stage and Townshend Glastonbury loudspeakers. He also used Ortofon and Sumo power amps and a pair of ATC SCM20 speakers.*

## Roksan Isoda Interconnect Winner

### Making the right connections

After many frustrating months of searching for new classical LPs, which have practically disappeared from the shops, we finally succumbed to a CD player on Christmas Eve. Aylesbury Hi-Fidelity gave an excellent demonstration of the Rotel RCD 855 and 865, and we decided on the more refined sound from the RCD 865. They said that we might want to replace the weedy interconnect cable supplied with the player after a year or so; how wrong they were!

We spent several weeks listening to the muffled sound, with poor stereo and little treble. A friend remarked that it was as though the orchestra was in the next room. We were at a loss to know what was wrong, as the amplifier was also made by Rotel, and the system sounded fine with tape, tuner or record deck.

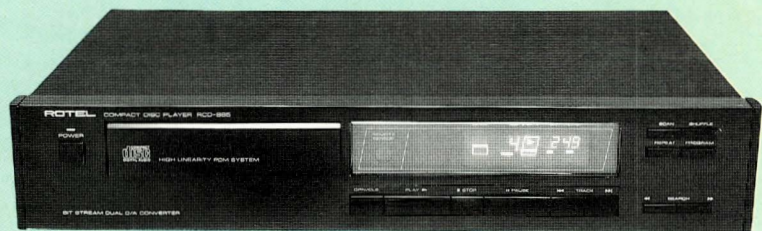
A little experiment: the CD interconnect was changed for the one supplied with our Aiwa tape deck, and there was an instant improvement in the sound. Music was exciting once more, and the treble and stereo imaging were there. This leaves us wondering why Rotel bother to supply a cable at all with their CD player, since it doesn't do it justice.

I wonder how it would sound with Roksan interconnects?

Brian and Mary Hayes, Berkhamstead, Herts.

*Classical recordings in particular are becoming increasingly hard to find on good old vinyl, a situation probably not unconnected to the fact that the record companies make more money from CDs. Second hand shops are a good alternative if you don't want to go digital.*

*The Rotel RCD-865, perhaps Brian Hayes' model will sound better with his new Isoda interconnects.*





**R**emote control extra. A phrase that in normal circumstances wouldn't rate a second glance. However, when the remote control in question weighs in at a cool £540 and contains the same computing power as the word processor on which I am writing this review, a second glance is perhaps in order.

The H210, is intended to look after the Revox's new H-Line component system's every need. The components can either be used as a standalone hi-fi system, albeit with some rather special features, or they can form the heart of a sophisticated multi-room system. In fact, it is not the components themselves, but the choice of ancillaries that dictates the facilities available from the system. *Hi-Fi Choice* managed to get hold of the H2 CD player, H5 amp and the H6 tuner, along with no less than three remote controls. The reason there are three remote controls is not that you require one for each unit, but rather that each remote accesses different facilities within the same system.

System is the key word here. Although you could use any one of these units on its own, it isn't very cost effective to do so, as a significant percentage of the not inconsiderable price has obviously been spent on redefining the term 'system synergy'. These components are more akin to an extremely upmarket rack system than a conventional separates system, in that each piece is designed to work as part of a larger whole.

Revox has asked itself: 'Who uses the



# The Missing Link

*With a mere 11 controls between them, Revox's minimalist hi-fi components are a knob twiddler's worst nightmare. However, as Andy Benham found out, the system has hidden depths, as well as a £540 all-singing-all-dancing remote control unit.*

multitude of knobs and buttons that grace the front of everything from CD players to washer driers? A good question. Try asking yourself when was the last time you used the A - B repeat facility on your CD player? Would life be possible without FTS? If the answers to those questions were "never" and "yes", then H-Line could

be right up your street. When you consider that the equipment we had for review came out to a cool £3,100, not including a remote control, it came as a bit of a surprise to unbox it all only to find that there was hardly a knob or flashing light in sight. The amplifier and CD player have the most controls to brag about, four

as opposed to the three found on the tuner.

The design of the H Series components is also a bit of a change from your average 'black box'. The units come complete with a burnished titanium finish and massive wooden end cheeks. The boxes themselves are a lot deeper than average and each is





*The Rexox H-Line components: not so much a system as a concept.*

though neither are exactly cheap, the *H9* costing £1,374 and the *H1* £1,177. In its defence, the *H1* can at least plead that it is actually Revox's 215 cassette deck, with remote control added and nearly 30 per cent shaved off the price tag.

So there you have the basic system. It's amazing how easy it is to get used to this sort of thing and within a couple of days it was hard to believe that I had ever managed to live with a system that worked any other way. More to the point, anyone, even the most ardent technophobe, can use this system. If you are capable of pressing one button, then you can use *H-Line*. Your first guess is nearly always correct.

However, this one-touch-does-anything mode is really just one of the options offered by the system, but to take it further you have to start investing in remote controls. The 'entry level' remote controls start at a mere £79.

### In complete control

There are two relatively cheap options, the *H8* and the *H208*. The *H208* is very much a standard system remote control with around 45 keys offering control of most functions and a numeric keypad enabling you to change tracks or radio stations. For instance, the amplifier section of the unit gives you a -20dB volume reduction for when the phone rings, A or B speaker selection, treble and bass tone controls, volume and balance as well as a default 'flat' setting. It is interesting to note that only the volume is controllable via the unit itself, all the other functions can only be altered via remote control.

The *H8*, on the other hand, follows the same minimalist design philosophy as its parents, offering a paltry 10 keys. These control the amplifier volume (plus and minus), the tuner station (< and >), the CD track (< and >), the cassette deck (play and stop), the record player (play) and the entire system (power off). Despite the facilities on offer from its more highly specified brethren, I found myself using the *H8* almost exclusively - it's just so simple. The fact that you could quite happily run the system using just a couple of keys rather tends to prove Revox's original supposition that all those extra keys are just there to look nice and impress people. However, looking nice and impressing people can be just as important

dominated by a large LCD window, which, on closer inspection, appears to be capable of displaying just two, very large, digits. The whole thing looks very, well, German I suppose. You'll either love it or loathe it, but it's certainly different.

To understand how the system works, let's consider playing a track on the CD player. You have four touch sensitive panels (buttons is far too prosaic a word), one for power, one to open the drawer and a pair to move up and down through the tracks. So to play track three you simply open the drawer, insert the disc and use the > key until 'three' appears on the large double digit display. This is where the logic takes over. Since you've selected track three you obviously want to play it. Therefore the CD player goes into play mode, the amplifier turns itself on, and music comes out of your speakers. Simple really. Operation of the tuner is

even easier - just touch the power switch and it turns itself on, goes to the station it was tuned to when you turned it off and then tells the amp to turn itself on. For lazy slobs like me this is pretty close to a dream system. No more having to go through a power up sequence that makes flight checking a jumbo jet look easy. Just press a single button and off it goes.

Each piece knows what the next piece is doing because they are all connected with DiN cables (supplied with each unit). The amp has a single DIN socket on the back while all the other units have a parallel wired pair. To wire up the system you just link them all together with the amp at one end of the chain.

### Adding to the system

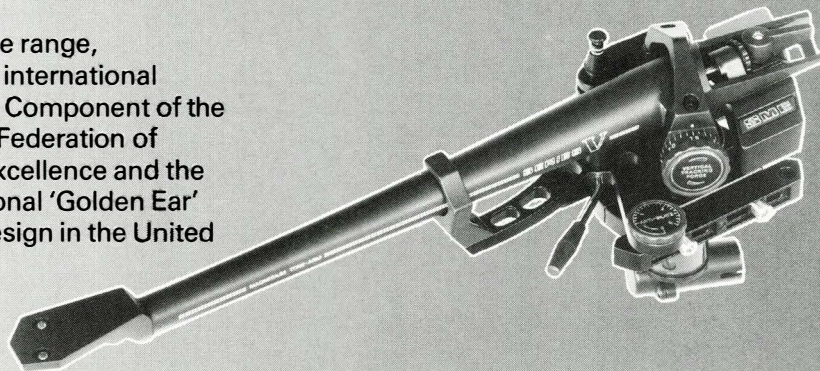
As well as the three units mentioned here, Revox also produces the *H9* linear tracking turntable and *H1* cassette deck, al-



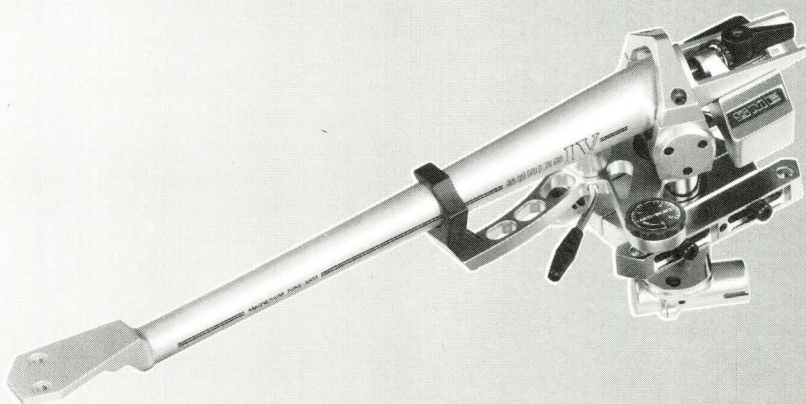
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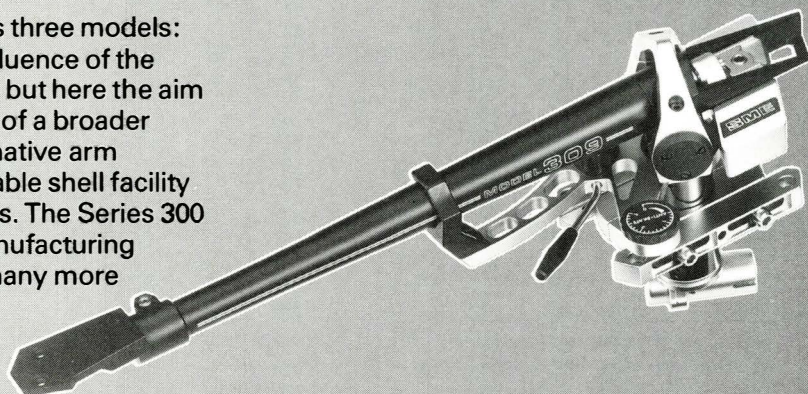
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criteria as ease of use when it comes to spending over £3,000 on hi-fi, so Revox has decided to cover all the bases.

If you want to seriously impress someone, just dump the aforementioned £540 H210 remote control terminal on the subject's lap. This is a remote control which is capable of providing hours of amusement for all the family. Calling it a terminal is not an idle boast. Not only does it talk to the H-Line components, it lets them talk back, by means of the H207 infra-red transceiver which connects onto the amp.

When used in conjunction with the H207 and H210, the amp acts as a switching centre for all the components connected to it via the aforementioned DIN cables. It relays system status information to the massive LCD screen on the remote control as well as routing the control commands to the relevant pieces of equipment.

### Talking back

The H207 comes with a more than generous length of cable and a useful 180-degree infra red acceptance angle. Thus the H207 can be positioned some way away from the system. Indeed, it could even be in another room all together. To show the massive difference that the H210 makes to the operation of the system, let's take a look at the tuner. In the normal, minimalist mode, the only real clue that the H6 has got RDS decoding built in is the fact that it says so on the front panel. It doesn't really affect the end-user that much.

When you first set it up, it uses the RDS station ID numbers to ensure that if a station is broadcasting on more than one channel, only the strongest signal is stored. But without the H210, the tuner won't give out any RDS information whatsoever, in fact it won't even display which frequency it is tuned to or let you renumber stations. This is all in line with the Revox minimalist philosophy. Revox argues that since the average user is likely to listen to a maximum of two stations, why confuse matters with all the extra unwanted information? However, with the remote control unit linked up, you can do just about anything your little heart desires.

Station ID numbers and the alphanumeric station identifiers are

displayed on the H210, as are frequencies, tuning modes and pretty much anything else you care to name. The only problem I found with the minimalist system was that you told it to tune itself in, but then had no indication as to which of the 16 stations it found were the ones you wanted to listen to. After a while I learnt that Radio 4 was station four and that Capital was station 12 but a little help would have been useful. With the H210 in place, this was no longer a problem.

When it came to listening to all this, I was more than a little surprised. There was no real reason to be, the system costs a lot of money and should sound superb. It is still a bit of a shock, though, to find that something which looks this good and offers this level of operational sophistication, also sounds very good indeed.

Obviously, there is a price to be paid for all the extra facilities, but by the sound of this combination, the price is not that high. The tuner in particular is a bit of a star, and although no tuner at £968 can ever be considered a bargain, this one really does sound excellent. One of the first tracks that I heard on it was the current Annie Lennox single, a quite astonishing performance, but Capital Radio really ought to give its record collection a bit of a clean at some stage. Still, despite the high levels of surface noise, the H6 was more than capable of offering a good sense of depth and had a nice natural timbre.

The CD player is a near state-of-the-art bitstream design and possesses a remarkably laid back feel to it, something which is particularly noticeable at low volumes.

**Not one, not two, but three remotes. For couch potatoes extraordinaire!**

Although you can turn up the volume with just a slight movement of your finger and from the comfort of your favourite armchair, you won't find yourself reaching for the volume control that often, such is the level of detail removed from the CD.

While the H2 perhaps falls a little short of the very best CD players on the market, it does so by only a very slight margin, perhaps most obvious in the bass delivery. Although the H5 is the heart of the control system and thus burdened down with relays for both source and speaker switching, the amp nonetheless enables the quality of the other components to show through. In fact, I had a highly rated, and indeed highly specified, £1,000 super integrated on hand for comparison, and the Revox was more open and detailed, although perhaps to blame for the slight bass slackness that I had already noticed with the H2.

### Value for money?

So what we have here is an extraordinary thought out, great sounding, up-market rack system. Which is rather a relief when you consider that the full remote control version won't give you an awful lot of change out of £4,000.

When used with the H210 and H207, the units are a treat and having all the information displayed on the remote control rather than having to squint myopically at the individual units is a definite plus. On the minus side, the two-way infra-red link is not continuous and if you set the display to track time and play a CD, the display does tend to jump a bit.

When used in minimalist mode, the equipment is again a joy to operate and you have the option of upgrading to full remote control at a later date. However, if you don't intend to add the H207 and H210, then you are paying for a lot of facilities that you can't even access, and £3,000 isn't cheap for an amp, CD player and tuner.

The basic decision is, as ever, yours. You might be able to better the sound quality of these components by spending your three or four thousand on separates designed solely for sound quality, but by offering sound quality, ease of use, and one of the most comprehensive remote control facilities known to man, the Revox is a unique product.



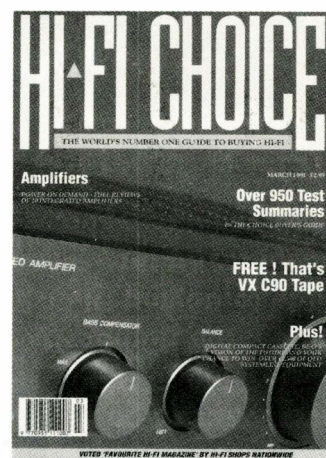
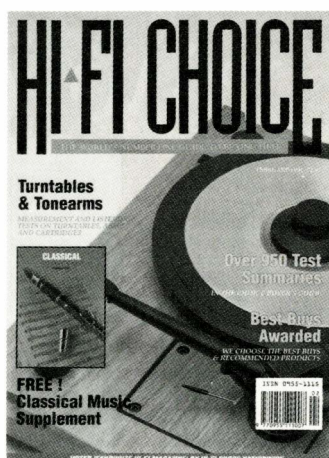






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# “Cambridge SoundWorks May Have The Best Value In The World. A Winner.”

David Clark—*Audio Magazine*

## Ensemble

BY HENRY KLOSS

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

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



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

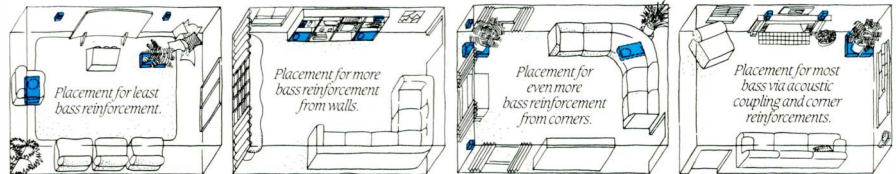
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At only £299—complete with all hardware and 100' of speaker cable,—Ensemble is *the* value on today's speaker market. America's *Esquire* magazine describes them by saying, “You get a month to play with the speakers before you either return them or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

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

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



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

# “We Know Of No Small Speaker That Surpasses The Overall Sound Of Ambiance” —*Stereo Review*

## Ambiance

BY HENRY KLOSS

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

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



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



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

**Inc.** Magazine

"Henry Kloss brought Dolby sound, CrO<sub>2</sub> cassette tape, and large-screen projection television into living rooms, and made the dominant speakers systems of three decades: Acoustic Research in the 1950's, KLH in the '60s, and Advent in the '70s. Now he's at it again at Cambridge SoundWorks, selling direct to the public."

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



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

**MODEL ELEVEN**

BY HENRY KLOSS

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



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**The Ideal "Second Stereo" Use It 52 Weeks A Year**

sound virtually identical to our acclaimed *Ensemble*<sup>®</sup> speaker system.

Model Eleven can be used virtually anywhere in the world—115- or 230-volt, 50 or 60 Hz AC or 12-volts DC. Because the entire system fits under an airline seat—or can be checked as baggage—you can take it just about anywhere. But Model Eleven's sound is so good, so "big," you may want to keep it home. It's an ideal second (or first) music system for a study, bedroom or kitchen. At £499 we don't know of any combination of components near its price\* (transportable or not) that approaches its sound quality.



*The drivers used in Model Eleven's two-way satellite speakers are no-compromise, high-performance components—just like you'd expect to find in the finest home speaker systems.*

work *with* a room's acoustics for optimum performance. Remove the satellite speakers, amplifier and your portable CD player from BassCase. Place the satellites where they create a musical "stage" near ear level. Put the BassCase where it reinforces low frequency output—on the floor, even behind furniture. The result is musically accurate



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*Henry Kloss created the dominant speaker models of the '50s (AR), '60s (KLH) and '70s (Advent)—as well as our highly acclaimed Ensemble and Ambiance<sup>®</sup> speakers. While packing a stereo system into a suitcase before a holiday, he realized that an amplifier, a CD player and two small speakers take up the same space required for an acoustic suspension woofer to reproduce really deep bass. That was the inspiration for BassCase, Model Eleven's bass speaker enclosure which doubles as the entire system's carrying case.*

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*A bargain at a mere 14p a minute, the latest generation of "supertapes" must have a lot to offer if they are to justify their very high price. We set Paul Miller loose on four of the latest offerings to see how they compare with conventional metals costing less than half the price.*

## Full Metal Jacket

**F**lagship products are part and parcel of the audio industry. They are statements of intent, expensive kit that embodies all the know-how of the manufacturer; know-how that might someday find its way into cheaper products. But flagship blank audio tape? If you think CDs are over-priced, then the prospect of spending £13 or so on a C90 might seem a little crazy.

Well, crazy or not, the leading tape manufacturers have all recently introduced top-of-the-line metal formulations complete with hi-tech packaging and prices to match. All this comes after a period that's seen a decline in the sale and production of metal tapes, which only account for some one percent of the total market anyway.

To see if there is any benefit in splashing out a tenner on a blank tape, we've got

hold of each of the four principal "supertapes" and pitched them against mid and lower-priced metals from the same stables. The "supertapes" include Sony's ceramic-shelled *Metal Master*, TDK's heavyweight *MA-XG* and the long-awaited *Suono* from That's, all of which retail for around £8. An extra £5, bringing the bill to a whopping £13, buys you Maxell's *Metal Vertex*. So what do these costly C90s offer that *Metal-S* (Sony - £4), *MA-X* (TDK - £3.60), *MG-X* (That's - £2.80) and *MX* (Maxell - £3.40) do not?

### In a bind

For a start the costlier tape usually employs a superior metal or metal alloy formulation. This means smaller magnetic particles for lower hiss and an improved binder to keep these invisible grains evenly separated across the tape. Differ-

ent magnetic layers may also be combined within the one tape, each optimised for a different range of audio frequencies. High recording levels are then tolerated across the entire audio band and this, together with the low hiss, ensures a wider dynamic range.

To take advantage of the increased dynamic range available you must have the right deck. Just because the machine is equipped with Type I, II and IV tape positions does not mean it will be able to sustain the high bias currents and powerful magnetic input demanded by these hi-tech tapes. Even if wow and flutter are kept at bay by a decent mechanism you're not going to realise the tape's huge dynamic range unless the record heads can hammer home those peak levels. All too often the deck's heads will overload and saturate before the tape has had its fill.



## Metal Master

This is particularly true of Sony's *Metal Master*, whose twin-layer formulation will tolerate a full 2dB more input level than the cheaper *Metal-S*. The finer extralloy particles also reduce hiss, resulting in a potential dynamic range that's a full 3dB wider than *Metal-S*, just so long as your machine is up to the job. The extra cash is also justified by *Metal Master's* white ceramic shell, a highly rigid structure that is deemed to reduce tape vibration and so reduce modulation noise. We'll talk about this claim a little later.

It's interesting to note that there are many similarities between this new ceramic *Metal Master* and Sony's original *Metal-ES*, specifically the low hiss and massive output levels which contribute to the widest dynamic range of any metal tape currently available, although TDK's *SA-X* pseudochrome boasts the widest range of all. However, like *M-ES*, *MM* also has a rather wacky sensitivity trend which, though more sensitive all-round, is a trifle bumpy when compared to an ordinary metal like *Metal-S*.

The abrupt treble peak doesn't lend *MM* a splashy or aggressive sound but it does introduce a certain buzz of excitement. Even a fairly bright pop track like the Pet Shop Boys' *Only the Wind* fails to aggravate the tape. There's no increase in vocal sibilance nor any obvious corruption in the purity of strings or percussion, yet an aural spotlight is trained on certain very precise details. The attack and focus of individual cymbal strikes come in for particular attention, for instance.

Yet because there's little or no smearing, no harsh spikiness about the recording, this innocuous 'lift' to the sound seems perfectly comfortable. In this respect the tape sounds more articulate than the cheaper *Metal-S*. If recording levels are matched tape-for-tape then hiss is also far less obvious, yet it's only by bludgeoning with level that the glorious dynamic range of *MM* can be truly exploited.

And for that you'll need a deck equipped with state-of-the-art heads, like the Nakamichi *Dragon* employed in these tests. Above all *Metal Master* has a very deep, firm and confident attitude to its music-making. So long as your deck is essentially free of wow and flutter then the rhythmic solidity and authoritative demeanour of the tape can hardly fail to shine through.

## Wrestling with Suono

Oddly enough if any recording was prone to sounding a little bright or pointed then this was most obvious with both of the That's metals. It was certainly rather more difficult to detect any real difference in quality between *MG-X* and *Suono* than it was between *Metal-S* and *Metal Master* or *MX* and *Vertex* for instance. Yet That's insists on creating something of a unique

if pseudo-scientific image for *Suono* with its 'Nano Dynamic Tactoid Magnetic' particles and 'Three-dimensional Resin and High Density Dome Cassette Shell'.

The domed centre portion of the shell is supposed to control vibrations within the structure but the optimum 'concavity' results in a shell that won't fit in all cassette mechanisms. Consequently, That's was forced to adopt something of a halfway house to ensure full compatibility.

Meanwhile the tape itself appears little different to that employed in either *MG-X* or *MR-X Pro*, though samples of these tapes have been varying quite wildly over the last six months or so. Of course, it makes perfect business sense to use graded versions of the same tape but I wish That's would come clean on the issue.

On the whole, both That's tapes offered a pleasantly open and transparent copy even if a hint of graininess infiltrated the most powerful of vocals. The relatively gentle, rolling quality of Sinead O'Connor's *Nothing Compares 2U* was captured beautifully by *Suono*. Bass was generally taut and richly textured just as the upper octaves were simultaneously detailed and relaxed.

No problems here, certainly, but faced with the abrupt force of Watanabe's sax from *Everything Happens to Me* there was a tightening of this once open and free ambience. The entire soundstage seemed tense or constricted, the searing timbre of the instrument just too cold - and all this within the MOL/SAT limits of the tape. Obviously you can expect some audible compression and distortion if you push any tape too hard but the 'character' of both *MG-X* and *Suono* distinctly aiter near the limits of their range.

## MA-XG

Compared to this, TDK's *MA-XG* sounded immediately beefier, fuller and more purposeful. Recordings were no more transparent, in fact, there was a very slight and underlying haze, yet there was a firmness and depth about the sound that was missing with That's tapes. Interestingly enough, TDK's cheaper *MA-X* did sound more transparent but it was also livelier and less well controlled at the frequency extremes. There was a youthful enthusiasm about its recordings whereas *MA-XG* sounded sober and reserved, not dull but certainly not as brisk or agile as the cheaper *MA-X*.

The sparkling backdrop to Prefab Sprout's *We Let the Stars Go* lost a little of its glitter with *MA-XG*, the vocals and strings certainly sounded taut, dry and solidly focused but there was also some dampening of the music's spirit.

Nevertheless, I would certainly not say that *MA-XG* is necessarily the better formulation. It is the first time TDK has opted for a dual-metal layer, binding finer low-noise Finavinx alloy crystals onto a

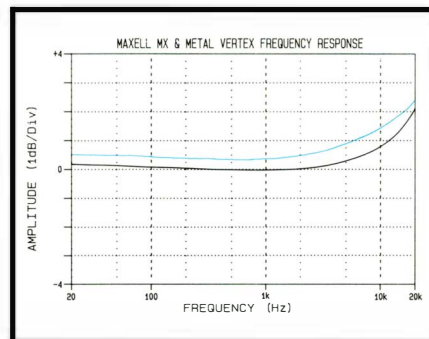


Fig.1

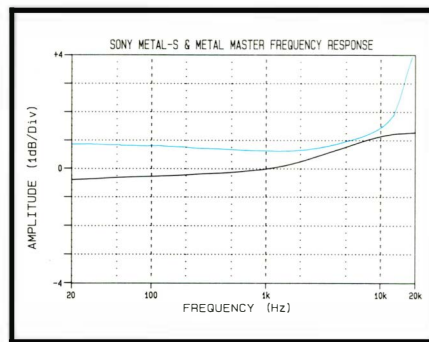


Fig.2

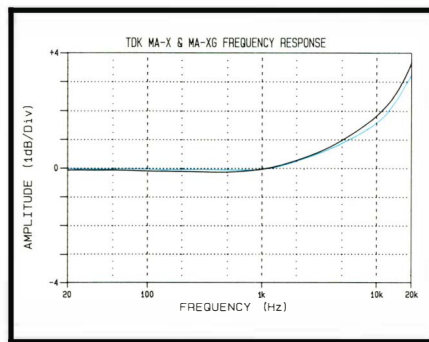


Fig.3

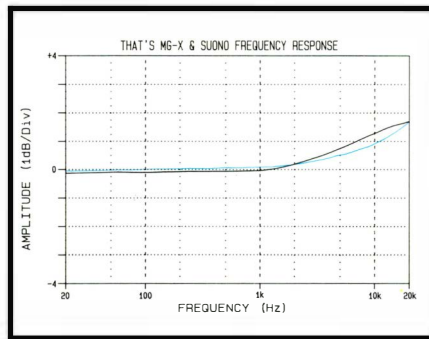


Fig.4



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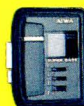
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aligns all the crystals before the pigment has dried on the base film. Vertex' principal claim to fame however, lies in its vanishingly low modulation noise.

This is a feature Maxell ascribes to the smooth tape finish, stable tape running and three-piece 'Anti-Modulation' cassette mechanism. To this end the shell is damped by an alloy 'Golden Emblem' that lies flush with both surfaces of the visco-elastic shell. These components, together with the fibreglass reinforced guide block, maintain the phase accuracy of the tape (ie reduce any azimuth error) while, according to Maxell, virtually eliminating any external vibrations that might introduce further modulation noise.

lower layer of high-output Finavinx pigment. Technically this means MA-XG will accept slightly higher levels than MA-X which, together with its lower hiss, should realise a wider dynamic range. Yet the very best Type II tapes will still improve upon this performance.

A heavyweight RS-III mechanism has been developed to do justice to MA-XG. The two opposing faces of the shell are moulded from a tough fibreglass reinforced plastic and are bolted together via three separate side frames. Weights are also introduced around the tape guide block to further reinforce the structure which contains no less than ten fixing screws! Once again, claims are made for reducing modulation noise even though the numerical results would appear to contradict this.

In an IEC calibrated deck MA-XG should offer a dry but ruddy bass and tightly focused midband, properties that lend it an individual character despite its lack of see-through transparency. I have to say, however, that the 'cleaner' sound of the Sony and That's formulations gives them the edge in this regard.

### Vertex

There's a similar contrast between Maxell's MX and Vertex metals even if, in its latest guise, MX is a trifle unruly when compared to MA-X. Recordings sound bright and occasionally spitty, particularly when handling forceful vocal material. But then even though MX has a similar sensitivity pattern to Vertex, in absolute terms it's less sensitive, slightly noisier and won't accept such punishing levels.

Vertex does not offer the widest dynamic range nor the highest MOLs of any metal but then this is a conventional - if very high quality - single-layer iron formulation. This said, Maxell has optimised the performance of these 0.3um particles with a proprietary binder and multi-stage orientation procedure which

Like MX, Metal Vertex can also sound a little forward but there's a refinement, a sense of poise and subtlety about its performance that's missing with the cheaper metal. Vertex excels at revealing a deep and inky black acoustic, this extra depth of detail a product of the tape's extraordinarily low modulation noise. Prefab Sprout's *One of the Broken* was certainly reproduced with all the spacious, open atmosphere of the original though there was some mild coloration of the vocals. The atmosphere was faithful enough but at the expense of precise articulation.

It's very easy to appreciate the positive qualities of Vertex but it still lacks the universal appeal, the balance of properties that might possibly justify its extreme price. No matter how low its modulation noise, £13 is simply too steep! Ignoring this for the moment, it is nevertheless true that both Sony's Metal Master and Maxell's Vertex offer immediate sonic gains over cheaper metals within the same range. TDK's MA-XG is really no better than MA-X; it's simply different. On the other hand, there is very little to distinguish between That's Suono and MG-X. So the latter would seem to represent something of a steal at just £2.80.

### Shelling out the extra

In truth, it is the fancy cassette shells that considerably bump-up the price

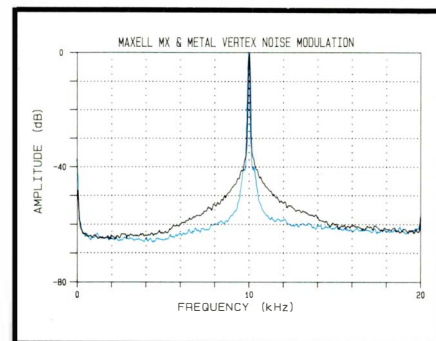


Fig.5

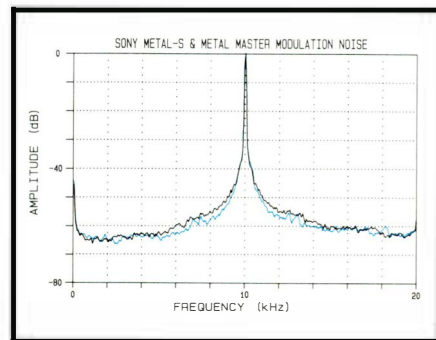


Fig.6

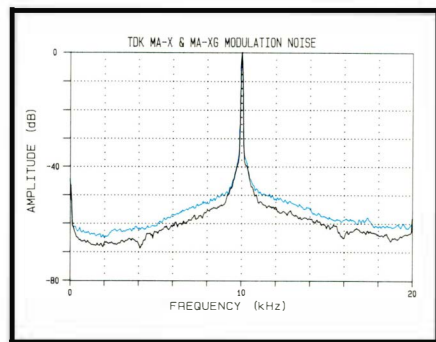


Fig.7

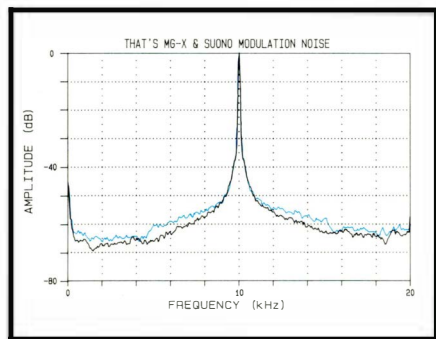


Fig.8



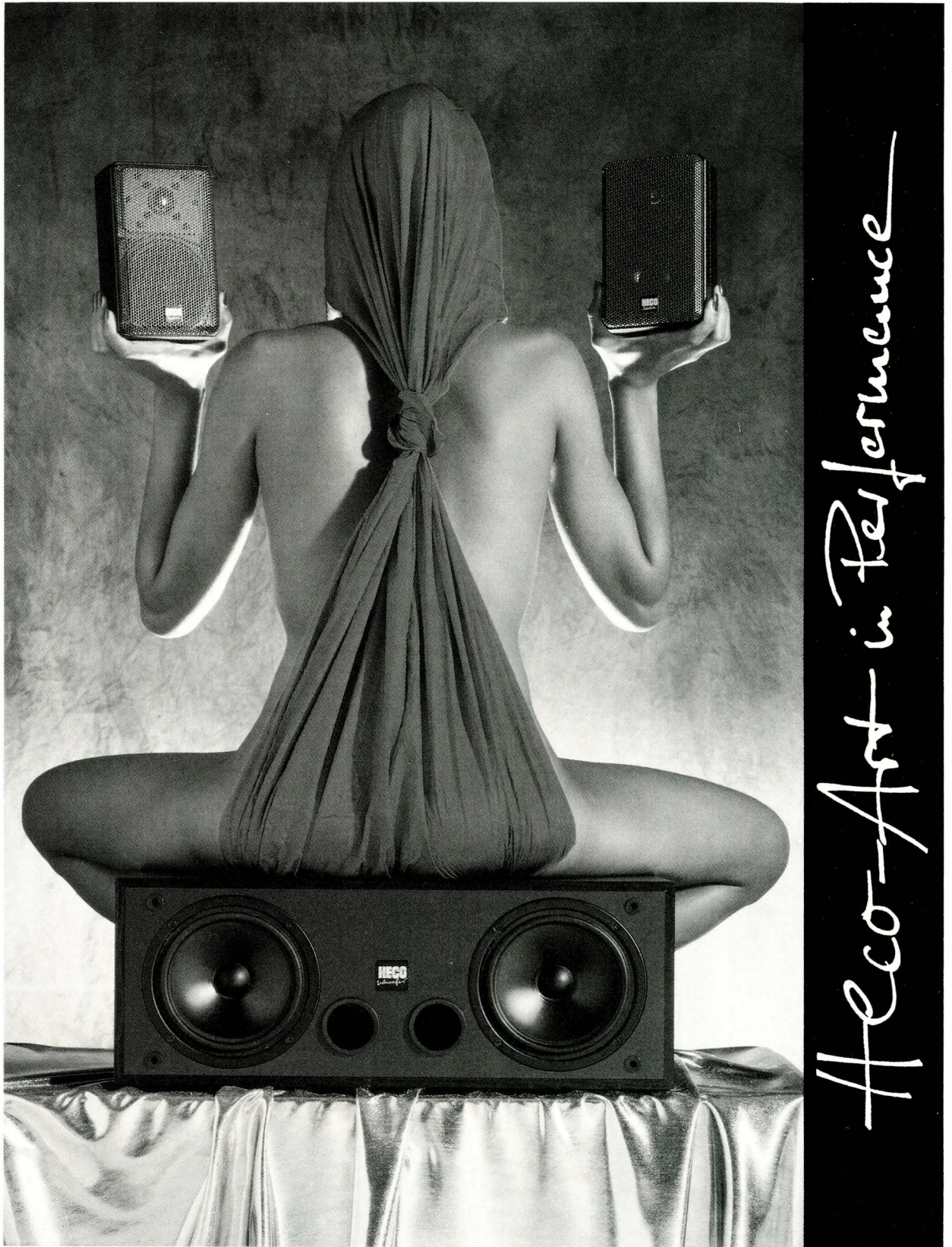
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of these super-tapes. Sure, the formulations should be a little more sophisticated but how otherwise can That's justify the extra cost of *Suono* for instance? Modulation noise is the key here and its reduction is championed most vigorously by the four protagonists in this test. Modulation noise is no technical distraction, in fact it's a very real and high-level phenomenon that is both easily measured and, often as not, correlated with sound quality.

Modulation noise is generated during recording by vibrations - however imperceptible - that wobble the tape as it passes over the top of the record head. The slightest movement from side to side will modulate the frequency of the recorded signals while similar 'wobbles' up and down will modulate the level or amplitude of the recorded signals.

Just like a radio broadcast the music waveform is now accompanied by both FM (Frequency Modulated) and AM (Amplitude Modulated) sidebands. But because the tape is wobbled in a random, noise-like fashion these sidebands also materialise as a sort of noise rather than discrete frequencies.

Just look at graphs 5-8 where the recorded 10kHz tone is accompanied by a broad skirt of modulation noise that extends across the entire audio range. In a perfect world this noise would be absent, yet in practice it's caused by the whirring of the deck's motors plus friction between the back of the tape and the guide pins, rollers and felt pressure pad. Some scuffing also occurs between the magnetic surface of the tape and the deck's audio heads, so anything less than a mirror-smooth finish will increase modulation noise.

The blue spectrum on fig 8 shows the That's *Suono* suffering slightly more modulation noise than MG-X which is depicted in black. Other samples of MG-X and *Suono* were closer still, adding further weight to the contention that regardless of differences in shell design the two tapes are pretty damn similar! Yet, in absolute terms, both these tapes are superior to

TDK's MA-XG when it comes to mod noise (fig 7, blue spectrum). In fact both MA-X and the old zinc-bodied MA-XG improve upon the new RS-III MA-XG, utterly contradicting TDK's own literature. Perhaps this is the reason for the vague or hazy ambience of certain recordings made on new MA-XG?

Sony's *Metal Master* (blue spectrum) betters *Metal-Son* fig 6 but the lower modulation noise also serves to reveal some flutter at 2.6kHz and 3kHz (two small peaks either side of the main 10kHz signal). This is caused by the very slightest scraping of the hubs in Sony's SPII tape mechanism. But take a look at fig 5 which compares Maxell's MX (black) with *Vertex* (blue). Here the difference is both huge and indisputable - the most impressive result I've ever clapped eyes on in fact. But does the costly *Vertex* shell really make that much difference?

### Hype?

All these manufacturers are playing heavily on the deleterious effects of modulation noise and make claims as to the superiority of their mechanisms in combating the phenomenon. It seems reasonable to assume that a cassette shell composed of acoustically 'dead' materials will be more effective at combating unwanted vibration than one struck from cheap and nasty transparent plastic. But who buys a £10 metal tape to use in a half-baked deck in the first place?

Figure 9 is quite revealing. The original modulation noise spectrum (black) shows Maxell's *Metal Vertex* tape in its own and very costly shell. But the (blue) spectrum shows exactly the same tape transferred into Sony's ceramic shell where there is no appreciable change. Neither is there any scrape flutter, by the way, because I transferred Maxell's hubs together with the tape.

In fact, it is the *Vertex'* proprietary 'Techno-Silver' back coating that makes all the difference. This, and the extensive calendaring (polishing) performed on its magnetic surface, gives rise to a mirror-smooth finish which reduces friction and thereby reduces modulation noise. In

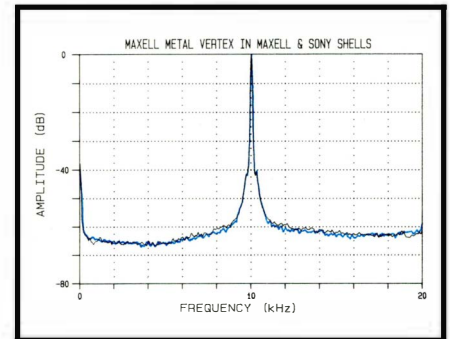
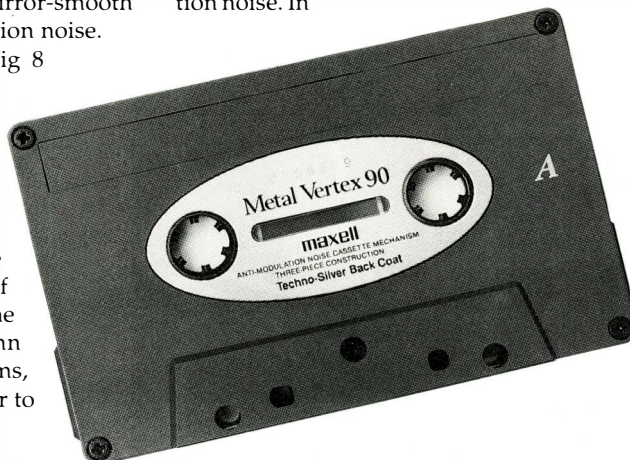


Fig.9

this respect there seems to be no difference between the *Vertex* and *Metal Master*.

### A polished performer

All manufacturers calendar or polish the magnetic tape as part of the orienting process but, clearly, some still end up rougher than others. Playing a tape over and over can polish-up the surface, however, thereby reducing modulation noise. BASF's chromes certainly benefit from a few passes, for instance.

Consequently, the comparably high modulation noise suffered by TDK's MA-XG is not the fault of its 'state-of-the-art' RS-III mechanism but a feature of the relatively abrasive tape finish. This is easily proved by placing Maxell's *Vertex* tape in TDK's RS-III shell whereupon its spectacularly low modulation noise is once again revealed. Likewise, That's has employed what appear to be two quite different cassette shells to distinguish MG-X and *Suono*. Yet because both models feature a very similar (if not identical) tape formulation their final modulation noise is also very similar.

There is no dispute that a high quality shell constructed to fine tolerances may well improve the phase integrity of the tape, particularly during warm weather when cheaper shells could begin to distort. A consistent treble performance is therefore assured. But dragging modulation noise into the act is, by contrast, something of a blue herring.

You need a sophisticated machine with tape tuning and/or bias adjustment to really get the best from these tapes, and it's good to see that the state of the cassette tape art is making progress. But it would be appreciated if manufacturers were to make these formulations available at more realistic prices.





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  - Marantz CD40
  - Marantz CD41
  - Marantz CD50
  - Marantz CD50SE
  - Marantz CD60
  - Marantz CD60SE
  - Nad 5320
  - Nad 5325
  - Nad 5440

- add £40 Philips CD624
- add £70 Philips CD634
- add £115 Philips CD850
- add £160 Philips CD6101i
- add £50 Pioneer PD6500
- add £95 Rotel RCD865
- add £120 Rotel RCD865
- add £140 Sony CDP790
- add £170 Technics SLPS50
- add £60 Technics SLPS70
- add £75 Yamaha CDX530
- add £160

- TURNTABLES**
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  - add £115 Dual CS505-4
  - add £245 AR EB 101
  - add £35 Nad 5120
  - add £90 Revolver black inc. arm
  - add £115 Revolver Rebel
  - add £165 Ariston Q Deck
  - add £45 Rotel RP855
  - add £110 Systemdek-1 - AT 110E
  - add £150 Systemdek II/900 + MOTH - AT 110E
  - add £50
  - add £15
  - add £30
  - add £90
  - deduct £30
  - add £100
  - add £50
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The first correct entry drawn from our mailbag after the closing date will win the following Acoustic Research/AKG system: A07 amplifier (£300), T-06R tuner (£250), EB-101 turntable (£230), RD-06 cassette deck (£300), CD-06 CD player (£300), AR-162 loudspeakers (£500) and AKG K340 headphones (£140). The second correct entry will win a pair of AKG K340 headphones and the third correct entry will receive a pair of AKG K44 headphones (£40).

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

1. Who was the founding father of Acoustic Research?
2. Where is headphone and microphone manufacturer AKG based?
3. Name one DAT player that has a display off facility?
4. Which which CD manufacturer makes an active loudspeaker equipped with bitstream D/A convertors?
5. Which well known author uses an Audio Research SP11 preamplifier?
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# 21st Century Fox

Acronyms are in as Barry Fox reports back from America on MIDEM, MITI, DCC, DAT, CD-R and Thor.

## A touch of farce

The whole business of DCC has a touch of farce about it. Which is a pity because the system is very clever and the engineers in Eindhoven who developed it deserve all credit. The main problems are political, and not of Philips making. But they could have been better handled.

The long running intrigue continued at the Las Vegas Consumer Electronics Show, where DCC was finally unveiled to the trade.

During confidential briefings on DCC given in Eindhoven before Christmas, but embargoed until the opening day of the Las Vegas show (January 10th), Philips had revealed that Matsushita is the co-developer and co-licencee of DCC. But at a press conference in Las Vegas, Philips backtracked and coyly refused to identify Matsushita by name, even though representatives from Matsushita's hi-fi division, Technics, were sitting in the audience.

Significantly, Matsushita's booth at the exhibition downplayed DAT, with only one Technics DAT deck on display. Sony's display, on the other hand, showed that the company is still presenting a solid commitment to DAT. In addition to two home DAT decks, a car DAT player and a DAT Walkman, Sony showed a new DAT home deck. With four, rather than two, recording heads on the rotating drum, the DTC-87ES can monitor off-tape, ie play back a recording as it is made, to check that the sound really is going onto tape without blemishes. The price, however, is \$1,800.

Sony also announced that the Digital Audio Disc Corporation at Terre Haute, in Indiana, will double its capacity for DAT duplication to 700,000 a year.

In addition to this DAT commitment, Sony is just one of several Japanese companies which has been talking to Philips about

committing to DCC.

This was confirmed at the MIDEM music industry Festival in Cannes, a week or so after Vegas, where I asked Philips' Jan Timmer why Matsushita's name had been pulled: "I don't deny that there were extensive discussions with Matsushita, and other Japanese companies. But I don't feel that I should make a statement on their behalf. It is up to those companies to decide when to go public.

"I agree that it would be regrettable if we were to confuse the public with two competing systems. The announcement on DAT came too early. DCC is better for the public at large. I still hope that discussions with the Japanese will prevent this confusion".

In fact, it makes sound sense for both Matsushita and Sony (and others) to hedge bets by working on both DCC and DAT. Whatever happens, DAT has an assured future as a professional and semi-professional format.

Sony's talks on DCC fell through last August when the Japanese government's trade body, MITI, demanded a solid front on DAT.

It was MITI's involvement that had caused all the previous delays on DCC. Philips had been ready to spill the beans last autumn at the Firato hi-fi show in Holland. After a lot of high level horse-trading with Philips, Matsushita decided to risk the wrath of MITI and commit to DCC, with the news scheduled to break at Las Vegas. That was why Philips felt confident, in those pre-Vegas briefings, to reveal that Matsushita was the co-developer and co-licencee of DCC.

But Japanese feet froze over the Christmas holiday. So at an eve of show press conference in Las Vegas, Wim Wielens, MD of Philips Audio, could talk only of partnership on DCC with "a big Japanese hardware manufacturer".

The next morning a newsletter distributed at the show opened the stable door wide again by naming Matsushita as co-developer and co-licencee of DCC.

Back in the UK, Panasonic and Technics staff were still being told to treat the DCC connection as a secret, play down any commitment to the new format and play up the company's commitment to DAT.

At Las Vegas, Robert McClure, President of Tandy Electronics, stood up at Philips' press conference and confirmed that Tandy will make DCC hardware at its factory in Fort Worth, Texas and Memorex-brand DCC tape at Tandy's Magnetic Media factory in Santa Clara, California. When asked the obvious question, "Whatever happened to Thor, the recordable CD system which Tandy previously promised?" McClure seemed content to say only that Tandy was developing both DCC and Thor. He saw no reason to explain why Tandy in May 1988 promised to launch a recordable CD system within eighteen months or two years, but failed to deliver.

Time for questions ran out before the press could corner McClure. And the men for Matsushita, who had been lurking in the audience, made a beeline for the door.

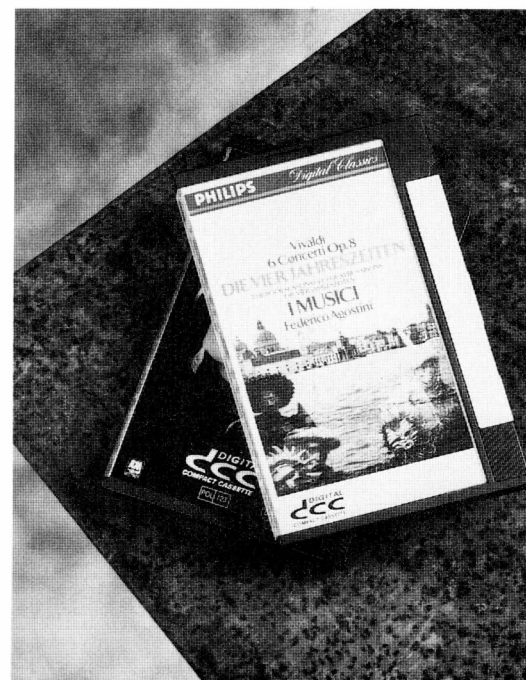
## CD-R news

While all the politics was playing on DCC, Trio-Kenwood made news at Vegas by showing a domestic version of the company's \$38,000 professional CD recorder. This records on write-once blank discs, made by Taiyo

and TDK. Both discs use Taiyo's dye-coating technology.

In fact the LZ-13 CD recorder was only a prototype. It does not yet contain the computer software needed to let the system make piecemeal recordings on the same disc, a few tracks of music one day, a few more the next and so on. The vital Table of Contents can only be written once, so the recorder writes a temporary listing on the disc each time a piecemeal addition is made. When the disc is full, it writes a final, complete TOC in the position specified by the Red Book standard. Then, and only then, is the disc compatible with a conventional CD player.

Kenwood's professional unit is controlled by a personal computer with 380 kilobytes worth of control software on a floppy disk. Any domestic unit will have to contain this software, burned permanently into ROM chips. Until this is done Kenwood will not even guesstimate a price. Nor will Kenwood even hint at when the chips and recorder will be ready.







# Definitely not Carver buyers

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# Choosing and Using . . . Cassette Decks

*What factors should you take into account when purchasing a cassette deck?  
Alvin Gold offers advice.*

According to the predictions of some industry pundits a few years ago, compact cassette should by now have been consigned to the great dustbin in the sky. As CDs are in the process of replacing records, DAT was to have usurped cassettes, but that has yet to happen, and probably never will.

Although DAT appears to be getting another marketing push now that the SCMS system has been agreed on (this system allows a DAT recorder to copy a CD in the digital domain - but will *not* allow you to make a copy of the copy), the message is that the humble cassette trundles into a new decade, consolidating rather than loosening its grip on the market.

Cassettes are cheap, flexible and insensitive to being moved around (unlike any disc based system), but most of all they're widely understood and used, currently outselling all other prerecorded media by miles.

Though the future of the cassette seems assured, this is not to say it will escape the winds of change. Potential buyers should take into account the imminent introduction of a new noise reduction process called Dolby S, which is both extremely powerful and yet is claimed to provide a degree of compatibility with Dolby B. That last claim should perhaps be taken with a pinch of salt, remembering that Dolby Labs said much the same of Dolby C. But it is also claimed that a Dolby S deck will perform comparably to digital media with respect to noise. Dolby clearly sees the process as one that will eventually usurp Dolby B for prerecorded applications, so it shouldn't be underestimated.

You can't buy a Dolby S cassette deck yet, although Harman Kardon is promising that first generation machines are imminent. Anybody buying an expensive cassette deck should at least take

Dolby S into account.

What other factors should you take into account? Obviously sound quality is a primary attribute, and is discussed fully in the reviews. Suffice it to say here that a good budget price deck (with the emphasis on 'good') costing say £100-£150, will be able to make recordings free of obvious problems like excessive noise, instability or varying pitch, at least when listening reasonably casually. However, something better will be needed for intensive use in a high resolution system, and you'll find ample rewards for paying extra, the point of diminishing returns becomes a factor only well into the several hundred pounds territory.

## Types of tape

One advantage of better quality cassette decks is that they make more of the tapes you feed them. Ultra-quiet Type IIs, for example, can often be used to record even quite wide range music without Dolby noise reduction, yet without obvious signs of hiss at normal volume levels, given an inherently quiet deck with good heads. It's surprising how noise free a sympathetically chosen deck and tape combination can be, and omitting noise reduction processing generally adds clarity and articulation to the sound which is, literally and metaphorically, less manipulated. Dolby HX Pro assists here, since it helps prop up flagging high frequency dynamics on musical passages recorded at high level, keeping compression at bay a crucial few decibels more than otherwise would be the case.

Metal tapes tend to be noisier (as well as being more expensive of course), and consequently it's harder to dispense with Dolby noise reduction. Nevertheless, metal tapes remain the best option for capturing music's solidity and dynamics since the nature of the recording process with

metals is inherently less prone to compression. At the same time, metals need high bias and record currents which makes the task of the cassette deck considerably more complicated.

Three independent heads - erase, record, play - are also part of the territory with expensive cassette decks. Reviewers love three-head decks because they make testing a less complicated task, but they do very frequently sound better, especially where other decks are at their weakest, at high frequencies and high levels. Dual capstan transports are often used in three-head decks, and generally this leads to improvements in wow and flutter, and in output stability. In other words, you get what you pay for, as usual.

The features offered by modern cassette decks haven't increased over the last couple of years, but more decks have soft-touch logic controlled transports, effective intro-search and track search options, memory counters, and so on.

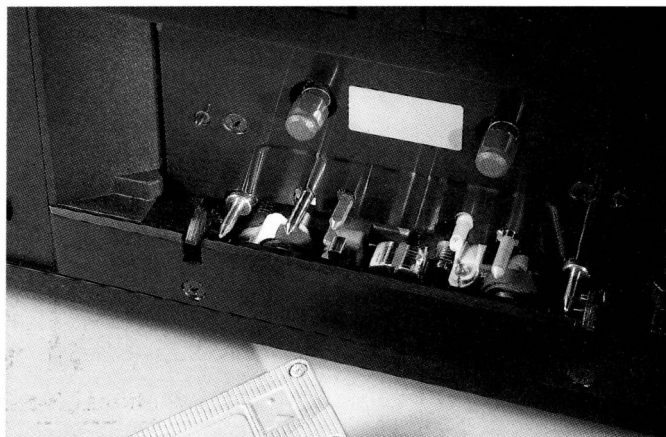
Electronics are being used for more and more functions of course, but sometimes this backfires on the user, who should beware that not all logic decks can be left in record standby using an outboard timer (this facility is intrinsic to decks featuring mechanically latching

transport controls) as the tests that follow demonstrate. In one or two cases, even Dolby switching is defeated when the player is turned off, leading to the near certainty of frequent operating errors.

## Different decks

Several of the more sophisticated features found on some decks add considerably to convenience and utility but to the almost inevitable detriment of performance standards. Dual transport decks - which allow tape-to-tape dubbing and sequential play - are predominantly low in price and don't even pretend to offer high standards of sound quality. Auto-reverse decks which certainly aren't restricted to any particular price bracket, involve considerable complication to transport design and almost guaranteed qualitative losses if not in normal use, then certainly when playing side two with the tape running in the reverse sense.

Technological fixes are available to bring auto reverse standards into line with unidirectional standards, but they don't come cheaply and these days are rarely employed against a background of an apparently diminishing interest in the breed. I wonder if deck manufacturers are reading the right messages from this diminishing interest?



*The cassette has an assured future, but there will be changes.*



# Aiwa AD-F500

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

**Recommended**



This month's reviews provide an excellent opportunity to compare a single transport deck with an identically priced twin deck from the same stable. The AD-F500 is a single transport deck, and the AD-WX616, also reviewed in this issue, is the comparably priced twin.

Aimed at a somewhat more quality conscious marketplace than the 616, several of the AD-F500's headline features are directed squarely at improving sound quality. It is important to qualify this, though, by remembering that it is always dangerous to definitively link specific characteristics of the sound you hear to particular hardware attributes.

Prominent features are the use of independent capstan and reel drive motors in a transport mechanism Aiwa describes as 'super stable' and having 'class beating' levels of wow and flutter. Other goodies include very fast wind speeds, PC-OCC head coils, and a cassette shell clamp which rejoices under the name AMTS (Anti Modulation Tape Stabiliser in case you're collecting trivia questions). Also fitted are independent manual record bias and sensitivity adjusters, the latter being useful for avoiding Dolby mistracking.

Remaining features include Dolby B and C, Dolby HX Pro, audible cueing, track search (the latter worked only erratically on the test sample) and seven step 30dB record level meters. The transport is logic buffered, has large, easy to use controls and works quietly. A fixed level headphone socket is fitted, as is a timer standby switch. The tape counter however, is strictly manual, and no counter memory option is available.

## Test Report

For some reason, the raw unweighted wow figure is slightly higher than for the AD-WX616, but all the other figures, including the overall weighted wow and flutter figure, support the thesis that Aiwa has been able to sink more resources into

this transport than into the two required for the equivalent twin. The superior numbers are supported by a more impressive spectrum analysis plot. The AD-F500's frequency responses are also more accurate at the normal settings of the bias and level controls. The bass end is smoother with less 'ringing' and there is greater control and uniformity elsewhere, along with less dropout (see Type IV response plot) and much improved Dolby line-up accuracy. Only the playback response was significantly in error, the shape being clearly dished.

Curiously, the AD-F500 was inferior to the 616 in the area of bias noise, by quite significant amounts - with or without the differences in THD taken into account.

## Sound Quality

The increased noise levels of the AD-F500 were less apparent than might have been expected. This would seem to be because the electronics of this model are more transparent and can be driven nearer to their limits without audible distress. Nevertheless, this isn't the quietest deck in its class, and it is generally not feasible to bypass Dolby processing, though as always this depends on the type of tape, and the nature of both the music and the playback system. As with the AD-WX616, the Dolby circuits are not totally transparent, but they remain a whole order of magnitude better than those fitted to the dual transport model.

Indeed, everything about this deck sounds an order of magnitude better, and the AD-F500 is a triumphant reaffirmation of the sonic advantages of a single transport deck at the lower price points. The AD-F500 is neutral and open sounding, with a solid and accurate bass. It has a clean refined treble and is capable of excellent presence and vitality.

## Conclusion

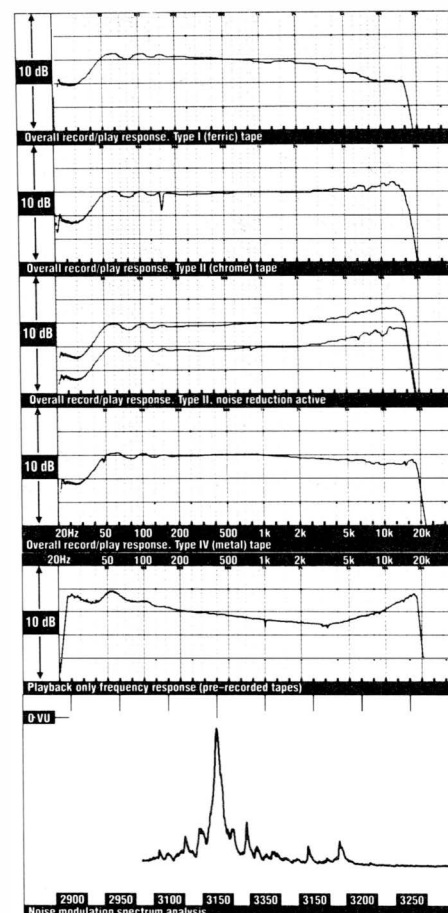
With slightly lower noise levels to facili-

tate Dolby-less recording, this would have been a Best Buy. It is still highly Recommended at the price - an excellent all-rounder.

*Note: Formal listening was carried out using a second sample after the first experienced failure on one channel.*

## TEST RESULTS

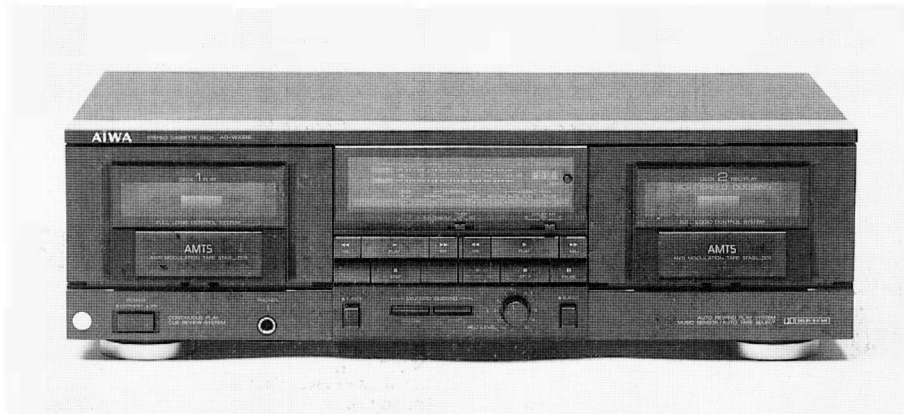
Dolby Level reading on deck's meters	+3dB
Rec/play response -3dB ref 1kHz	
IEC Type I	<20Hz - 16kHz
IEC Type II	<20Hz - 17kHz
IEC Type IV	<20Hz - 20kHz
Wow/Flutter - Peak DIN wtd /unweighted	0.08%/0.25%
Wow/Flutter - Peak DIN wtd	0.06%/0.30%
Speed error	0.9%
Type I signal/noise CCIR/ARM 400Hz & distortion OUV	47.5dB
Type II signal/noise CCIR/ARM 400Hz & distortion OUV	54dB
Type IV signal/noise CCIR/ARM 400Hz & distortion OUV	0.85%
Noise Figure of Merit (Dolby level/noise Type II)	9.5dB
Line input sensitivity/overload	0.95%
Mic input sensitivity/overload	57dB
Line output for 0dB/maximum	90mV/>13V
IM distortion 10kHz/1kHz 0dB peak, 1kHz product	n/a
Azimuth check R-L phase at 10kHz	563mV/2.9V
VU indication at IEC 0dB	2.82%
Dimensions (wxhxd)	0 degrees
Average wind/rewind time (C90)	3dB
Typical Retail Price	43x13.5x2.7cm
	1 min 40 sec/very fast
	£150





# Aiwa AD-WX616

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



From an extensive range of the twin transport decks that appear in the Aiwa catalogue (the latest edition of which lists no less than seven different models!), the AD-WX616 is a middle ranking model which sells for the same price as the AD-F500 (reviewed opposite).

The Aiwa has been designed with admirable restraint. The two sets of light touch, logic transport controls are positioned adjacent to each other between the tape loading doors, an arrangement that is very easy to get to grips with. One obvious difference to the AD-F500 is that this deck doesn't have Dolby HX Pro, a circuit designed to maximise performance from lower bias tapes. Dolby B and C are included however. The tape transports are fitted with stabilisers designed to reduce shell resonances.

The list of convenience features is impressive at the price. It includes track search, audible cueing (which worked more effectively than on the sister model) and auto-rewind when a recording has been completed - a facility borrowed from the video world. Both transports are unidirectional, and as usual, only one records. This has the usual linked operations which include sequential play, normal and double speed dubbing, the latter started with a single button press. The Aiwa can drive headphones, though only at fixed level, and can be linked to a timer for absentee recordings. There is no counter memory.

Taking price and other twin decks into account, the AD-WX616 has the feel of a quality product which operates smoothly and with seemly decorum.

## Test Report

This is a surprisingly quiet deck, which has low levels of bias noise with all tape groups, and a slow build-up of distortion products at higher levels. It matches - or beats - the ability of much more costly decks in this area.

Unfortunately, however, this is about the best that can be said of this deck, which is otherwise shown up by the AD-F500 - usually in no uncertain terms. The various frequency responses, for example, are extremely scrappy. Note in particular the rough low frequency response, the dropout apparent in the metal record/replay plot (metal tapes suffer worse from this effect) and the wayward Dolby C response shape. The Dolby B response matches the non-Dolby plot well, but the Dolby C plot is all over the place, perhaps due to the use of low tolerance Dolby ICs (with Dolby ICs, as with most other products, you get what you pay for), or simply poor internal alignment. Wow and flutter levels also proved high - note the broad 'shoulders' of the spectrum analysis - and finally the deck ran slow enough for a mild flattening of pitch to be noticeable with prerecorded material, at least by those sensitive to pitch variations.

## Sound Quality

It was not pitch problems that sank this model, but something more insidious, namely a severe lack of detail, presence and life. This is the popular conception of cassette sound at its worst, with all the important features of a good hi-fi product diminished, leaving a somewhat amorphous wodge of sound which threw very little light on the music, and cast no shadows. In particular, stereo imagery was vague and shapeless, and overall the deck sounded compressed.

The problems even extended to the playback of prerecorded material, which was additionally subject to clear evidence of Dolby mistracking in the form of bodedged transients and truncated sustain on hanging notes.

There was some improvement in perceived dynamic range when recording with metal tapes, but peak treble distortion was a real problem, and the midband became repressed, leading to an

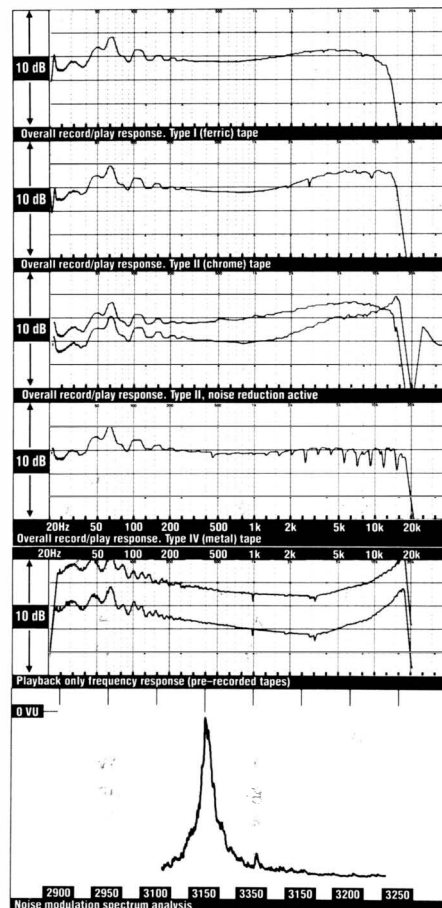
exaggerated, rather nasal quality with a tizzy top and boomy bass.

## Conclusion

The AD-WX616 is well laid out and has useful features without, apparently, overegging the pudding. On audition, however, it is a mess, and certainly not worthy of the hi-fi appellation.

## TEST RESULTS

Dolby Level reading on deck's meters	+3dB
Rec/replay response -3dB ref 1kHz	
IEC Type I	<20Hz - 13kHz
IEC Type II	<20Hz - 16kHz
IEC Type IV	<20Hz - 20kHz
Wow/Flutter - Peak DIN wtd /unweighted	0.15%/0.28%
Wow/Flutter - Peak DIN wtd	0.09%/0.27%
Speed error	0.3%
Type I signal/noise CCIR/ARM 400Hz & distortion 0VU	53dB
Type II signal/noise CCIR/ARM 400Hz & distortion 0VU	58dB
Type IV signal/noise CCIR/ARM 400Hz & distortion 0VU	56dB
Noise Figure of Merit (Dolby level/noise Type II)	61dB
Line input sensitivity/overload	75mV/>13V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	573mV/2.95V
IM distortion 10kHz/11kHz 0dB peak, 1kHz product	A=5%/B=5%
Azimuth check R-L phase at 10kHz	A=20degrees/B=30degrees
VU indication at IEC 0dB	3dB
Dimensions (wxhxd)	43x13.5x26.6cm
Average wind/rewind time (C90)	2 min 16 sec/slow
Typical Retail Price	£150





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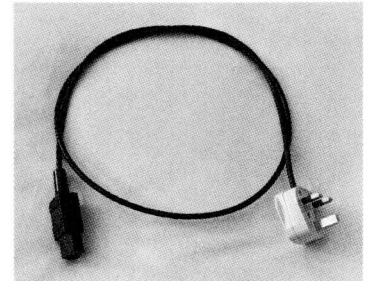
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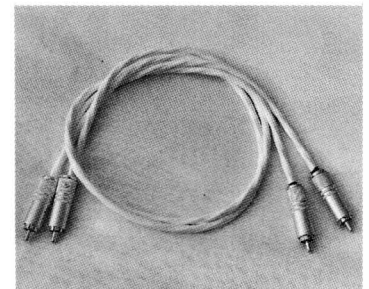
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# Denon DRW-650

HAYDEN LABORATORIES LTD, CHILTERN HILL, CHALFONT ST PETER, BUCKS SL9 9UG. TEL: (0753) 888447

**Recommended**



This deck is built around the simplest possible pattern, that is two unidirectional transports just one of which is record capable. Dolby HX Pro helps make the best of low bias tapes. Normal and double speed dubbing is available using just a single key for each speed to set the process in motion. Sequential ('relay') play is also available. On the tape search side, the deck has a mechanical tape counter with memory stop and a simple track search feature enabling the deck to locate the next track or the start of the current track. A variable bias control and fixed level headphone socket complete this rather austere package.

Like previous twin decks of this marque, the DRW-650 uses a single set of transport controls which are assigned to one transport or the other, depending on which deck was last loaded with tape or the setting of a 'deck select' key. I have praised this arrangement in the past for the useful simplification it allows of the control section, but long term experience shows that the lack of prominence given to the assignment key and the associated telltales (Marantz does this much better, as on the SD515 for example) negates the advantage of simplicity. I suspect many others, too, will find the ergonomics counter-intuitive.

Long term limitations of the Denon proto-design (as you might say) have been partly addressed. The electronic Dolby switching now remembers its setting when switched off, but there is still no timer standby feature, more's the pity.

## Test Report

The replay response test shows quite a good match between transports, though a mild midband balance shift was measured. The record/replay plots are a little wayward in the bass and mid treble, but, more significantly, the nature of the Dolby plots shows a rather peculiar error in the area of operation of the anti-

saturation network near 15kHz. Signal/noise is somewhat below expectations as is channel separation (results not tabulated) of 42dB at 1kHz, nearly 10dB below the group average. The good news concerns pitch integrity, which is of a high order for a £200 twin. Wow was not audible under normal circumstances and tape to head contact was good, leading to a feeling of stability. But the amount of flutter band energy (see spectrum analysis) turned out to be worryingly high.

## Sound Quality

In common with most other twin cassette decks, the Denon DRW-650 is at its worst when doing what it has been specifically designed to do. Dubbing performance is far from brilliant. It's OK at normal speed as you'd expect, but high speed dubs sound well and truly flattened - dynamically, spatially and tonally.

As a playback machine, the comparatively modest difference noted between the two transports in the playback response plot is effected considerably by azimuth differences and by the exaggerating effect of Dolby B processing. In short, the modest difference takes on near chasmic proportions. At best, prerecorded material sounds accurate and highly explicit. Switch to the other transport and you jump back 50 feet, and much of the detail and openness goes.

Finally, as a recorder, the Denon shows considerable strengths alongside some distinctive weaknesses. It is difficult to ignore a certain background instability, as high frequency hiss varied in level behind transient material, though inevitably this was much more obvious on headphones than loudspeakers. Musically, however, the Denon DRW-650 sounded quite good. The high frequency content wasn't wholly natural: there was a strained feeling at times, and occasional signs of excess even with Type II tapes. On the whole, though, this is one of the

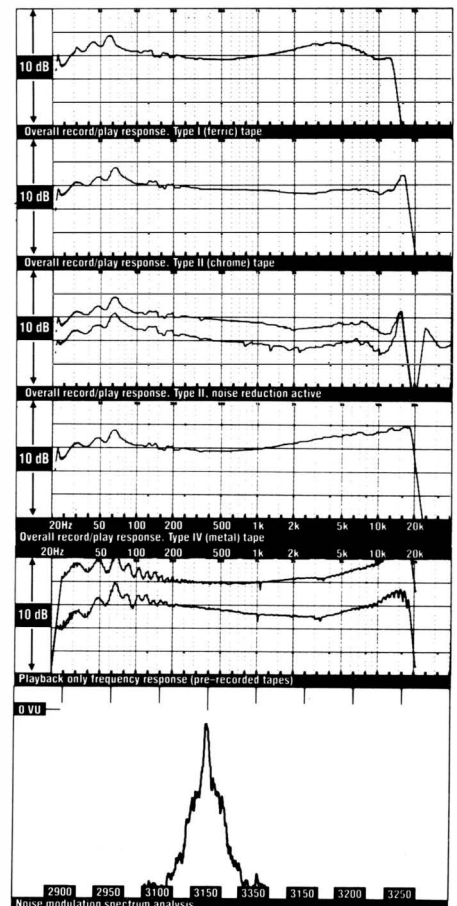
better twin decks at this price level.

## Conclusion

Good value for money, and Recommended. Sound quality ranks as pretty good, which is better than most twin decks achieve. Nevertheless, there was inconsistency of sound between the two transports and the Dolby circuits are not the cleanest around.

## TEST RESULTS

Dolby Level reading on deck's meters	0dB
Rec/replay response -3dB ref 1kHz	
IEC Type I	20Hz - 14kHz
IEC Type II	<20Hz - 18kHz
IEC Type IV	<20Hz - 21kHz
Wow/Flutter - Peak DIN wtd/unweighted	0.13%/0.13%
Wow/Flutter - Peak DIN wtd	0.08%/0.14%
Speed error	0.2%
Type I signal/noise CCIR/ARM 400Hz & distortion 0VU	51dB 1.1%
Type II signal/noise CCIR/ARM 400Hz & distortion 0VU	57dB 0.95%
Type IV signal/noise CCIR/ARM 400Hz & distortion 0VU	54dB 1.3%
Noise Figure of Merit (Dolby level/noise Type II)	57dB
Line input sensitivity/overload	97mV/V >13
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	900mV/4.3V
IM distortion 10kHz/1kHz 0dB peak, 1kHz product	A=2%/B=1.5%
Azimuth check R-L phase at 10kHz	A=60 degrees/B=0 degrees
VU indication at IEC 0dB	0dB
Dimensions (wxhxd)	43.5x12.5x27.5cm
Average wind/rewind time (C90)	2 min 47 sec/slow
Typical Retail Price	£200





# Denon DRM-700A

**Best Buy**

HAYDEN LABORATORIES LTD, CHILTERN HILL, CHALFONT ST PETER, BUCKS SL9 9UG. TEL: (0753) 888447



The DRM-700 was covered in issue 80; this is an updated version which features a number of minor under-the-skin improvements, and a price reduction, from £249.95 (it was £240 at the time of the previous test) to £230.

The DRM-700A is a three-head deck with real time off-tape monitoring. The transport is a single capstan type, but well designed, and teamed with a sophisticated cam operated transport. Signal processing circuits are the usual mix and include Dolby HX Pro.

Notable features include an attractive display whose centrepiece is a long two-colour 50dB peak hold record level meter. The counter is electronic and reads in minutes and seconds.

Over the years, Denon cassette decks have acquired certain idiosyncrasies, the old DRM-700 for example, had Dolby switching without a status memory so that it needed to be reset every time the deck was turned on. This certainly qualifies for the 'idio' bit, and must have led to thousands of recordings that its owners thought had Dolby NR on, but didn't. This has been corrected in the current model. The counter also remembers its setting, but the DRM-700A still can't be left to record off-air at the behest of an external timer.

Another mild annoyance is an output level control which as well as adjusting the headphone socket feed (a notably good quality feed, by the way), also adjusts the main output. Other features include adjustable bias, track search, a counter memory and record return.

## Test Report

Minor changes from the 700 include an improved cassette shell clamping arrangement, but the deck is generally well endowed with decent electrical components, and engineering (structural) details. Fast wind speed, previously interminably slow, has improved

significantly. More substantive performance aspects like wow and flutter have also been improved to a point where it is among the best in this area of the market, and a match for some much more costly decks. Electrically, the Denon is perfectly satisfactory, but seemingly little changed from its predecessor.

On the frequency response front, Type I and IV tapes show a steady HF rise, which can be partly corrected with the bias control, but the Type II and replay only plots are essentially straight lines. In all cases the bass is smooth and even, the head having been revised from the original. The Dolby circuit (which has also been redesigned) is very accurately calibrated.

## Sound Quality

It would be nice to be able to report that the current model was significantly better than its predecessor - or even that it wasn't. Unfortunately, the DRM-700 wasn't available, and audio memory is notoriously fickle, so I shall content myself by noting that at its new price, the Denon is difficult to match.

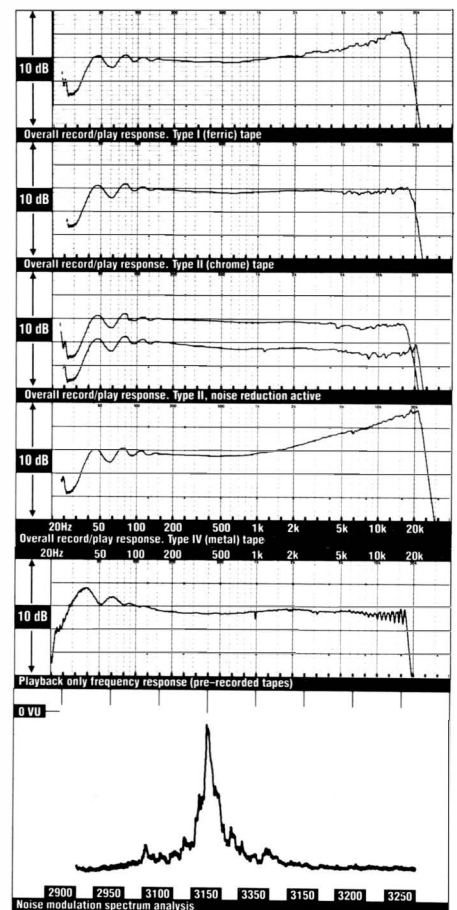
Prerecorded material fared particularly well. I detected little of the older machine's 'woodiness,' instead finding the deck explicit and articulate. When I tested the Denon's recording abilities, I found that many types of music did not sound entirely convincing when the Dolby noise reduction had been selected. There was for example, some flattening of transients. Nevertheless, the deck proved to be a fine sounding machine with Type I and II tapes, with Dolby B representing a fair compromise between noise and euphony. Complex, densely recorded material lost little of its information content, and the subtleties of vocal expression were handled well. Stability was of a high order, the Denon sounding more like a dual capstan model in this respect than some real dual capstan models.

## Conclusion

Cassettes are a convenience medium, and I would be unhappy with a deck I cannot leave to record a play or concert in my absence which lasts more than 45 minutes. This is the only really important blot (for me) on an otherwise clean bill of health. In fact, the standard of engineering, which is directly reflected in the integrity of its music making, is of a particular high order. Maybe I would buy it after all. Best Buy.

## TEST RESULTS

Dolby Level reading on deck's meters	0dB
Rec/replay response -3dB ref 1kHz	
IEC Type I	25Hz - 19kHz
IEC Type II	25Hz - 21kHz
IEC Type IV	25Hz - 23kHz
Wow/Flutter - Peak DIN wtd/unweighted	0.10%/0.20%
Wow/Flutter - Peak DIN wtd	0.07%/0.14%
Speed error	0.1%
Type I signal/noise CCIR/ARM 400Hz & distortion 0VU	49dB
Type II signal/noise CCIR/ARM 400Hz & distortion 0VU	54.5dB
Type IV signal/noise CCIR/ARM 400Hz & distortion 0VU	53dB
Noise Figure of Merit (Dolby level/noise Type II)	54.5dB
Line input sensitivity/overload	96mV/>13V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	710mV/1.75V
IM distortion 10kHz/11kHz 0dB peak, 1kHz product	3.0%
Azimuth check R-L phase at 10kHz	40degrees
VU indication at IEC 0dB	0dB
Dimensions (wxhxd)	43.5x13.5x29.5cm
Average wind/rewind time (C90)	2 min 7 sec/average
Typical Retail Price	£230

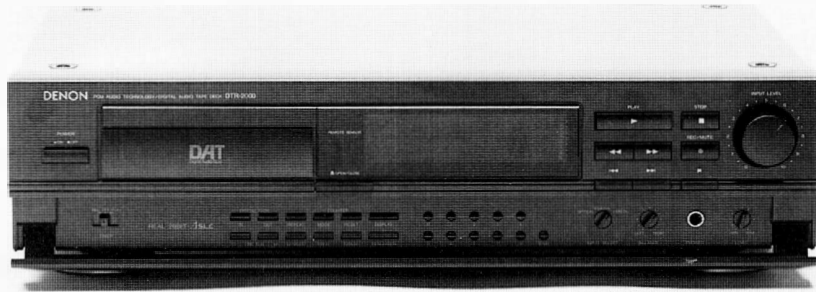




# Denon DTR-2000

HAYDEN LABORATORIES LTD, CHILTERN HILL, CHALFONT ST PETER, BUCKS SL9 9UG. TEL: (0753) 888447

**Recommended**



'The front panel of the *DTR-2000*' (brags the leaflet) 'is stunning in its simplicity.' It's true that with the bottom edge full-width flap closed, this Denon DAT player limits itself to standard transport facilities, plus an input level knob and a well organised and informative display.

The facilities hidden behind the flap are comprehensive and in the main comprehensible. Switching is provided for timer standby operations, various counter modes, editing ID codes (track ID erasing and renumbering etc), and for random track search. Unusually there are also facilities for digital fades and for fine cueing which inches the tape very slowly past the head drum in 'pause' mode. Headphone monitoring is adjustable and a remote control handset is also provided. A display off switch is fitted - a first for DAT?

## Test Report

The *DTR-2000* is elaborately specified, with extensive anti-resonance and damping measures, high grade power supplies and audio components. The deck does not have an LP (long play) analogue record capability (32kHz sampling, 4 hours recording), but will play tapes recorded elsewhere to that standard, and record and play at the usual 44.1kHz (from digital sources via an SCMS copy protect circuit which inhibits digital dubbing from the first generation copy) or at 48kHz (from analogue sources). Both give a two hour maximum recording duration.

The input Delta-Sigma A/D convertor is paired with a 20 bit Super Linear convertor with eight times oversampling which is designed to eliminate zero cross distortion, endemic to multibit convertors.

The high 0dB distortion levels result from the player being in clip at this level. The player only comes out of clip at -2dB when fed with a digital (44.1kHz) signal, the relevance here being that it is not possible to turn a digital signal down to

avoid the distortion. Performance is good below this level, though resolution is only 15.3 bits and there are mild tolerance errors such as channel balance, de-emphasis accuracy and asymmetric overload.

## Sound Quality

There are two main ways of using this recorder: analogue recording via the A/D convertor, and digital bit copies, typically from CD. In this mode the data stream off disc is simply stored on tape as it is. Assuming no data loss (a big assumption), differences in sound from the original ought to relate strictly to differences in DAC technology. I teamed the Denon with a Philips *CD850*, which sounded a little warmer, closer, and arguably more communicative.

Copying from an analogue source is a different matter. For interest I started by recording from the same CDs used for direct digital dubbing, but this time from the analogue output of the Philips CD player. Later I used other sources including a record deck. In this case, too, the Denon performed extremely well, though not quite as well. The most noticeable loss was of high frequency detail and dynamics. The high frequency area generally sounded a touch muted. From sounding like a pretty good CD player when bit copying (which is better than most of the current generation of DAT recorders manage), the Denon was sounding more like a rather ordinary CD player, and moreover, one that could be induced to spit rather uncomfortably if record levels were allowed to stray too close to the 0VU ceiling.

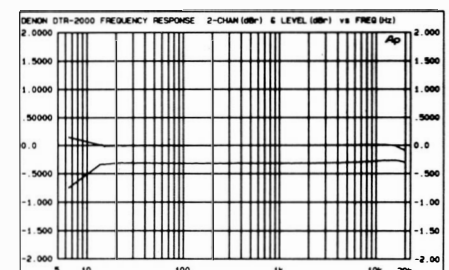
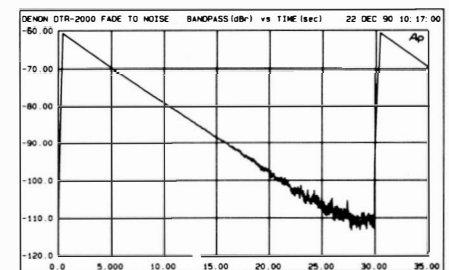
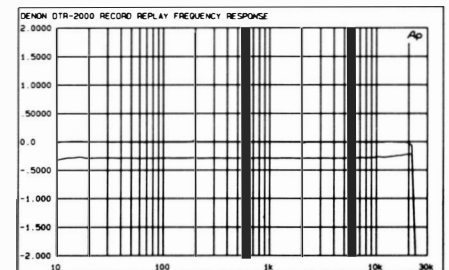
## Conclusion

This was the more successful of the two DAT recorders tested in this issue, albeit by a comparatively small margin, and at a substantial price premium. No obvious problems cropped up on test beyond the theoretical possibility of clipping when

recording in the digital domain where adjustments to record level are not possible. Compared to CD, DAT is OK but not quite a match for the best. Compared to compact cassette, it's a revelation. Recommended.

## TEST RESULTS

<b>Test resolution</b>	15.3 bits
<b>Output level, dB rel 2V, Source 2.10V, 0.48dB, 330ohm</b>	
<b>Effective dynamic range (-70dB thd + N + dither)</b>	100dB
<b>Pure harmonic distortion at full level ref 0dB</b>	20Hz -26dB, 1kHz -28dB, 20kHz -66/50dB
<b>(20kHz in-band products only)</b>	20Hz 5.01% 1kHz 3.98%, 20kHz 0.05/0.32%
<b>at -70dB encode + dither</b>	-35dB or 1.78%
<b>Stereo separation</b>	20Hz 113/106dB, 1kHz 102dB, 20kHz 77dB
<b>Stereo balance L/R</b>	20Hz 0.43dB, 1kHz 0.44dB, 20kHz 0.36dB
<b>Frequency response (ref 1kHz) 20Hz - 20kHz</b>	+/-0.02dB
<b>Audible high frequency intermodulation</b>	-33dB or 2.23%
<b>Audible electrical noise</b>	-102dB (CCIR, ARM wtd, 1kHz)
<b>Audible mechanical noise</b>	low
<b>Ultrasonic noise</b>	-100dB
<b>Shock/vibration resistance</b>	good
<b>De-emphasis</b>	+/-0.45dB to 16kHz
<b>White noise overload test</b>	clip on -ve
<b>Line input sensitivity/overload</b>	520mV/>13V
<b>Mic input sensitivity/overload</b>	n/a
<b>Line output for 0dB/maximum</b>	2100mV/2100mV
<b>IM distortion 10kHz/11kHz 0dB peak, 1kHz product</b>	2.23% (0.018% at -2dB)
<b>Azimuth check R-L phase at 10kHz</b>	n/a
<b>VU indication at IEC 0dB</b>	0dB
<b>Dimensions (wxhxd)</b>	43.5x2.5x32cm
<b>Average wind/rewind time</b>	n/a
<b>Typical Retail Price</b>	£800





# JVC TD-X321

JVC (UK) LTD, ELDONWALL TRADING ESTATE, 12 PRIESTLEY WAY, STAPLES CORNER, LONDON NW2 7BA. TEL: (081) 450 3282

**R**ecommended



The TD-X321 is a typically astute budget package. For a smidgin under £130, the JVC offers such refinements as a quiet running, logic operated transport and Dolby HX Pro. The 321 even boasts 6.3mm microphone sockets for those with interests stretching beyond the simple copying of records, CDs and other tapes.

Other facilities are pretty basic stuff on the whole: a mechanical tape counter and Dolby B and C noise reduction circuits being the most prominent. The two-colour record level meters have a range of just 16dB in five steps, but the scale legends are almost invisible.

One useful feature for JVC watchers: proprietary *Compu Link* terminals on the rear to facilitate synchronised recordings when used in conjunction with JVC branded cassette decks and other components.

## Test Report

Lab test results are about par for the course. The various measured response shapes mostly show a rising output at the top end prior to a roll-off which terminates the output pretty sharply above 14kHz or so, irrespective of the tape type employed. Prerecorded tapes however, show a loss of mid and upper midband energy, followed by a rising top end. The Dolby installation has been handled accurately enough.

The raw unweighted wow and flutter figure looks reasonable, but is belied by a high level of flutter from the transport, much of which lies outside the rather crude DIN weighting curve. The spectrum analysis of the test 3150Hz signal shows this effect all too clearly as the 'shoulders' in the spectrum analysis plot, which also shows some telltale signs of mild capstan wow.

## Sound Quality

Prerecorded tapes suffered a rather distant quality (as suggested by the measure-

ments), but this was accompanied by a curiously hollow, edgy treble apparent mainly with cymbals and the like. Generally, the sound was not particularly bright despite the rising top end. In practice, the deck tended to lack a degree of detail and 'slam' compared to some of its peers, which reinforced the somewhat shabby sonics of all too many prerecorded titles, especially those that are getting on a bit.

But all is not lost. There were good points, too. Despite the measured flutter result, the JVC sounded stable and reasonably detailed when playing back its own recordings. Although it wasn't wonderful by hi-fi standards, the JVC was capable of making recordings with quite acceptable resolution, which was manifested, for example, as good separation between similar sounding instruments and voices, and as surprisingly solid and three dimensional stereo imagery. Dolby B and Type II tapes presented comparatively little impediment to sound reproduction, but the deck has intrinsically low noise levels and good dynamics, and Dolby B, which sounds a little more transparent than Dolby C, is normally adequate.

Signal/noise and distortion figures look reasonable, and although Dolby level isn't marked on the meters, the distortion trend shows that the available dynamic range is adequate, which was effectively confirmed in practice.

## Conclusion

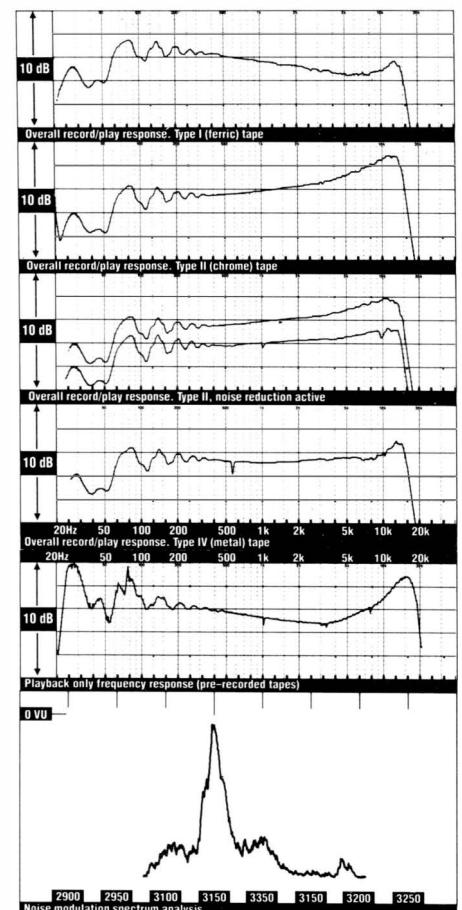
The simplicity of the control system made this a very easy deck to get to grips with, though larger illuminated controls and meter legends would have made it a still more attractive proposition, especially for the technologically naive in our midst.

Musically, however, it holds its own quite effectively. The deck is stable and clean sounding, and has a solid, refined stereo performance. Compared to the £100

models in this issue (which come from Pioneer and Sony), the JVC doesn't appear to offer any great advantage on paper, but it would take a very undiscerning listener to miss the scale of the differences found, and a formal Recommendation is therefore in order. Those who care about sound should spend more if at all possible, but if £130 is your limit, the JVC TD-X321 represents good value.

## TEST RESULTS

Dolby Level reading on deck's meters	n/a
Rec/replay response -3dB ref 1kHz	
IEC Type I	20Hz - 16kHz
IEC Type II	35Hz - 17kHz
IEC Type IV	35Hz - 17kHz
Wow/Flutter - Peak DIN wtd /unweighted	0.18%/0.38%
Wow/Flutter - Peak DIN wtd	0.09%/0.38%
Speed error	-1.0%
Type I signal/noise CCIR/ARM 400Hz & distortion 0VU	49dB 1%
Type II signal/noise CCIR/ARM 400Hz & distortion 0VU	54dB 0.55%
Type IV signal/noise CCIR/ARM 400Hz & distortion 0VU	52.5dB 0.95%
Noise Figure of Merit (Dolby level/noise Type II)	n/a
Line input sensitivity/overload	138mV/>13V
Mic input sensitivity/overload	0.56mV/2.54mV
Line output for 0dB/maximum	500mV/3.1V
IM distortion 10kHz/11kHz 0dB peak, 1kHz product	2.82%
Azimuth check R-L phase at 10kHz	60 degrees
VU indication at IEC 0dB	3dB
Dimensions (wxhxd)	43.5x11.5x29cm
Average wind/rewind time (C90)	2: min 35sec/very slow
Typical Retail Price	£130

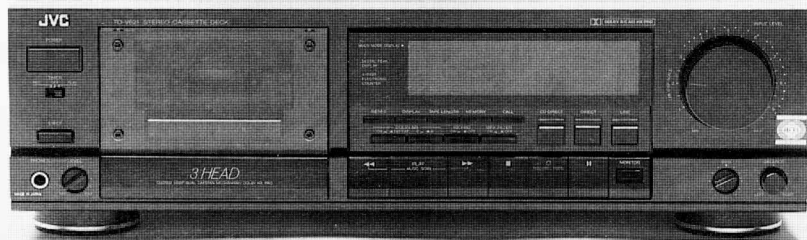




# JVC TD-V621

JVC (UK) LTD, ELDONWALL TRADING ESTATE, 12 PRIESTLEY WAY, STAPLES CORNER, LONDON NW2 7BA. TEL: (081) 450 3282

**Recommended**



This surprising cassette deck has it all. It has independent record and play heads which means recordings can be monitored as they are made, with automatic control over the tape/source switch, unless overridden. The TD-V621 also has a full dual capstan transport. Good dual capstan transports offer greater control of the tape as it passes over the headblock, and firmer control of tape back tension, which in turn means better tape-to-head contact and ultimately less dropout. This is a *very* good dual capstan transport.

And the list continues. Dolby HX Pro is switchable, surprisingly, and the tape counter is a genuine real-time one which calculates remaining time (once the tape length has been programmed), even if the tape is inserted part wound through. A counter memory is supplemented by track search. Fine control over record bias and no less than three separate line inputs are fitted. Ease of use is good despite the complexity, and is assisted by excellent quality wide ranging meters with a numeric dB readout for use when scanning CDs for dubbing purposes.

## Test Report

The TD-V621 has a number of anti-resonance measures including a cassette shell clamp to reduce structural resonances, which combined with the high grade transport, determines physical behaviour. Although weighted wow and flutter levels are nothing to write home about, the unweighted combined figure and the flutter only figures are state of the art. There is some generalised wow, but nothing that can be resolved into specific frequency sidebands. But this has caused the slight blunting of the centre peak.

Other test results are first class - or very close. With IEC 0VU at 4dB on the meters, the measured signal/noise figures can be readily exceeded in practice, which means that the user can work without Dolby if required, where many other decks would

still be noise bound. Measured high level IM distortion is kept well in check too, though the maximum line output before clipping (<4V) could perhaps prove restrictive with tapes that are driven very hard. This isn't just a theoretical limitation: the electronics do indeed run out of headroom and clip with a harsh 'cracking' sound and this happens around two or three dB earlier than the best of its competitors.

Frequency response traces are all flat or have a mildly rising trend. Treble extension probably wasn't a particular design priority, but it still ranks as satisfactory.

## Sound Quality

The JVC's electronics are not as transparent as some. Even in bypass mode (ie in record mode with the tape stationary and the JVC switched to source monitor), there is a lack of stereo front-back differentiation and an insistent 'ringing' treble quality. The bass is a little coloured too, and in more general terms there was a lack of informativeness and of subtlety.

What was remarkable, on the other hand, was the comparatively small amount of deterioration caused by channelling the sound to and from tape. The almost complete absence of the obvious low level muddling characteristic of modulation noise, the near CD-like stability and the rock solid treble output at times almost made me question that I was listening to tape at all.

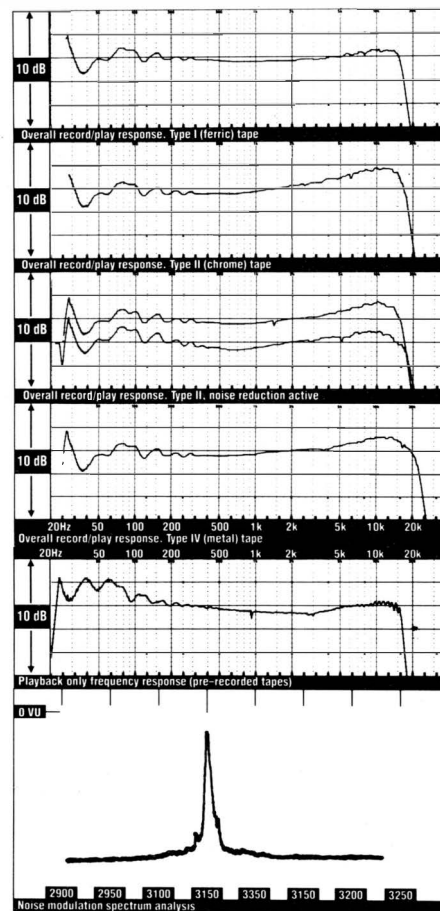
All three tape groups gave good results, but the lower bias types tended to sound a little soft in the midband, and overall the greater clarity and presence of Type II and IV tapes paid off. The effect of switching Dolby HX Pro off is small but noticeable as a greater internal stability in the midband and lower treble, and greater dynamic consistency when recording music covering a wide tonal and dynamic range on ferric tapes.

## Conclusion

The electronics do sound somewhat synthetic, which detracts significantly from a standard of performance which otherwise varies between good and absolutely top class. The JVC is also extremely well equipped and evidently well built. Nobody could accuse JVC of skimping, and a firm Recommendation is mandatory.

## TEST RESULTS

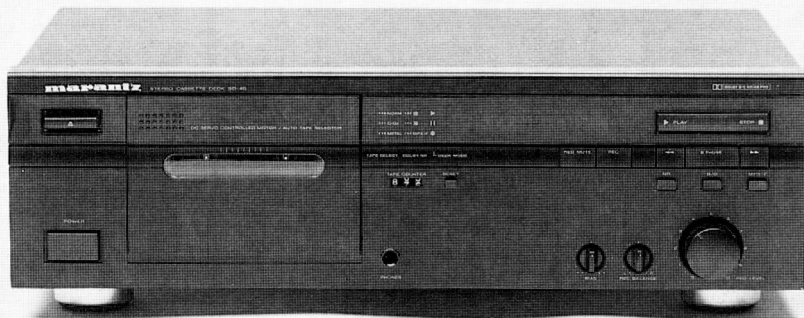
Dolby Level reading on deck's meters	n/a
Rec/replay response-3dBref1kHz	
IEC Type I	22Hz - 16kHz
IEC Type II	22Hz - 17kHz
IEC Type IV	22Hz - 18kHz
Wow/Flutter - Peak DIN wtd	
/unweighted	0.13%/0.14%
Wow/Flutter - Peak DIN wtd	0.10%/0.12%
Speed error	0%
Type I signal/noise CCIR/ARM 400Hz & distortion 0VU	49dB
Type II signal/noise CCIR/ARM 400Hz & distortion 0VU	55dB
Type IV signal/noise CCIR/ARM 400Hz & distortion 0VU	55dB
Noise Figure of Merit (Dolby level/noise Type II)	n/a
Line input sensitivity/overload	127mV/>13V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	480mV/3.96V
IM distortion 10kHz/1kHz 0dB peak, 1kHz product	1.0%
Azimuth check R-L phase at 10kHz	60 degrees
VU indication at IEC 0dB	4dB
Dimensions (wxhxd)	43.5x13.5x33.5cm
Average wind/rewind time C90	2 min 15 sec/average
Typical Retail Price	£300





# Marantz SD-40

MARANTZ HI-FI UK LTD, KINGSBRIDGE HOUSE, PADBURY OAKS, 575-583 BATH ROAD, LONGFORD, MIDDLESEX UB7 0HE. TEL: (0753) 680868



Technically, the SD-40 breaks little new ground, but it's a thorough piece of work nonetheless.

The specification list includes many of the expected highlights: Dolby B and C with MPX filter switching, Dolby HX Pro, fine bias adjust for Type I and II tapes only, a fixed level headphone outlet and a simple mechanical tape counter. There is no surfeit of tools for exploring tapes, but there is a record return feature which is activated by selecting 'rewind' when in record mode.

Its ergonomics are not wholly successful. On the plus side, the SD-40 can boast of controls which are well differentiated and grouped according to function. It has to be said, however, that many of them are quite small, and some even defy logic. One example of the latter is the transport control cluster which has the fast wind keys flanking a larger pause key, a position better occupied by either the stop or the play key.

Considering the amount of bare space available to the designer, I was also disappointed that the record level display was so short, though in recompense it is otherwise well specified, down to the illuminated scaling to match the level readouts themselves. The microprocessor controlled transport operates sweetly while fully protecting the tape against misuse. Aesthetically, the SD-40 does have strengths. It is at least different, but I fear that it will not wear well.

## Test Report

The front panel is rather flimsy and probably not an ideal platform for the transport, but deep side panels make the basic tray structure less wobbly than some. Electrical standards appear to be a little better than average at this price level (eg Elna audio grade capacitors at critical points), though despite the Philips connection, it is Sony that supplies the Dolby IC. The power supply is better

endowed than usual, and the transport has separate capstan and reeldrive motors, and a decent looking capstan flywheel.

Even the shock absorbing feet appear to serve more than the usual merely decorative function. Marantz also specifies items like copper case screws to reduce undesirable magnetic coupling effects.

Technical performance looks highly competent in some areas; in others it appears to be somewhat lacking. The bass end is limited in extension but very smooth. The mid and top end response shapes are well tailored, and have little need for bias adjustment with tapes close to IEC standards. The replay response is also very accurate. Signal/noise is barely adequate, however, and the transport is somewhat disappointing, as is illustrated both by the raw figures and the spectrum analysis.

## Sound Quality

Prerecorded material was handled well, though in a somewhat unengaging way. As a recorder it was uneven. Despite the measurements, the bass sounded thin and dry, but the treble was surprisingly sharp and clear. This Marantz is a scavenger of detail of a high order, and although little was masked by the action of the Dolby circuits, which proved essential with most programme material, there was a curious and not altogether explicable unevenness of tone. The effect was reminiscent of designs with a tape path across the heads that is unstable, perhaps due to problems with the tape guides.

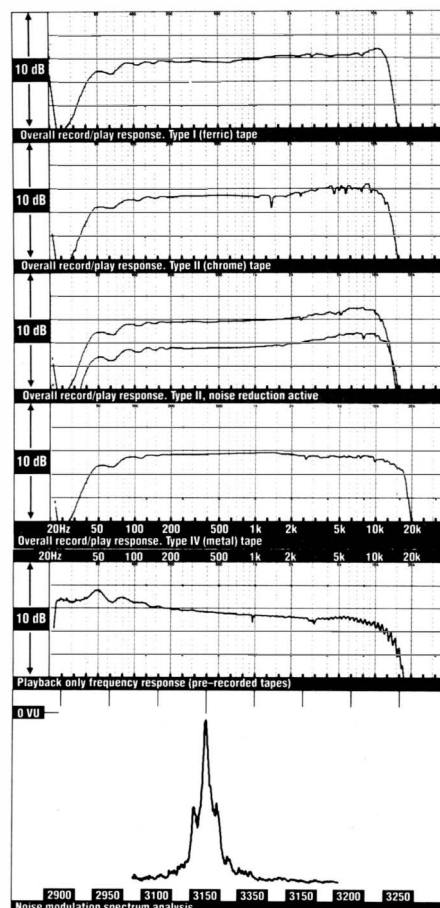
Background hiss levels varied considerably, even with Dolby C in circuit, and the treble had a grainy effect suggesting that tape-to-head contact is suspect. There were other problems too, not least quite severe losses of ambient structure and a flattening of musical dynamics. Finally, the Marantz proved unsuitable for metal tapes which appeared to exaggerate its shortcomings.

## Conclusion

I found this deck fiddly to use, and was constantly pressing the wrong button or peering at the absurdly secretive Dolby status indicators or the tape counter which needs to be read on axis if it is to be visible. Musically, too, it was something of a dog's dinner despite quite acceptable measurements.

## TEST RESULTS

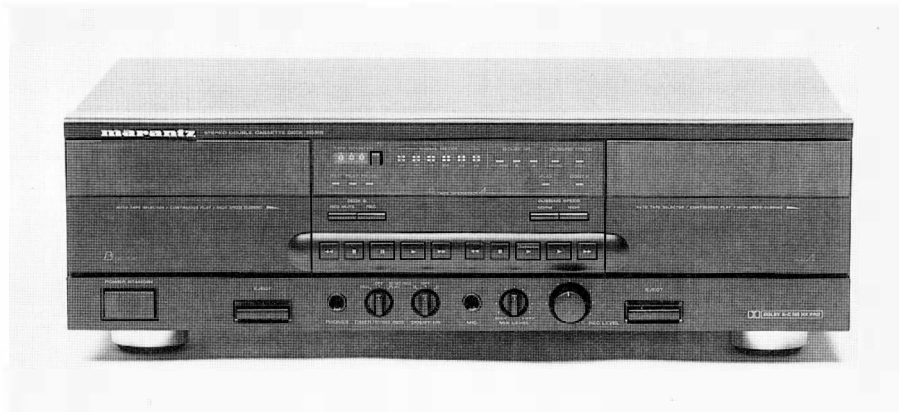
Dolby Level reading on deck's meters	0dB
Rec/replay response -3dB ref 1kHz	
IEC Type I	35Hz - 14kHz
IEC Type II	40Hz - 14kHz
IEC Type IV	40Hz - 17kHz
Wow/Flutter - Peak DIN wtd /unweighted	0.10%/0.14%
Wow/Flutter - Peak DIN wtd	0.06%/0.14%
Speed error	+0.3%
Type I signal/noise CCIR/ARM 400Hz & distortion 0VU	52dB
Type II signal/noise CCIR/ARM 400Hz & distortion 0VU	50dB
Type IV signal/noise CCIR/ARM 400Hz & distortion 0VU	45dB
Noise Figure of Merit (Dolby level/noise Type II)	50dB
Line input sensitivity/overload	67mV/>13V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	553mV/3.8V
IM distortion 10kHz/11kHz 0dB peak, 1kHz product	2.0%
Azimuth check R-L phase at 10kHz	60 degrees
VU indication at IEC 0dB	1dB
Dimensions (wxhxd)	42x12x28cm
Average wind/rewind time (C90)	2 min 15 sec/slow
Typical Retail Price	£170





# Marantz SD315

MARANTZ HI-FI UK LTD, KINGSBRIDGE HOUSE, PADBURY OAKS, 575-583 BATH ROAD, LONGFORD, MIDDLESEX UB7 0HE. TEL: (0753) 680868



The capabilities of this Marantz deck are pretty much par for the course. The two transports are single direction devices, just one of which is capable of recording as well as playing back. Tape-to-tape dubbing can be performed at normal or double speeds, with single key starts to make this part of the package supremely easy to use. Timer controlled record and playback operations are invoked by a rotary knob at the bottom of the fascia; another switches the two Dolby noise reduction circuits: B and C. Dolby HX Pro is also part of the package.

The SD315 has a microphone input which can be mixed with a line feed if required, for example to record voice-overs as titles for taped musical compilations. There are also facilities to help make synchronised recordings from other Marantz components (usually a CD player and amplifier). On the other hand there are no tape search aids apart from a tape counter.

The Marantz feels solid and stable, and sits on shock absorbing feet to reduce microphony. Ergonomics come firmly in the 'could do better' category, though, and transport engagement is based on extremely noisy solenoids.

## Test Report

Careful shaping of the front surface of the permalloy record/playback head has given this deck a smooth bass which extends down to about 50Hz before rolling smoothly away. All the record/replay responses are controlled to a high standard, and even the playback only response can be made to fit within a +/-1dB envelope between 60Hz and 10kHz, though there is a perceptible downward output trend with increasing frequency.

Noise and distortion results are quite good, but the deck won't tolerate over-recording to any great degree. No problems here, but the transport turns out to be a mite crude if judged by the

numbers. Wow and flutter is quite high even for a twin deck, mainly due to higher than usual wow (low rate) variations, though the second transport (not measured because it can't record) seemed somewhat better. The spectrum analysis plot shows a number of discrete flutter sidebands.

## Sound Quality

Performance is good in parts. Curiously enough, the wow problem, which had been perfectly audible with certain instruments as a distinct and slightly drunken weaving of pitch, appeared to improve after a while, perhaps as the various moving parts bedded in. But flutter levels remained high. Percussion in particular had a coloured, splattered quality, and open, ambient recordings lost much of their airiness. Most notably, treble detail and energy was dulled, and this even with metal tapes which measured almost completely flat.

The odd Dolby C behaviour was matched by a compressed sound, with some very high frequency hiss apparent on many recordings. Dolby B sounded altogether more natural, and with Type I and II tapes, the Marantz acquitted itself a good deal better than the cheaper twin transport models in this month's line-up. On the whole the SD315 did quite well with many orchestral recordings which are often recorded as though from some distance and which don't provide too strenuous a test over the top octave or so. But close miked chamber music, female vocal and music involving upfront use of percussion were affected by the lack of top end openness.

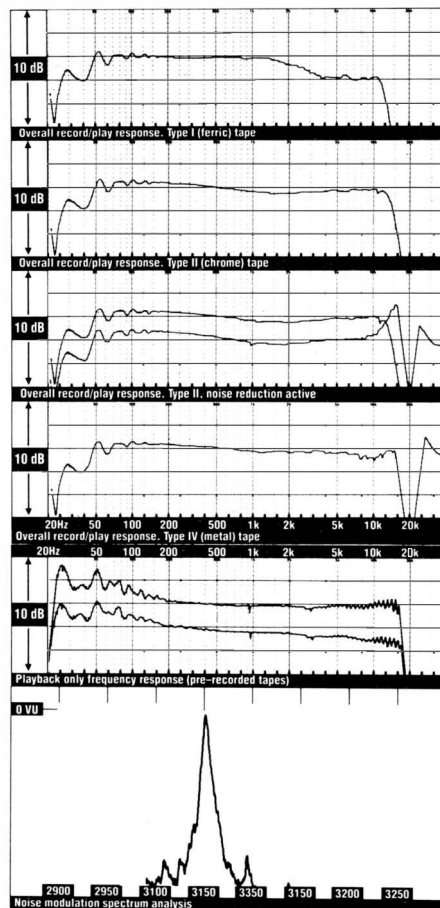
## Conclusion

A bit of a curate's egg, the SD315 has a rather unconvincing user interface which will alienate many potential users who simply want a tool for a job and don't want anything that requires much

learning. Musically, it is about par for the course: better than some twin decks but not really good enough to challenge any half decent single transport model at the price. Worth considering.

## TEST RESULTS

Dolby Level reading on deck's meters	0dB
Rec/replay response -3dB ref 1kHz	
IEC Type I	25Hz - 12kHz
IEC Type II	25Hz - 15kHz
IEC Type IV	25Hz - 17kHz
Wow/Flutter - Peak DIN wtd/ unweighted	0.20%/0.26%
Wow/Flutter - Peak DIN wtd	0.15%/0.22%
Speed error	0.1%
Type I signal/noise CCIR/ARM 400Hz & distortion 0VU	53dB
Type II signal/noise CCIR/ARM 400Hz & distortion 0VU	57.5dB
Type IV signal/noise CCIR/ARM 400Hz & distortion 0VU	55.5dB
Noise Figure of Merit (Dolby level/noise Type II)	55.5dB
Line input sensitivity/overload	97mV/>13V
Mic input sensitivity/overload	0.48mV/14.7mV
Line output for 0dB/maximum	551mV/3.73V
IM distortion 10kHz/11kHz 0dB peak, 1kHz product	A=18.8%/B=17.4%
Azimuth check R-L phase at 10kHz	A=40 degrees/B=0 degrees
VU indication at IEC 0dB	0dB
Dimensions (wxhxd)	42x12x28cm
Average wind/rewind time (C90)	2 min 39 sec/very slow
Typical Retail Price	£180





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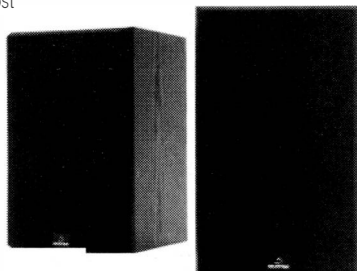
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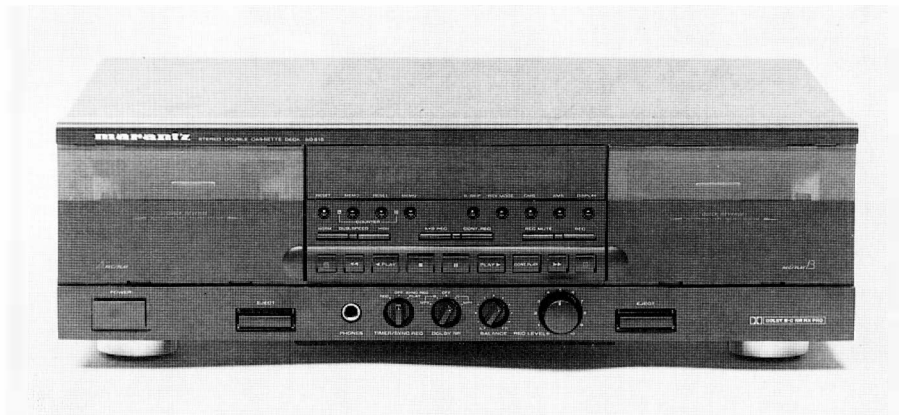


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SWINDON, 60 FLEET STREET, 0793 538222



# Marantz SD515

MARANTZ HI-FI UK LTD, KINGSBRIDGE HOUSE, PADBURY OAKS, 575-583 BATH ROAD, LONGFORD, MIDDLESEX UB7 0HE. TEL: (0753) 680868



This twin cassette deck should have serious appeal to those who customarily turn their noses up at twin decks. It does almost everything, but is also engineered to a standard quite different to any of the other twin decks in this issue. It also costs serious money - £350 - and is heavy and solidly constructed.

The SD515 consists of two auto-reverse recorders, with photocells to detect the joint between tape and leader, which allows a quick end of side changeover. As both transports record, it is possible to make parallel recordings (there's even an A+B record key for the purpose) from the system to which it is connected, as well as the usual single and double speed dubs and sequential play modes. In this case, of course, sequential play means that both sides of the first tape are followed by both sides of the other. Signal processing circuits include Dolby B, C and HX Pro, with a switchable MPX filter. Full timer standby options are also available.

Support features include intro-scan (AMS) and a 15-track search function which can also be used as a programming tool from which compilations can be assembled when dubbing.

Naturally, there are various other minor features designed to make the deck more flexible, not the least of which are short but wide ranging (35dB) peak hold level meters and twin electronic memory tape counters.

The control system is based around a single set of transport controls which can be assigned to either transport as required. The system has been craftily designed, but the wild disorganisation of the plethora of tiny secondary control buttons made operating it a rather fraught affair, at least until the steep learning curve had been ascended. It was also impossible to ignore the agricultural clatterings from the transport as it switched into and out of play etc.

Surprisingly, however, there's no

volume control for the headphone socket and no facility for varying record bias.

## Test Report

There were more surprises in store. Wow and flutter levels are well above expectations. The much cheaper Denon DRW-650, for example, has a weighted wow and flutter figure which amounts to little over half of the Marantz's 0.22 per cent. Even more surprisingly, Marantz's cheaper model, the SD315, also showed a superior wow and flutter result. In addition, the spectrum analysis shows significant wow sidebands flanking the central 3150Hz test frequency peak.

There was nothing special about the other measurements either. The frequency response traces show a number of shortcomings, including mild but noticeable errors in the way the Dolby C circuit was lined up and large differences in the two transports when playing back prerecorded material. Neither of these things is under direct user control, but the deck was well aligned for Type IV (metal) and Type I (ferric) I tapes. Type IIs were generally a little bright, but acceptable.

## Sound Quality

Only lack of pitch integrity stood between this machine and a formal recommendation. Not for the first time, a perfectly decent Marantz design has been let down by a transport which is well below the standards now routinely achieved by the likes of Pioneer, Sony and JVC. The deck had an unstable, slightly shimmery quality with strings, and notes played on piano and synths could be clearly heard drifting. There was also a significant loss of top end clarity, though less so than with the cheaper Marantz SD315. All these failings can be laid at the door of the transport design.

Elsewhere, the deck did well. Degradation with Dolby switched in was limited, and replay sound quality was

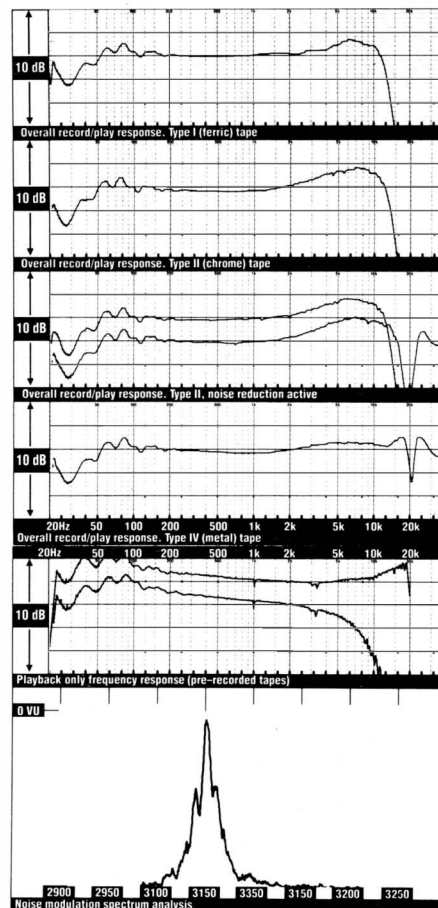
good from Deck B (not deck A - see plot), though there were inconsistencies if the tapes were turned over after recording.

## Conclusion

This is a costly deck, and it is not unreasonable to expect a high standard of sound quality as well as plenty of features. The transport is a severe let down.

## TEST RESULTS

Dolby Level reading on deck's meters	0dB
Rec/replay response -3dB ref 1kHz	
IEC Type I	30Hz - 12kHz
IEC Type II	30Hz - 13kHz
IEC Type IV	30Hz - 30kHz
Wow/Flutter - Peak DIN wtd /unweighted	0.22%/0.35%
Wow/Flutter - Peak DIN wtd	0.13%/0.34%
Speed error	0.1%
Type I signal/noise CCIR/ARM 400Hz & distortion 0VU	50.5dB 1.8%
Type II signal/noise CCIR/ARM 400Hz & distortion 0VU	56.5dB 1.7%
Type IV signal/noise CCIR/ARM 400Hz & distortion 0VU	52dB 2.5%
Noise Figure of Merit (Dolby level/noise Type II)	56.5dB
Line input sensitivity/overload	86mV/>13V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	554mV/3.84V
IM distortion 10kHz/11kHz 0dB peak, 1kHz product	A=5.3%/B=4.0%
Azimuth check R-L phase at 10kHz	A fwd/rev 120/60degrees/B fwd/rev 40/40degrees
VU indication at IEC 0dB	0dB
Dimensions (wxhxd)	42x12x28cm
Average wind/rewind time (C90)	2 min 10 sec/average
Typical Retail Price	£350





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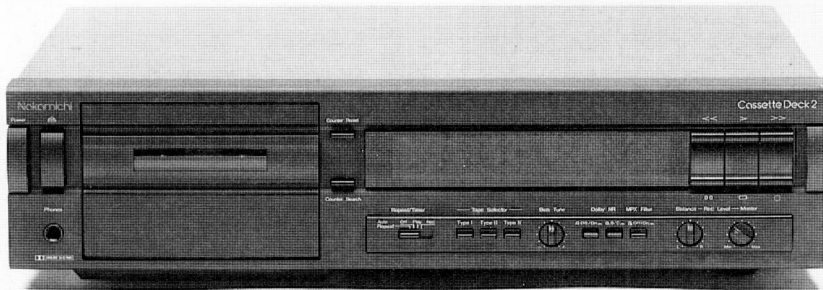
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# Nakamichi Cassette Deck 2

**R**ecommended

NAKAMICHI B&W (UK) LTD, MARLBOROUGH ROAD, CHURCHILL INDUSTRIAL ESTATE, LANCING, WEST SUSSEX. TEL: (0903) 750750



The rather pedantic sounding moniker *Cassette Deck Two* was presumably an attempt to avoid the singularly inappropriate and perhaps misleading title *CD2*. Prepare to be confused.

£300 is cheap for a Nakamichi, so it was no surprise to discover that the *CD2* is a two-head deck at a price level where most of Nakamichi's competitors are producing more glamorous three-head machinery. The austerity message is reinforced by the decision to use manual tape group switching.

Elsewhere, the *CD2* is about par for the course. There is a bias trim pot, Dolby B and C with an MPX off switch (but no Dolby HX Pro) and an electronic tape counter with a 'zero search' key.

But it is the details you can't see that mark the *CD2* out. These range from the minor - like automatic elimination of tape slack and the near silent transport engagement - to major points like a re-engineered capstan, an improved servo, a rigid single piece chassis and increased headroom (20dB ref 0VU claims Nakamichi) in the record/play amps. There are also less tangible benefits, of which two deserve special mention. The first is separate, independent, internal L and R bias adjusters for all three tape groups. Most decks these days have a single adjustment that forces all settings to track together. The other is an unrivalled backup which guarantees indefinite servicing to the full original specification, automatic replacement of consumables like belts and pulleys and automatic updates where available.

## Test Report

Wow and flutter isn't quite as low as the remarkable Pioneer *CT-757*, and the spectrum analysis shows a number of well distributed error artefacts. But

numerically, the *CD2* still figures amongst the best in the group.

The replay only frequency response shape is fairly accurate, the major anomaly being a sharp output rise in the extreme HF area, above 10kHz, with peak level at least 4dB ref 0VU at the 18kHz measuring limit. The only other very mild effect was a slight shelving up of response above 1kHz with all tapes, including the prerecorded variety. The effect is limited in amplitude to around 1dB, but as this is a wideband phenomenon, the amount of energy involved is substantial and some aural effect can be anticipated. Signs of the promised headroom can be seen in the exceptionally low IM and Type II and IV THD figures.

## Sound Quality

The Nakamichi is proof - if proof be needed - that what emerges from the loudspeakers at the end of the day is not necessarily what the numbers say you are going to get.

Prerecorded material, for example, shows a trace of grit which was not expected from the measurements. But this deck also offers range and power, and a vivid sense of instrumental colour and texture in the bass and mid that is extremely rare from any cassette deck. The bass sounds a little lean and dry, and the treble is somewhat rough in feel, even taking into account the slightly exposed treble suggested in the measurements.

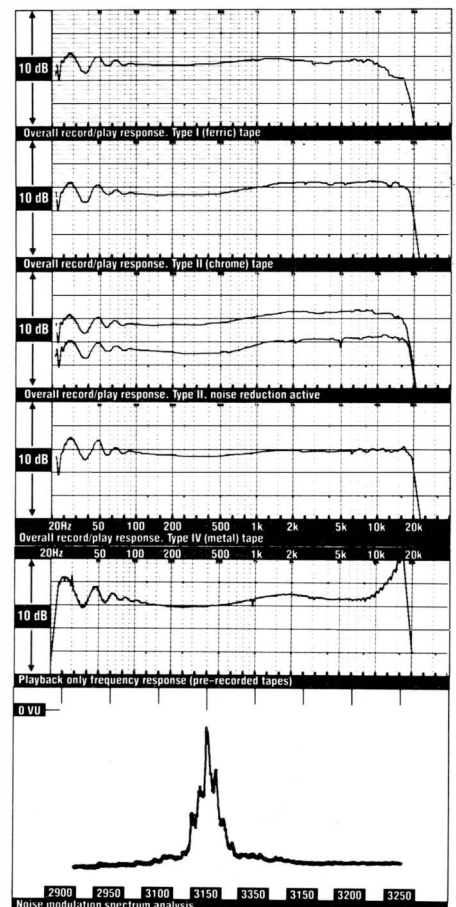
The sound has real balls, but needs the superior dynamic headroom and consistency of metal tapes to make it work at its best. It is also a good idea to avoid Dolby noise reduction. Lack of Dolby tends to exaggerate the graininess of the sound, but it also helps to retain clarity and liveliness in a way that Dolby seems unable to emulate.

## Conclusion

To describe the sound as raw but real is perhaps an exaggeration on both counts, but provides a fair flavour of the beast. Not for the fainthearted, the Nakamichi is a distinctive product in this price range, but you'll have to live without the extras.

## TEST RESULTS

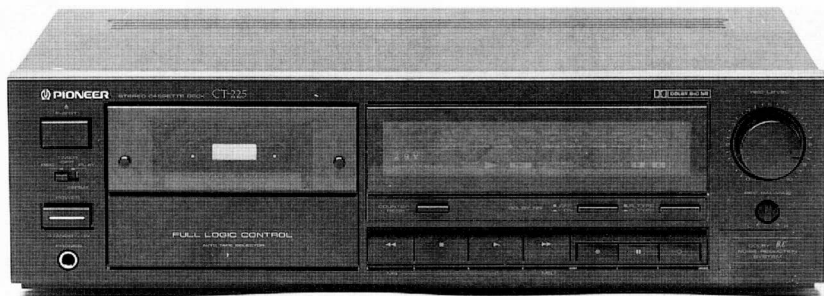
Dolby Level reading on deck's meters	n/a
Rec/replay response -3dB ref 1kHz	
IEC Type I	<20Hz - 17kHz
IEC Type II	<20Hz - 20kHz
IEC Type IV	<20Hz - 20kHz
Wow/Flutter - Peak DIN wtd /unweighted	0.08%/0.17%
Wow/Flutter - Peak DIN wtd	0.05%/0.15%
Speed error	0.01%
Type I signal/noise CCIR/ARM 400Hz & distortion 0VU	48dB
Type II signal/noise CCIR/ARM 400Hz & distortion 0VU	54.5dB
Type IV signal/noise CCIR/ARM 400Hz & distortion 0VU	52.5dB
Noise Figure of Merit (Dolby level/noise Type II)	n/a
Line input sensitivity/overload	70mV/>13V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	668mV/5.5V
IM distortion 10kHz/11kHz 0dB peak, 1kHz product	0.045%
Azimuth check R-L phase at 10kHz	40 degrees
VU indication at IEC 0dB	1dB
Dimensions (wxhxd)	43x10x32cm
Average wind/rewind time C90	2 min 23 sec/slow
Typical Retail Price	£300





# Pioneer CT-225

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



Surprisingly for a £100 cassette deck, the Pioneer CT-225 is rather well equipped. You get a recorder with Dolby B and C, timer standby (Radio 3 documentaries on Miles Davis *in absentia* and all that jazz) and a full logic controlled transport with track search capable of skipping up to 14 tracks in either direction.

The peak-hold record level meters cover 28dB in seven steps, which is more than satisfactory, and although the meter legends are unilluminated, levels of 0VU and above are picked out in red to improve intelligibility. If you're looking to see what corners have been cut (as Pioneer's competitors most surely will), you have only to look at a certain fundamental under the skin flakiness, and on the outside such details as a plastic front panel and a cassette loading door which doesn't unclip for cleaning of the head block area. None of this, however, is unexpected at this price level.

## Test Report

Highlights (or lowlights) of the lab test programme include the characteristic signature of low cost cassette decks: a rough and reticent bottom end which is cured in more costly models with subtle shaping of the heads and by other means. The high frequency responses are erratic (another characteristic of budget decks, of course), with the Type II plot showing a 3dB boost at 8kHz (exaggerated by the action of Dolby processing) and the Type IV plot perversely showing a mild treble roll-off, coincidentally also amounting to about 3dB at the same point. Like all but the most expensive recorders, the CT-225 doesn't have separate internal adjustment points for the three tape groups.

Pitch stability is quite good for the price - look at the Sony TC-FX120 for example - but noise levels are well above average with all three tape groups. Again, comparison with the Sony, which is no less than 6dB quieter with TDK SA-X at an

only slightly lower distortion level, is instructive.

## Sound Quality

The acid test, of course, is how well the recorder makes recordings, and the short answer is that it does so somewhat crudely. Even with metal tapes, which produce on paper what looks like a rather shy, retiring balance, the budget Pioneer sounds coarse and congested, especially when stressed with complex musical structures involving reasonable quantities of high frequencies. The Latin inspired rhythms of *La Habanera* from the album *One Second* by Yello presents an ideal example of just such a recording where the end result could do no better than parody the original - and an unkind parody at that. The complex cymbal work took the foreground for itself, and other instruments lacked presence. Stereo imagery was a particular casualty. The sense of soundstage presence wasn't so much dissipated - a common failing - as simply cluttered and confused.

Recordings made using Type II tapes predictably suffered from the boosted top end, especially with Dolby processing, which was all too necessary with virtually all types of music. Not only was the musical balance thin and topmy, there were also telltale signs of the internal spectral and tonal shifts that indicate Dolby mistracking.

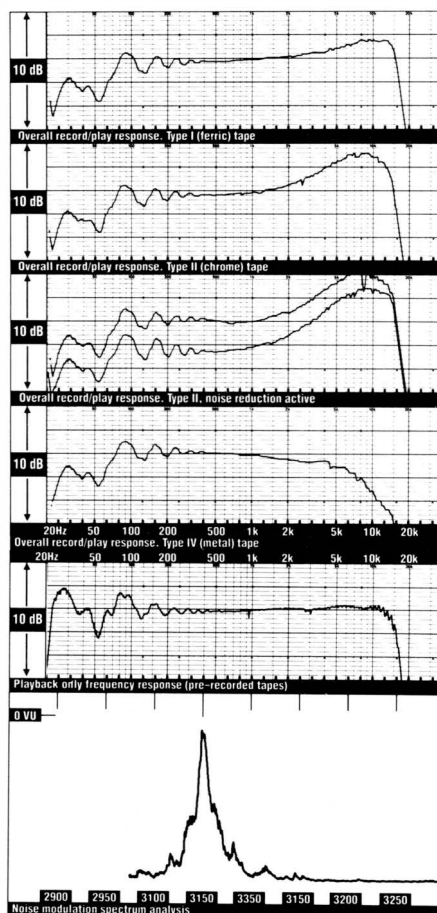
Only with Type I (ferric) tapes and with prerecorded material was the deck more or less accurately set up. In fact the response shape with prerecorded material was ruler flat, a fact rewarded by a smoother, more consistent, but still rather flat performance - and still at the mercy of unusually high background noise levels. Good Type I tapes such as TDK AR made acceptable recordings within the limitations already described, and probably represent the optimum tape-to-machine match in this instance.

## Conclusion

£100 is not a lot to pay, but even so, the CT-225 was a little disappointing to listen to in most cases, though it worked reasonably well with ferric tapes, and when playing musicassettes. By contrast, the facilities count is surprisingly high. Perhaps Pioneer invested just too much of the scarce resources available to the latter and not enough to the former.

## TEST RESULTS

Dolby Level reading on deck's meters	+3dB
Rec/replay response -3dB ref 1kHz	
IEC Type I	60Hz - 16kHz
IEC Type II	60Hz - 16kHz
IEC Type IV	60Hz - 14kHz
Wow/Flutter - Peak DIN wtd /unweighted	0.23%/0.32%
Wow/Flutter - Peak DIN wtd	0.16%/0.31%
Speed error	+0.3%
Type I signal/noise CCIR/ARM 400Hz & distortion 0VU	47.5dB
Type II signal/noise CCIR/ARM 400Hz & distortion 0VU	52.5dB
Type IV signal/noise CCIR/ARM 400Hz & distortion 0VU	53dB
Noise Figure of Merit (Dolby level/noise Type II)	55.5dB
Line input sensitivity/overload	71mV/>13V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	525mV/2.58V
IM distortion 10kHz/11kHz 0dB peak, 1kHz product	8.6%
Azimuth check R-L phase at 10kHz	20 degrees
VU indication at IEC 0dB	3dB
Dimensions (wtxhxd)	42x12x27.2cm
Average wind/rewind time (C90)	2min 35sec/very slow
Typical Retail Price	£100





# Pioneer CT-656 MkII

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



This is the *MkII* version of the three-head *CT-656* reviewed in issue 75, itself a spin-off of the *CT-91a* flagship.

In common with an increasing number of three-head decks, tape/source switching is performed automatically so that an off-tape feed is provided wherever possible. In addition to Dolby B and C, which, unusually for a deck at this level, come without the option for switching the MPX filter off, the 656 boasts Dolby HX Pro. Less usefully, it also includes a Pioneer speciality - record level meters which can be switched between two ranges: -30dB to +18dB with best case 2dB resolution and -3dB to +12dB with best case 1dB resolution.

Other features include track search (up to 15 tracks can be skipped either way), a headphone volume control, bias adjust, and electronic rolling number or elapsed time counter and timer standby. It's also possible to switch the display area off entirely, reducing visual intrusion and improving sound quality by eliminating the fluorescent display elements and the microprocessor that drives them as sources of internally generated RF.

The only external signs of change for the *Mk II* status is the deletion of the MPX filter switch.

## Test Report

This is a well engineered design with a substantial power supply and good audio component quality in which various anti-resonance measures have been taken, including fitting a cassette shell damping arrangement.

The frequency responses are dominated by very civilised low frequency behaviour but excessively wobbly results elsewhere. The Type I and IV tapes are flat enough at the standard setting, but the Type II plot was seriously adrift. The plot shown was made with bias corrected for optimum results, which is by no means flat. This is important because it is not

possible to adjust for a single tape group internally without simultaneously altering the settings for the remaining tape groups. There is also some fall away of midrange output with Dolby C selected.

The transport is well behaved overall. The spectrum analysis plot is clean, but the wow and flutter figures are somewhat higher than with the *MkI* sample previously tested. Overall signal/noise figures are broadly comparable, but not exactly class leading.

## Sound Quality

The *CT-656* is notably good with prerecorded material. The bass has a light touch, but packs considerable clout and authority. Tonality was richly varied yet accurate, and intelligibility, such as the shaping of vowel sounds and consonants, was of a high order. Pitch integrity was beyond reproach.

The *CT-656* doesn't have the floor to ceiling operating range to work effectively without Dolby noise reduction, except on specialised material: heavy metal ought to qualify. On the other hand, the Dolby C circuit sounded uneven (as suggested by the plots) and muddled with complex, transient rich material such as piano. Dolby B represents the optimum compromise here, as it often does, but this doesn't alter the fact that both systems strips something important from the sound, the subtle edge that separates the truly exciting and transparent from the plainly synthetic.

With most tape types there is a tendency to sound a little thin and harsh at the standard bias settings. Rebiasing helps the mid/top balance, but robs recordings of sparkle. Unlike its predecessor, I could not get this deck to aurally 'disappear' when listening. There always seemed to be something edgy or unbalanced about the sound.

I confess that try as I might, I wasn't able to reliably distinguish between

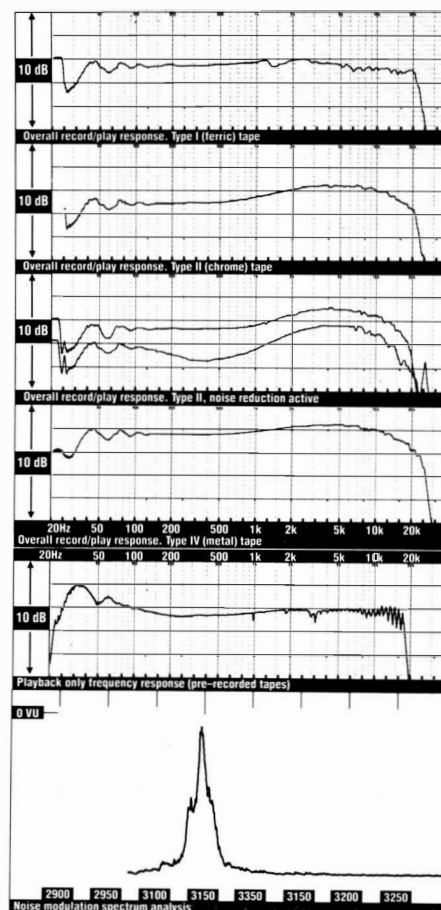
display on and off modes when listening 'blind', but when I could see the deck, it certainly looked much better without the light show.

## Conclusion

The good result with prerecorded material shows that the potential for excellence is there. It seems that skimped quality control may be partly responsible for an unexpectedly average performance from this once highly recommendable model.

## TEST RESULTS

Dolby Level reading on deck's meters	+3dB
Rec/replay response -3dB ref 1kHz	
IEC Type I	<20Hz -21kHz
IEC Type II	<20Hz -21kHz
IEC Type IV	<20Hz -23kHz
Wow/Flutter - Peak DIN wtd/unweighted	0.10%/0.20%
Wow/Flutter - Peak DIN wtd	0.07%/0.14%
Speed error	0%
Type I signal/noise CCIR/ARM	00Hz 46dB
& distortion OUV	0.95%
Type II signal/noise CCIR/ARM 400Hz	51dB
& distortion OUV	0.48%
Type IV signal/noise CCIR/ARM 400Hz	50dB
& distortion OUV	0.50%
Noise Figure of Merit (Dolby level/noise Type II)	54dB
Line input sensitivity/overload	100mV/>13V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	582mV/2.53V
IM distortion 10kHz/1kHz 0dB peak, 1kHz product	0.25%
Azimuth check R-L phase at 10kHz	50 degrees
VU indication at IEC 0dB	6dB
Dimensions (wxh xd)	42x13x32.5cm
Average wind/rewind time (C90)	2 min 5 sec/average
Typical Retail Price	£250





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# Pioneer CT-757 MkII

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



Pioneer's CT-757 MkII replaces the CT-737 MkII (Q: Why does Pioneer persist in using Boeing nomenclature?), and incorporates many of the superior components and ideas from the CT-959. These are aimed at improving wow and flutter, reducing microphony and feedback (the cassette loading door for example is physically isolated) and improving low frequency response (partly through power supply improvements).

This is a three-head deck with off-tape monitoring and a single capstan transport which features a re-engineered cassette shell clamping arrangement. Record bias and equalisation can be performed using built-in 400Hz and 10kHz oscillators, using an alternative mode of the very comprehensive display.

Tape searches are assisted by track search and record return features. The excellent quality dual range display area can be switched off. Dolby HX Pro is included, plus a meter peak hold and CD sync keys which can be used when dubbing compact discs. The electronic tape counter has alternative time and rolling number readouts, though it defaults to the latter. A switch to defeat the MPX filter is fitted out of sight on the back. Luxurious touches include gold plated signal socketry and a volume control for the headphone socket.

## Test Report

Bench test performance is extremely fine in almost every detail. In two areas in particular - pitch integrity and frequency response linearity - the Pioneer is as good as, or better, than any of the other cassette decks tested in this issue. Wow and flutter is particularly low at 0.06 per cent peak DIN weighted, and the unweighted wow figure - wow is perceived as a slow 'weaving' of pitch - is no less impressive at 0.04 per cent.

The bass end of the frequency spectrum is very smooth, with minimal head

contour effects (ringing) and a well extended response. The mid and treble show deviations from the nominal 0dB line no worse than +/- 0.4dB between 50Hz and 15kHz, increasing to 20kHz in the case of metal tapes. Dolby processing has little material effect here, though Dolby B results in a mild drawing in of the upper response limit. Only the prerecorded response looks a little wayward. IM distortion is very low, indicative of good electrical headroom, while the signal/noise and THD results are good, but not exceptional.

## Sound Quality

With almost CD like measurements, the Pioneer was expected to audition well, but it was quickly apparent that this was not to be. Of course, there were some positive points. The unusually stable transport, for example, makes itself felt in a real sense of definition and precision at both frequency extremes. The firm, taut bass is particularly impressive for its lack of 'waffle.' In its way, the Pioneer sounds remarkably homogeneous.

But there were problems, too. With, and even without, running through the tape alignment procedure, there were indications of loss of midband focus and perceptible almost random image shifts, which increased markedly as levels drifted up to and slightly beyond 0VU. The electronics appeared to compress and soften the impact of the music, and in doing so upset Dolby levels, resulting in the effects described here, which are symptomatic of Dolby mistracking. These effects were apparent with all three tape groups, and were significant musically. Prerecorded material was much better served by this deck, despite the measured imbalance, but there was still significant masking of fine detail.

## Conclusion

This deck appeared to have everything

going for it: painstaking engineering, excellent operating feel, high ambitions, and, of course, impressive measurements. Sadly it all came apart in the face of a range of perceived problems including compression and the characteristic muddling effects of Dolby mistracking. Two samples of this deck were covered. The first suffered failure of the replay Dolby processors during the tests, and the report refers to its replacement.

## TEST RESULTS

Dolby Level reading on deck's meters	+3dB
Rec/replay response -3dB ref 1kHz	
IEC Type I	<20Hz - 18kHz
IEC Type II	<20Hz - 18kHz
IEC Type IV	<20Hz - 22kHz
Wow/Flutter - Peak DIN wtd /unweighted	0.06%/0.13%
Wow/Flutter - Peak DIN wtd	0.04%/0.12%
Speed error	-0.15%
Type I signal/noise CCIR/ARM 400Hz & distortion 0VU	48.5dB 0.85%
Type II signal/noise CCIR/ARM 400Hz & distortion 0VU	54.0dB 0.45%
Type IV signal/noise CCIR/ARM 400Hz & distortion 0VU	52.5dB 0.60%
Noise Figure of Merit (Dolby level/noise Type II)	57dB
Line input sensitivity/overload	88mV/>13V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	500mV/4.52V
IM distortion 10kHz/11kHz 0dB peak, 1kHz product	0.56%
Azimuth check R-L phase at 10kHz	20 degrees
VU indication at IEC 0dB	4dB
Dimensions (wxhxd)	42x13.5x37cm
Average wind/rewind time C90	2 min 3 sec/average
Typical Retail Price	£350





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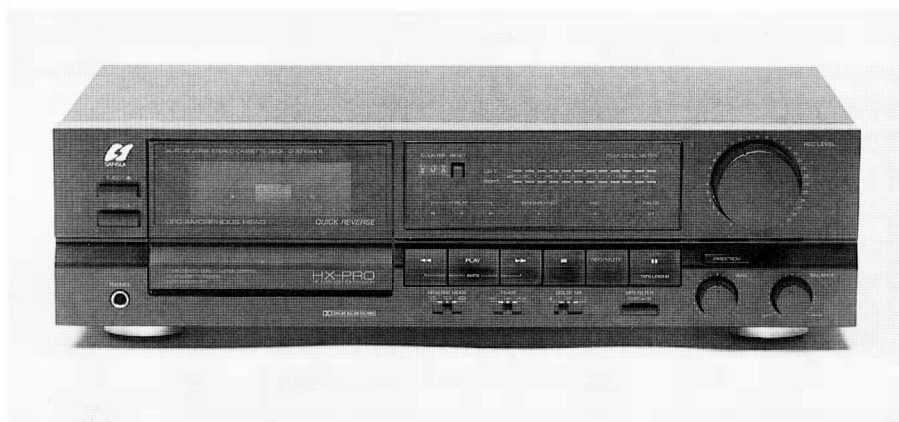
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# Sansui D-X211HX-R

**Best Buy**

SANSUI MISSION LTD, STONEHILL, HUNTINGDON,  
CAMBRIDGESHIRE PE18 6ED. TEL: (0480) 52777



The Sansui *D-X211HX* is a middle price (£170) two-head deck with an auto-reverse transport. Many cassette freaks turn their noses up at auto-reverse in a single transport design, that is one not aimed at the audiophile enthusiast, on the grounds that transport performance is inevitably impaired, and azimuth compatibility problems often intrude. But the inability to record for more than 45 minutes at a stretch can be an insuperable problem.

The *D-X211HX* uses an optical sensor to change direction. That is the transport is thrown into reverse gear (to the accompaniment of great grunts and groans from the innards) when the magnetic tape runs out, minimising out-time which would be of the order of 12 seconds or so with a non-optically triggered deck.

The transport controls are basically conventional, but with an added 'direction' key. If you try 'play' at the start of the tape with the direction incorrectly set, the transport is not intelligent enough to know how to get out of the trap. The transport mode is preserved during power off or after a tape has been extracted, which can lead to errors for the unwary.

As the model designation suggests, this is a Dolby HX Pro equipped model. Noise reduction follows convention with Dolby B and C processors and independent MPX filtering. Bias is adjustable manually. Other operating features include track search, a simple 16dB five step meter (with the LED 'windows' doubled up to suggest higher resolution - a commonplace deception), fixed level headphone monitoring and so forth. The Sansui is also equipped with a 'record return' key, which returns the tape to the start of a recording which has just finished. Handy.

## Test Report

Taking price into account, the *D-X211* acted in an exemplary way on the test

bench. Good LF tailoring is supplemented by well optimised frequency responses with all tape groups - minor errors such as with Type I are readily correctable with the bias pot. Pre-recorded material is equally well handled. The plot shown was produced in the conventional forward direction, but almost identical results were obtained in the reverse direction (not shown) where cumulative azimuth errors can be a problem. Noise and distortion figures are fairly good, though metal tapes are not perhaps the Sansui's forté. Most gratifying of all, however, is the behaviour of the transport, for which no concessions need be made for its bi-directional capability. If it continues as it started out, on this score at least.

## Sound Quality

The *D-X211* was approached with some trepidation, partly because previous Sansui decks in this area of the market had proved disappointing, but also because auto-reverse decks are frequently disappointing anyway. It may well be that the Sansui's performance will deteriorate faster than a comparable unidirectional deck, but it is not a foregone conclusion, and starting out standards are certainly high. In particular, pitch integrity was never called into question, irrespective of the music being played.

The Sansui was crisp and lively sounding in the midband, which suggests clean, transparent electronics allied to a good transport. The bass can sound slightly wispy, but there's no real loss of control, and both frequency extremes can be described as tidy. An accurate frequency balance is ensured by the bias pot and all three tape groups performed well. But there was little to gain by using Type IV metals rather than a good Type II like TDK SA-X or equivalent, and the Dolby circuits were only mildly intrusive. It is worthwhile experimenting with

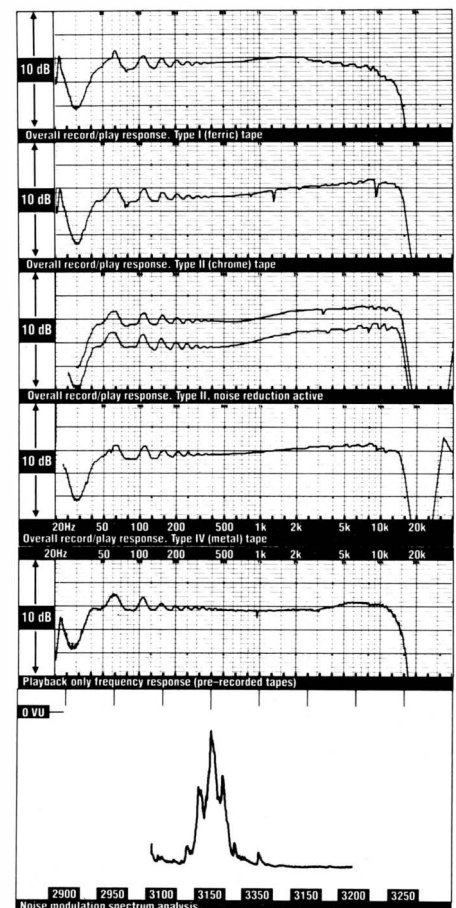
recording with Dolby noise reduction switched out.

## Conclusion

This is that most welcome of cassette decks, one that offers a really useful feature - auto-reverse operation - without extracting a negative quid pro pro. The Sansui works well and deserves every success. A clear Best Buy.

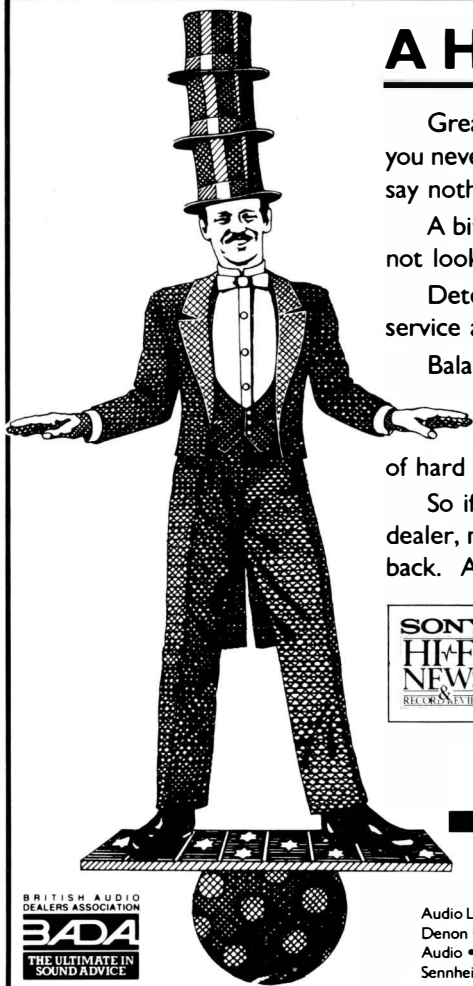
## TEST RESULTS

Dolby Level reading on deck's meters	+3dB
Rec/replay response -3dB ref 1kHz	
IEC Type I	35Hz - 15kHz
IEC Type II	35Hz - 16kHz
IEC Type IV	35Hz - 16kHz
Wow/Flutter - Peak DIN wtd /unweighted	0.09%/0.24%
Wow/Flutter - Peak DIN wtd	0.05%/0.26%
Speed error	+0.6%
Type I signal/noise CCIR/ARM 400Hz & distortion 0VU	48dB 1.3%
Type II signal/noise CCIR/ARM 400Hz & distortion 0VU	53dB 1.3%
Type IV signal/noise CCIR/ARM 400Hz & distortion 0VU	49dB 1.3%
Noise Figure of Merit (Dolby level/noise Type II)	56dB
Line input sensitivity/overload	134mV/>13V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	690mV/2.96V
IM distortion 10kHz/11kHz 0dB peak, 1kHz product	0.56%
Azimuth check R-L phase at 10kHz	80 degrees
VU indication at IEC 0dB	6dB
Dimensions (wxhxd)	43x12.5x27.5cm
Average wind/rewind time (C90)	2 min 14 sec/slow
Typical Retail Price	£170





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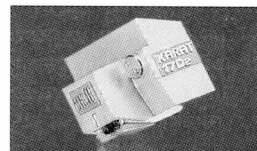
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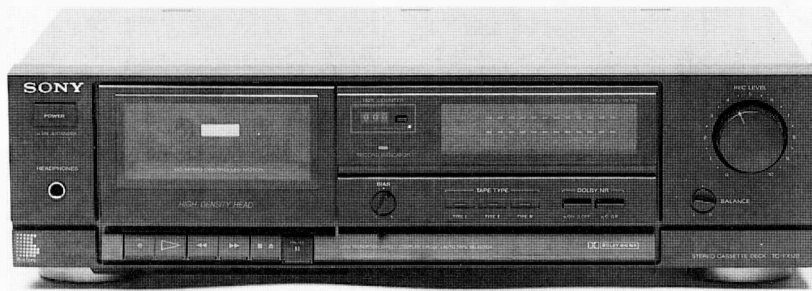
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# Sony TC-FX120

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



Sony's new cheapie is the least expensive cassette deck in the group. So what does it have to offer?

Anachronistically in 1991, the Sony is built around a mechanical transport, which even lacks such everyday niceties as auto-stop from fast wind mode.

Operating facilities are limited to Dolby B and C and fine bias adjust. The record level meters are clear but limited in resolution and dynamic range. Other gadgets include a mechanical tape counter, a fixed level headphone socket and - wonder of all wonders - automatic tape type switching, a feature missing from previous budget Sony models. There are even LED telltales on the otherwise almost totally unadorned fascia which confirm what type of tape has been inserted.

## Test Report

One key finding was made without the aid of any test instrumentation whatsoever. The Sony produced a substantial level of mechanical motor whine whenever it was under power. By substantial, I mean broadly comparable to the amount of background din made, for example, by many personal computers, and certainly enough to be intrusive when listening to music at low levels. By contrast, and I report this not without a touch of irony, electrical noise levels were surprisingly low with all tape groups, though some of this advantage is illusory due to the unusually low setting of the Dolby magnetisation level at -1dB, which is 1 to 4dB less than usual.

The record/replay frequency responses were sound, with the exception of the one made with Type II tapes, which is fully 3dB or so proud at 12kHz at the standard bias setting. This, of course, can be readily adjusted by the usual method of making short test recordings of wideband material. FM interstation noise is particularly well suited. The

prerecorded frequency response is ruler flat.

Turning to the transport, the Sony turned out to give disappointing figures which were easily the worst in the group. The level of wow (low rate pitch variations) was high enough to be obviously a problem with pitch-critical material, classic examples of which include piano and woodwind.

## Sound Quality

The transport appears to be the Sony's undoing. Even where the measurements show a healthy treble output, the TC-FX120 has a damped down quality. Treble detail is badly masked and instrumental separation is poor. Stereo imagery is deficient to the point where complaints that the sound appeared to be in mono appeared in the listening notes. The problem was endemic to all tape types, but at its most noticeable with treble rich material, which includes quite a few rock recordings, female vocal and piano.

The ills perpetrated by the transport extended further. Output was often distinctly uneven with more dropout than with other comparable decks. Finally there is the problem already hinted at: lack of pitch stability, which can be clearly heard with many types of music, though other listeners who lent an ear during the reviews didn't always notice the problem for what it was.

This is probably academic, but elsewhere the Sony sounded quite good. Its midband was strongly presented and surprisingly articulate, showing a wonderfully live drum skin sound with one test recording that left some much more expensive competition floundering. The employment of simple and therefore transparent sounding internal amplifiers is a likely explanation for this surprisingly strong showing. Prerecorded material also fared reasonably well, though pitch stability and treble presence again tended

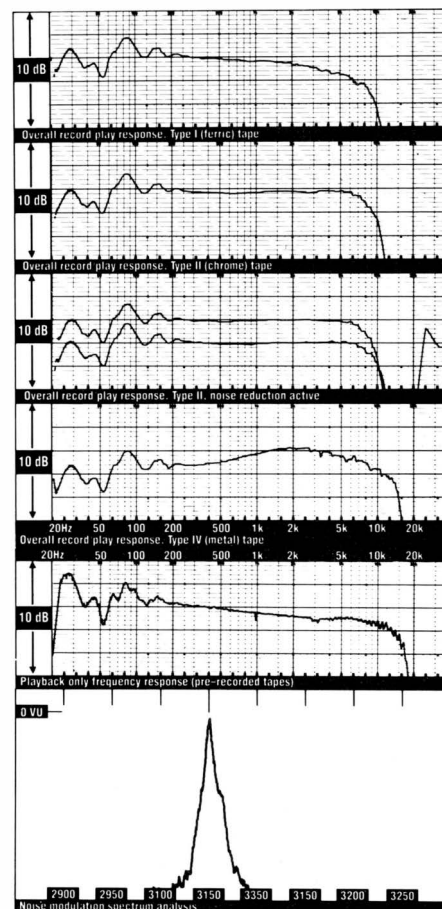
to be problems, depending on the nature of the programme material.

## Conclusion

Despite the rude mechanical transport, the Sony looks good and is pleasing to use. The electronics seem reasonably transparent, but the transport is far from stable enough for high fidelity use. Best save those pennies for a while longer.

## TEST RESULTS

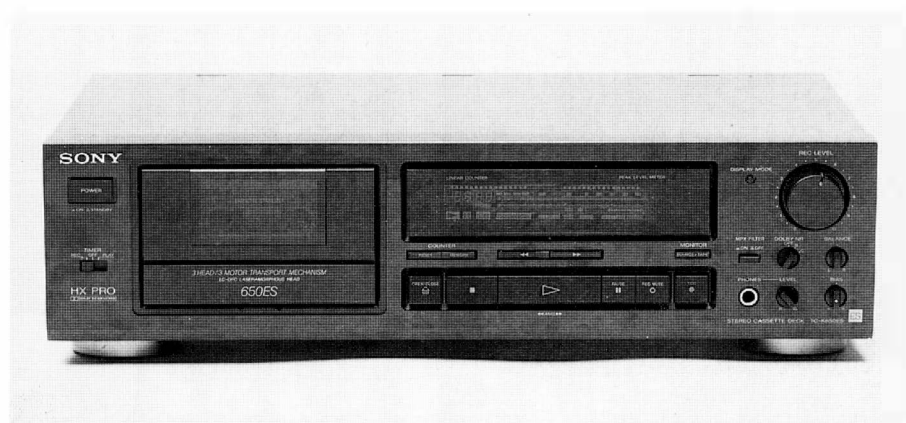
Dolby Level reading on deck's meters	-1dB
Rec/replay response -3dB ref 1kHz	
IEC Type I	<20Hz - 8kHz
IEC Type II	<20Hz - 10kHz
IEC Type IV	<20Hz - 14kHz
Wow/Flutter - Peak DIN wtd /unweighted	0.30%/0.40%
Wow/Flutter - Peak DIN wtd	0.21%/0.32%
Speed error	-0.5%
Type I signal/noise CCIR/ARM 400Hz & distortion OUV	52dB
Type II signal/noise CCIR/ARM 400Hz & distortion OUV	58.5dB
Type IV signal/noise CCIR/ARM 400Hz & distortion OUV	57.5dB
Noise Figure of Merit (Dolby level/noise Type II)	56.5dB
Line input sensitivity/overload	98.5mV/>>13V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	678mV/2.74V
IM distortion 10kHz/11kHz 0dB peak, 1kHz product	28.2%
Azimuth check R-L phase at 10kHz	50 degrees
VU indication at IEC 0dB	1dB
Dimensions (wxhxd)	43x12.5x28.5cm
Average wind/rewind time (C90)	2min 34sec/v slow
Typical retail price	£90





# Sony TC-K650ES

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



This is another entry level three-head deck with independent, siamesed record and playback heads. The tape/monitor switch is controlled automatically, but curiously it does so according to a priority which defies ready analysis. Select 'record' for example, and the deck stays in source monitor. Selecting 'pause' in record mode when monitoring off tape leaves the deck in tape mode and you listening to the sound of pure silence. The tape counter, which reads elapsed time in minutes and seconds, has a similar peculiarity in that it forgets its setting the moment power is turned off.

Apart from these comparatively minor matters, however, the *TC-K650ES* should meet most expectations. The specification includes a smooth running cam operated transport with well organised controls. Tape searches are abetted by a counter memory and a basic one track at a time track search feature. Dolby HX Pro processing is included, along with the usual noise reduction amenities and a bias control knob. The record level meters cover a fair 28dB range. They're very easy to read and have a peak hold function.

None of these features is out of the ordinary on a deck in this price band, and there are better equipped decks if you look around. The Sony does have one completely inconsequential but rather pleasant feature though: a powered door mechanism linked to the transport logic which operates rather like a CD player drawer. Make a front panel selection with the door open (including 'record') and the action is carried out directly. And vice versa: eject can also be selected automatically from any mode except record - for obvious reasons.

## Test Report

Wow and flutter levels were much higher than expected, and, if memory serves, higher also than on a previous sample of this deck assessed for another purpose

some months ago. The spectrum analysis shows just this effect, with some broadening of the central peak and some high level sidebands confirming the trend indicated by the numbers.

The measured Type IV metal tape noise figure is rather high, but the other tape types give quite reasonable figures, though there are signs, more from the listening results than from the numbers, that HF headroom is a little more limited than usual. Distortion residuals are benign - note in particular the low IM distortion result - but most of the frequency response plots look rather wayward, especially the playback only plot, which of course is not amenable to adjustment, and which is directly relevant with prerecorded material.

## Sound Quality

As with all the other decks, I made an initial assessment of the practicality of recording without Dolby noise reduction using a solo piano recording (*Mozart Sonatas* played by Mitsuko Uchida on Philips) which has plenty of air and space between notes, to assess the annoyance value of tape hiss, and which also has the transient integrity needed to probe the headroom limits. The Sony was found wanting here. Transients were audibly cracking up at a level where bias noise remained highly intrusive, especially via headphones, and this with TDK SA-X, an extremely quiet tape.

But Dolby C was not needed; Dolby B matched the noise spectrum off tape better than expected (the hiss had a slightly more than usually HF biased spectrum), and the circuit has been well enough designed to avoid excessive side effects. It had a clean, engaging and lively sonic balance, with a lean, attractive bass but just a little coarseness of tone and a somewhat lean balance at the optimum measured bias settings. Some raggedness with piano tone, and elsewhere, with

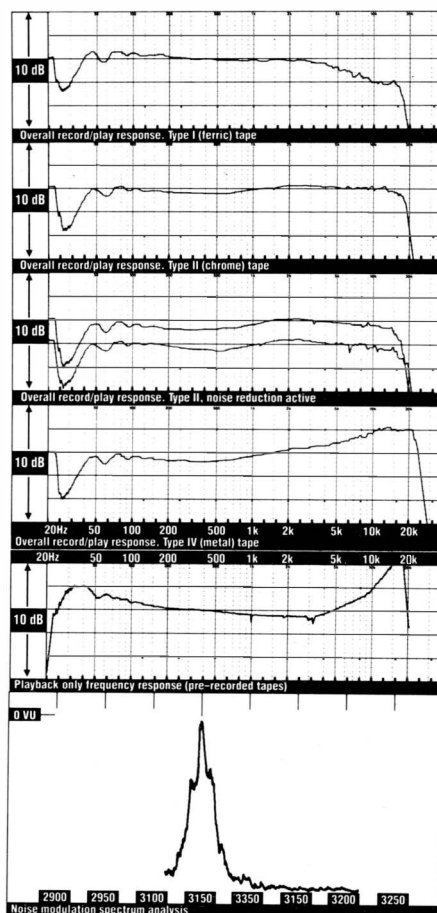
female voice and woodwind were the only real signs of the higher than usual wow and flutter figures.

## Conclusion

A slightly scrappy standard of music making, perhaps due to inadequate quality control and excessive transport irregularities, mar a deck whose underlying character is clearly true to the music. At £250, a 'could do better' conclusion seems in order, but this is a competent deck, and worth shortlisting.

## TEST RESULTS

Dolby Level reading on deck's meters	-2dB
Rec/replay response -3dB ref 1kHz	
IEC Type I	25Hz - 17kHz
IEC Type II	25Hz - 20kHz
IEC Type IV	25Hz - 22kHz
Wow/Flutter - Peak DIN wtd/unweighted	0.15%/0.23%
Wow/Flutter - Peak DIN wtd	0.10%/0.24%
Speed error	+0.2%
Type I signal/noise CCIR/ARM 400Hz & distortion 0VU	49.5dB
Type II signal/noise CCIR/ARM 400Hz & distortion 0VU	56.0dB
Type IV signal/noise CCIR/ARM 400Hz & distortion 0VU	49dB
Noise Figure of Merit (Dolby level/noise Type II)	55dB
Line input sensitivity/overload	112mV/>13V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	68mV/3.3V
IM distortion 10kHz/11kHz 0dB peak, 1kHz product	0.5%
Azimuth check R-L phase at 10kHz	60degrees
VU indication at IEC 0dB	0dB
Dimensions (wxhxd)	43x12.5x28.5cm
Average wind/rewind time (C90)	1 min 54 sec/fast
Typical Retail Price	£250

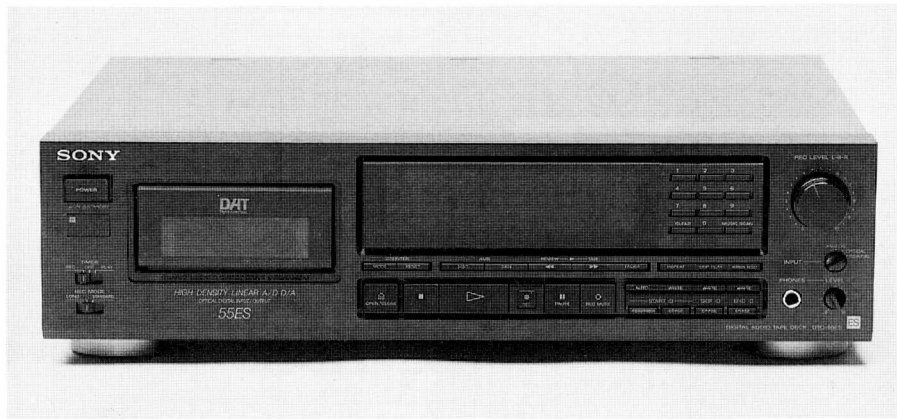




# Sony DTC-55ES

**Recommended**

SONY (UK) LTD, SONY HOUSE, SOUTH STREET, STAINES, MIDDLESEX TW18 4PE. TEL: (0784) 46700



Sony headed the group of manufacturers that developed DAT and it is among the format's most ardent promoters, first to the studio and broadcast worlds, and now to the domestic user. This makes the *DTC-55ES* a particularly significant product. Sony's central position means they have been through more generations of players than many, and although this is the first to feature Solocopy/SCMS (Serial Copy Management System software, which prevents recordings dubbed digitally from CDs or from other digital sources being used to generate further one-to-one digital copies), it is a fully mature product which is reflected in three ways: the accomplished way it handles tapes and goes about its business, an unusually wide range of secondary features and impressively sharp pricing.

In contrast to most DAT recorders, the tape is vertically oriented and remains visible when inserted, which helps reinforce the cassette like origins and nature of DAT. The *DTC-55ES* can record and play all normal DAT standards, including the LP (4 hour) recording mode from analogue sources, which gives notionally FM quality standards from a 32kHz sampling rate.

A wide range of features back these basics up, including a full range of subcode editing keys (skip, end, renumbering etc), automatic fades, display brightness adjustment, display off, intro-scan, track programming and more. Optical in and outputs are provided, as is a coaxial digital input, the usual analogue in and outputs and a headphone fed by a volume control.

## Test Report

Build quality is of a high standard throughout, and high tolerance components have been used. The A/D convertor is a fourth order Delta-Sigma type with 64 times oversampling and noise shaping. The D/A convertor is the low bit PLM design used in Sony CD players.

The measurements need very little comment. Almost every one of them is state of the art, with a large number of figures around the -100dB level, a measured 15.9 bit resolution and an effective dynamic range of 111dB.

## Sound Quality

The LP record mode gives results which are superficially similar to the standard mode, but with some loss of subtlety and detail. It remains eminently usable for general purposes where optimum quality is not needed.

The real interest, however, is in the Sony's performance standards when dubbing from CDs and when recording from analogue sources at 48kHz. In the former case, copies are made bit for bit, and the results are comparable to Sony CD players, which means an outgoing and cleanly defined style of sound with a solid bass and penetrating treble. Compared to Philips' bitstream convertor (as fitted to the *CD850* CD player used for this test), the Sony ultimately lacks low level detail and naturalness. The Philips has a less synthesised kind of sound, more natural and organic when stressed. This was particularly true when the Sony was used to record in the analogue domain, which adds the A/D convertor into the reproduction chain, and inevitably involves further subtle losses.

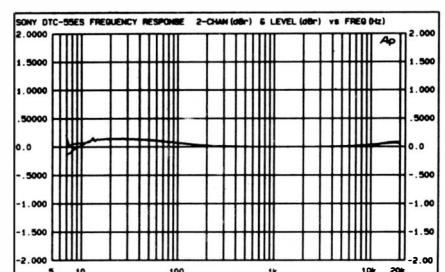
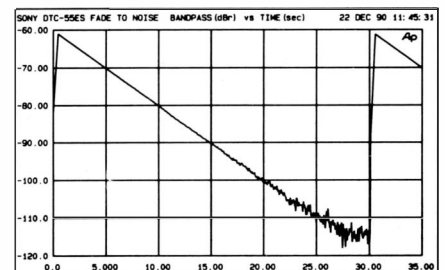
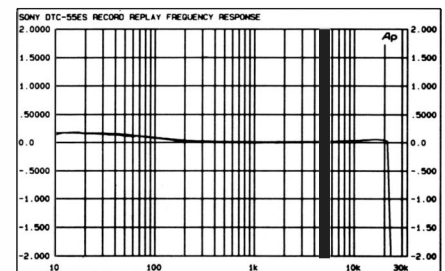
## Conclusion

Close attention was paid to comparisons with the Denon *DTC-2000* DAT machine, which is also included in this project. The two are fairly close (though not identical), and to some extent the choice between them is a personal matter. The Sony is cheaper and more flexible, but it can sound slightly slow and synthetic by the best standards, despite an attractively upfront feel. The Denon is cooler and more naturally distanced in balance, but this is a matter of presentation rather than

substance, and what may be more telling is its marginally more relaxed and less mechanical style and its somewhat more solid bass. But the Denon is also more costly and although it handles well, the button freak will find it less well equipped. The Sony is Recommended.

## TEST RESULTS

<b>Test resolution</b>	15.9 bits
<b>Output level, dB rel 2V, Source 2.05V, 0.21dB, 500ohm</b>	
<b>Effective dynamic range (-70dB thd + N + dither)</b>	111dB
<b>Pure harmonic distortion at full level ref 0dB</b>	20Hz -94dB, 1kHz-94dB, 20kHz -88dB
<b>(20kHz in-band products only)</b>	20Hz 0.002%, 1kHz 0.002%, 20kHz 0.004%
<b>at-70dB encode + dither</b>	-46dB or 0.50%
<b>Stereo separation</b>	20Hz 110/124dB, 1kHz 104/114dB, 20kHz 100/98dB
<b>Stereo balance L/R</b>	20Hz 0.01dB, 1kHz 0.02dB, 20kHz 0.01dB
<b>Frequency response (ref 1kHz) 20Hz - 20kHz</b>	+/-0.2dB
<b>Audible high frequency intermodulation</b>	-100dB or 0.001%
<b>Audible electrical noise</b>	-96dB (CCIR, ARM wid, 1kHz)
<b>Audible mechanical noise</b>	very low
<b>Ultrasonic noise</b>	-95dB
<b>Shock/vibration resistance</b>	very good
<b>De-emphasis</b>	+/-0.08dB to 16kHz
<b>White noise overload test</b>	OK
<b>Line input sensitivity/overload</b>	460mV/>13V
<b>Mic input sensitivity/overload</b>	n/a
<b>Line output for 0dB/maximum</b>	2050mV/2050mV
<b>IM distortion 10kHz/11kHz 0dB peak, 1kHz product</b>	0.001%
<b>Azimuth check R-L phase at 10kHz</b>	n/a
<b>VU indication at IEC 0dB</b>	0dB
<b>Dimensions (wxhxd)</b>	43x12.5x35cm
<b>Average wind/rewind time</b>	n/a
<b>Typical Retail Price</b>	£550

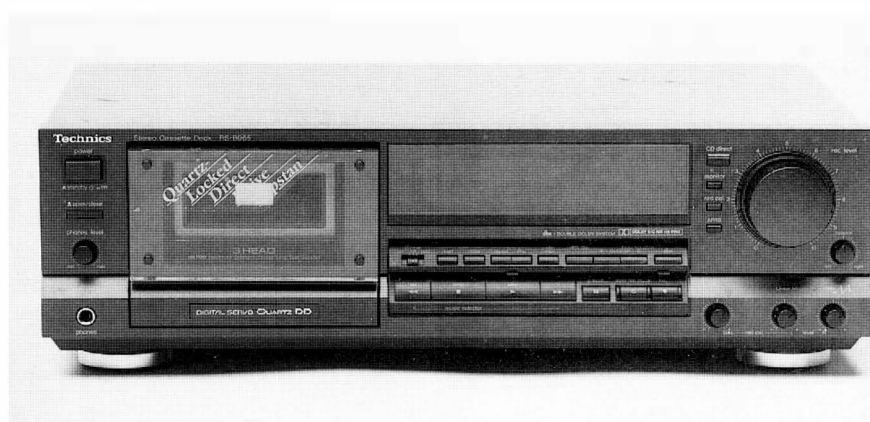




# Technics RS-B965

PANASONIC UK LTD, PANASONIC HOUSE, WILLOUGHBY RD,  
BRACKNELL, BERKS RG12 4FP. TEL: (0344) 862444

**R**ecommended



Here is another all-singing up-market cassette deck from the Technics stable. Styling is in the standard modern Technics scheme of dark chocolate brown with a lot of front panel sculpting and a plethora of control buttons, a number of which are extremely close together and fiddly to operate. Certain key features are all too easily overlooked, an example of which is the record bias/level calibration key the presence of which was missed during the measurement programme, which meant re-running the lab tests from the start.

The transport is a dual capstan type which is driven by a very sophisticated proprietary quartz locked direct drive capstan motor. The casework uses synthetic compounds to damp resonances and reduce microphony. Turning to the user features, the Technics spec sheet includes the aforementioned bias/equalisation set-up routine, which involves pressing the appropriate key when in record mode, which changes the meter to an alternative display mode. From then on it's a two stage match needle process. Noise reduction is by Dolby B, C and dbx, and Dolby HX Pro processing is included.

There is a plethora of minor features too: dual range meters (long and offering high resolution) and an optional peak hold readout (used when scanning CDs etc for peak levels), a time/rolling number counter with memory stop and repeat options, and track search. Headphone monitoring level is adjustable, and the eject key is powered and linked into the deck's control logic, which like the dual range meter option, was first introduced to the market (as I recall) by Pioneer.

## Test Report

It would be more than a little surprising if the Technics high tech complement of quartz locked direct drive capstan motor and closed loop dual capstan transport didn't result in very good mechanical

behaviour, and sure enough the spectrum analysis is exceptionally clean and sharp looking, with just mild discrete artefacts to detract from the near ideal showing. The various numerical figures relating to wow, flutter or both are also impressive.

The frequency responses after calibration are good, with a characteristic slight rise at the top end which is exaggerated by noise reduction - dbx especially, for which the tape was separately calibrated. The replay only response shape is also a textbook example of its type.

## Sound Quality

The powerful noise reducing effect of dbx is particularly effective at reducing mid and low frequency tape noise untouched even by Dolby C. Unfortunately, it leaves the music with a coagulated quality, short of low level detail, which reminded me of overcooked rice - and also why just about every other manufacturer has stopped using dbx on domestic cassette decks. Dolby C wasn't all that much better, but there was more presence and shape to the sound, and further improvements to be had by switching to Dolby B, or running without noise reduction at all. This is entirely feasible with most types of programme material, even open textured chamber or recital music, as the ability of the Technics to push tape to the point where other decks are in serious if not terminal trouble is one of this model's greatest joys. Ultra quiet tapes like TDK SA-X work well, but a good metal (MA-X etc) has a tauter, sharper and more dynamic quality altogether, and is well worth the extra cost - Dolby HX Pro notwithstanding.

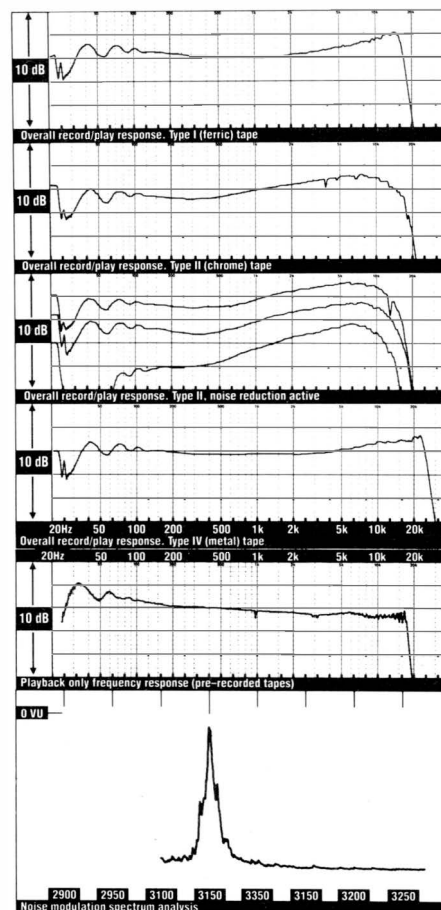
The Technics is not merely good at shovelling on the level. It has open and surprisingly transparent sounding record and play electronics which are almost certainly an improvement over the previous range.

## Conclusion

There are shortcomings: patchy ergonomic details and some tape mod noise in particular, but this is the best sounding Technics I can recall. It sounds excellent with prerecorded material but comes into its own when recording with high energy tapes without noise reduction. Recommended.

## TEST RESULTS

Dolby Level reading on deck's meters	+3dB
Rec/replay response -3dB ref 1kHz	
IEC Type I	<20Hz - 17kHz
IEC Type II	<20Hz - 11kHz
IEC Type IV	<20Hz - 25kHz
Wow/Flutter - Peak DIN wtd /unweighted	0.08%/0.17%
Wow/Flutter - Peak DIN wtd	0.05%/0.15%
Speed error	+0.05%
Type I signal/noise CCIR/ARM 400Hz & distortion 0VU	47dB
Type II signal/noise CCIR/ARM 400Hz & distortion 0VU	0.95%
Type IV signal/noise CCIR/ARM 400Hz & distortion 0VU	56dB
Type II signal/noise CCIR/ARM 400Hz & distortion 0VU	0.55%
Type IV signal/noise CCIR/ARM 400Hz & distortion 0VU	50dB
Noise Figure of Merit (Dolby level/noise Type II)	59dB
Line input sensitivity/overload	92mV/>9.23V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	629mV/7.18V
IM distortion 10kHz/11kHz 0dB peak, 1kHz product	0.32%
Azimuth check R-L phase at 10kHz	15 degrees
VU indication at IEC 0dB	+4dB
Dimensions (wxhxd)	43x13.5x29cm
Average wind/rewind time C90	2 min 9 sec/average
Typical Retail Price	£350





# Yamaha KX-250

**Best Buy**

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The essence of this rather fussily designed near-budget model is that it is very well equipped. Facilities include a full side and phrase repeat mode and timer play/record standby. The next along is a bias adjust control, which is followed by Play Trim, Dolby B and C switching (with or without MPX filtering - a good point on a deck at this price level) and the other standard amenities.

Play Trim? Like most good ideas, Play Trim is intrinsically simple, consisting merely of what amounts to a treble tone control, placed in the playback circuit after the playback amplifiers, but before the Dolby decode circuit. Tapes recorded on one machine will often reproduce with reduced treble on the next, usually due to head azimuth (alignment) incompatibilities. Positioning the circuit ahead of the Dolby processor doesn't just flatten the tonal balance of the sound, it also means that Dolby level errors can be corrected, the results of which can be very impressive indeed. The only problem - if it can be called that - is that the adjustment can only be made by ear. This takes some practice, but is not hard.

Other features include 21dB six step record level meters, fixed level headphone monitoring, a mechanical tape counter, track search and intro-scan. Engineering and operational feel are of a standard commensurate with the price. An infrared remote control handset is available for about £20 extra - a real plus.

## Test Report

The effect of the Play Trim feature in the frequency domain can be seen in the family of replay response plots which also show that the central 12 o'clock control position gives an accurate result for nominally correct tapes (ie specially recorded test tapes whose azimuth is guaranteed). The various record/replay responses are very accurately handled, though there is a trace of mistracking with Dolby C which can,

however, be eliminated as a practical problem by using Play Trim.

Transport integrity is of a high order: the 0.08 per cent weighted wow and flutter figure leads its class, and the spectrum analysis plot is clean. Bias noise and THD results are also satisfactory with the +3VU Dolby level taken into account, as the noise 'Figure of Merit' indicates. Even wind speed is a little better than expected for a deck at this price level, perhaps due to the use of separate dedicated capstan and wind motors.

## Sound Quality

This is a good one. Compared to other similarly priced decks, the Yamaha has greater subtlety and 'shape'. This is difficult to explain on paper, but is readily apparent on a quick play through. The Yamaha was no less hiss bound than most. Slight variations in pitch were sometimes audible, and the bass was both more extended and woollier than usual, which occasionally led to blurred and excessive bass lines. Through all this however, the Yamaha demonstrated an ability to reproduce fine detail and to separate out the strands of a musical performance, especially in the midband. The result of this was that subtle events that pass other such decks by were clearly reproduced by this one.

This slightly more exacting than usual performance standard was consistent with all tape types, though it would be hard to justify the cost of some of the more expensive metals in particular. A quiet Type II such as TDK's SA-X is ideal for most situations, but excellent results were obtained from AR and AD-X.

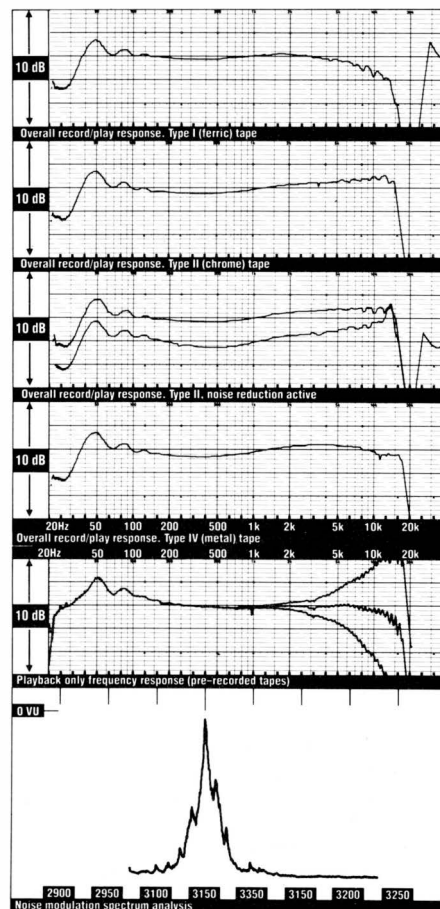
Play Trim proved useful in rescuing tapes (some prerecorded) which often don't sound too good, though as with any stable-door bolting exercise there is a trade off, in this case for increased hiss, which naturally is concentrated on the most exposed area, the top couple of octaves.

## Conclusion

The fussy control layout happily turns out to be the only significant shortcoming of this excellent budget all rounder. Play Trim is a decided plus, but the main attribute is its simple musical integrity. Best Buy.

## TEST RESULTS

Dolby Level reading on deck's meters	+3dB
Rec/replay response -3dB ref 1kHz	
IEC Type I	25Hz - 14kHz
IEC Type II	25Hz - 16kHz
IEC Type IV	25Hz - 16kHz
Wow/Flutter - Peak DIN wtd/unweighted	0.08%/0.17%
Wow/Flutter - Peak DIN wtd	0.06%/0.16%
Speed error	0.01%
Type I signal/noise CCIR/ARM & distortion 0VU	500Hz 50dB
Type II signal/noise CCIR/ARM 400Hz & distortion 0VU	0.65%
Type IV signal/noise CCIR/ARM 400Hz & distortion 0VU	54dB
Noise Figure of Merit (Dolby level/noise Type II)	57dB
Line input sensitivity/overload	13mV/>13V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	62mV/3.83V
IM distortion 10kHz/11kHz 0dB peak, 1kHz product	0.9%
Azimuth check R-L phase at 10kHz	0 degrees
VU indication at IEC 0dB	3dB
Dimensions (wxhxd)	3.5x12x27.5cm
Average wind/rewind time (C90)	2 min 9 sec/average
Typical Retail Price	£149





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# Conclusions, Best Buys and Recommendations

*Which cassette decks made the grade? Alvin Gold collects his thoughts and sums up the best and the rest from this month's batch.*

In the last few months, everything in the cassette deck world has started to move. First and potentially most significantly, Philips has announced Digital Compact Cassette as a contender for the cassette market, with the launch scheduled for spring next year.

In the meantime, DAT has been relaunched to the cassette buying public with a batch of new recorders at a new and more interesting price level of £550 - £600.

At the present time, there is no obvious reason to suppose DAT will take off in the exponential way CD managed after its launch, but DCC does look very likely to succeed if the early promises for its innovative low density recording technology are fulfilled and if Philips can abide by their timetables - two very big 'ifs' indeed.

The other interesting event - non-event rather - is the continued non-appearance of the new, more powerful, whiter-washing Dolby S. I have no doubt that a handful of Dolby S equipped cassette decks will finally reach the shops over the next few months, but the prospects for this third bite of the noise reduction cherry from Dolby Labs appear dim in view of the brightening prospects for a digital future for tape as well as disc.

The implication of all this is that relatively little development effort is likely to be expended on compact cassette technology over the foreseeable future. But the flow of new models continues unabated, and almost imperceptibly many of the rougher edges are being smoothed down.

## Best Buys and Recommendations

In ascending order of price, the first deck to receive a wholehearted recommendation was the £130 JVC *TD-X321*. Described in the text of the review as an 'astute'

package, the JVC has a polished user interface and modest but adequate lab test and sonic performance, and is good value. But if you can stretch to an extra £20, you might consider some altogether less compromised machinery in the shapes of the Aiwa *AD-F500* and the Yamaha *KX-250*, both around £150. The Yamaha has a wide range of play and repeat modes, and also has 'Play Trim' to help iron out inconsistencies arising when playing tapes recorded on other cassette decks, or which have been commercially duplicated. The Yamaha also boasts an excellent transport with class beating wow and flutter levels, and a fine, detailed sound. It is the clear Best Buy in this price area, but the Aiwa *AD-F500* is not far behind with a somewhat more limited range of rather more purposeful features. Auto-reverse decks continue to be a comparative rarity, but Sansui supplied a £170 model called the *D-X211HX* which performs as well as comparably priced unidirectional models and is a clear Best Buy. There can be no doubting the usefulness of the auto-reverse feature, especially when making unattended recordings.

The next two models cost £200 and £230 respectively. The first is Denon's *DRW-650*, the latest in their dual deck range. It is not quite as exactly built as the best single decks in this price area, but some persistent limitations of previous models have been addressed, especially the Dolby switching that forgot its setting every time the unit was switched off. There's still no timer standby unfortunately, but it performs well enough in other respects. Another Denon, the £230 *DRM-700A*, achieves Best Buy status. This is one of the least expensive three-head decks available. As usual with Denon there are some operating foibles - no timer standby, a headphone socket

volume control that also adjusts the line output feed - but engineering is of a surprisingly high standard - and it works.

Amongst the most attractive middle price models currently available is another JVC, the *TD-V621*. This all-singing model is aimed primarily at the enthusiast, but the external bells and whistles do not cover up internal weaknesses. The *621* has a very well engineered dual capstan transport and three heads, supplemented by a plethora of inputs, allowing the deck to work independently of a system amplifier (this will appeal to many owners of esoteric amplifiers), switchable Dolby HX Pro, and a first rate real time counter and record level meter display. Sonically, the *621* is not completely transparent, but the deck as a whole performs to a high standard.

The big name in this area of the market, however, is Nakamichi. Its new *Cassette Deck 2* continues the company tradition of superb engineering at the expense of surprisingly primitive features (two heads, single capstan, manual tape selection), but this is a more modern looking package than its predecessor and it is Recommended for its powerful, energetic sound quality.

Next up the price ladder is the Technics *RS-B965*, another three-head, dual capstan design with a wide range of features, which includes a manual but assisted tape bias and equalisation adjustment routine using built-in oscillators and an alternative display mode. Extensive anti-resonance measures are taken, and the motor is a sophisticated and smooth running direct drive type, whose speed integrity is clocked by quartz crystal. The Technics also has dbx noise reduction, but this circuit is best avoided. Indeed, the available dynamic range is

such that all noise reduction circuits can be avoided with advantage.

## DAT

Our two DAT machines are both Recommended. The Sony *DTC-55ES* offers greater technical accuracy, and a better set of lab test results, and shows that for Sony, DAT is now a fully mature product. The *DTC-55ES* sounds polished and slick, and the deck has a standard of stability and clarity that leaves all but the very finest cassette deck standing.

The Denon *DTR-2000* is a little different. Denon's expertise in professional digital audio processing predates Sony and just about every other producer too, but Denon doesn't have Sony's resources and has been forced into the position reserved for such companies of avoiding the bread and butter mainstream in favour of value-added up-market variants. The *DTR-2000* is an accomplished up-market DAT, and the measurements are all good, but they are bettered by a dB or so all round by the Sony.

But the fact that Denon still has a distinctive contribution to make is obvious from the *DTR-2000*. Its simple, fuss-free user interface should win it many friends, and the tape inching facility is a useful idea which can help when dubbing from tape-to-tape by making it easy to find edit points accurately. The Denon's main selling feature, however, is the apparent superiority of its analogue circuits which imbue the music with a spark of life in a manner that eludes the Sony, which ultimately sounds a tad more synthetic. But you pay for this: the Denon costs fully £250 more than the Sony, and it's hard to avoid the thought that within a fairly short timescale, there will probably be better, cheaper machines from which to choose.





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And finally, the selector/attenuator is a passive pre-amp of elegant simplicity. Just select from any of the seven inputs, set the volume, and enjoy the music.

However, unlike many passive pre-amps, this is not just a "pot in a box". Instead of using a humble potentiometer as a volume control, a high quality stepped attenuator has been used. The result is superb inter-channel balance and unsurpassed control over the volume, especially at low listening levels.

The moving coil step-up transformer (£115.00) the valve phono stage (£374.00), and the passive pre-amp (£199.00) are all available separately (and all have their uses as separate items), or can be purchased together to form a complete and versatile pre-amp.

The price may be ridiculously low for hi-fi of this quality, but you'll obviously want to know more than I can tell you in this ad before investing in any or all of the modules. So if you are considering an upgrade to your system, give me a call or write to me at this address and I will send you free further details. Then you can audition the pre-amp where it really matters - at home in your own system.

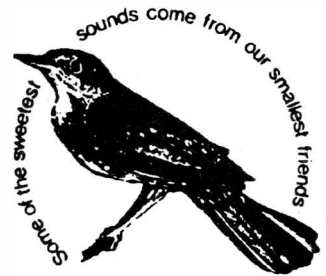
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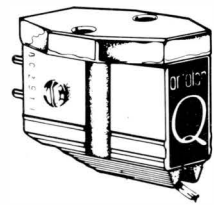
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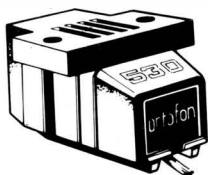
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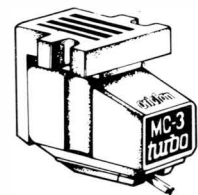
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# Tech Talk

*Every review includes a table of laboratory test results. Alvin Gold explains how the tests were carried out and how to interpret the results.*

At the outset let me acknowledge the help I received from Chris Bryant, who did the sensitivity, overload, azimuth, intermodulation and VU indication at IEC 0dB measurements. All the remaining machine tests and tape tests were done using the author's own facilities.

As in previous projects, the cassette decks were assessed in two distinct ways: first as hardware designed to play commercially recorded musicassettes, and secondly as recording tools.

The vital distinction is that for the former, the deck must correspond (in physical alignment and electrical equalisation) to the external standards applied during the duplication of prerecorded material. In the latter case this stricture doesn't apply in quite the same way. Although a recorded tape ought still to replay accurately on other cassette decks (the owner's *Walkman* or ICE players, for example), some of the commonest errors (notably those due to head alignment) are essentially self-correcting with the same machine.

## Lab testing

**Dolby Level.** Dolby level 200nW/mm as indicated on cassette deck meters, using Teac test tape. Note limited resolution of some meters can give reading errors.

**Rec/replay response - 3dB ref 1kHz.** The two figures given are simply the frequency extremes that define the bandwidth (referred to the arbitrary 0dB 1kHz level, and recorded at -10dB ref IEC). These are shown separately for all three tape types.

**Wow and Flutter - Peak DIN wtd/unweighted.**

Central to the task of writing to and reading from tape is that the consequence of any lack of absolute speed stability will superimpose itself on the signal, and you

will hear the effect of that. In an analogue system like compact cassette, the inevitable variations in speed of the tape passing over the heads appear as momentary (and sometimes longer term) pitch variations. This class of variation is known under the blanket term wow and flutter, and is shown in unweighted and weighted form. Wow and flutter are shown separately.

**Speed error** is measured in percentage deviation from the nominal standard (4.75cm/s).

**Signal/noise ratios are quoted with CCIR/arm weighting.** The test frequency is 400Hz, the distortion is shown at the same point (0VU on the deck's meters) for each of the three tape types.

**Noise 'Figure of Merit'** like signal/noise but referred to as constant magnetisation level, ie Dolby level Type II tape used.

**Line input sensitivity/overload.** Will it match your amplifier tape feed?

**Mic input sensitivity/overload.** What sort of microphones (if any) can be used?

**Line output for 0dB/maximum.** Will it drive your amplifier properly? (Probably.)

**IM distortion 10kHz 1kHz 0dB peak, 1kHz product.** This test gives a useful measure of how well or badly the various machines respond when asked to record two high frequency signals at 0VU level simultaneously. Real life musical signals are much more complex still, of course, and an inability to deal with this test cleanly suggests an inability to cope with upfront percussion or other high energy material without sounding hard, splattery or just plain distorted.

**Azimuth check R-L phase at 10kHz.** Expressed in three degrees (of treble phase shift), this is a measure of azimuth misalignment. The higher the error, the greater the HF loss when playing commercially recorded cassettes.

**VU indication at IEC 0dB.** A flux level corresponding to IEC 0dB (= 250nW/m) will usually produce a record level metre reading in the range +/-3VU.

**Dimensions (wxhxd).** In centimetres, of course.

## Plots and graphs

In addition, a number of plots and graphs are included with each review. The frequency response plots were run with the highest pen writing speed available, which means that dropouts tend to show up in all their glory, and frequency response errors are not 'sanitised' as is often the case. The chart recorder was used with its greatest vertical resolution. This exaggerates response aberrations by a factor of 2.5 times compared to previous cassette deck tests but brings them into line with CD players, cartridges and amplifiers. The record/replay sweeps were also continued right up to 40kHz.

All response plots were run at -10dB, which stresses the machines rather more than if they were run at the traditional -20dB.

Also included are similar comparable plots showing the effects of the noise reduction systems in the frequency domain.

The playback only plots were run in exactly the same way giving an indication of the frequency response available with prerecorded material. For these tests, thanks to Sony and Pioneer, we were able to run with official IEC 120mS replay sweep tapes from ABEX. The tapes used were TCC-162B (20Hz to 18kHz) and TCC-162 (31.5-18kHz).

We also performed spectrum analysis tests to investigate the mechanical behaviour of each of the decks, though space prevented the publication of more than one of these.

The noise modulation spectrogram graphically illustrates the mauling endured by a 3150Hz sinewave when recorded and replayed by the deck under test - there are close parallels with a similar analysis carried out in last year's edition. The central peak should be as fine and as thin as possible, any problem here being heard as a lack of pitch stability. Response runs were also made using the high speed dub option, but have not been reproduced for space reasons. With auto-reverse decks, all data refers to Side One, but the reverse side was checked in the same way, and again discrepancies were reported as they arose. In the case of decks with automatic tape alignment, the alignment procedure was followed, and where a bias adjustment facility was fitted, the setting recommended for TDK AD, SA and MA was used if available. Otherwise, the central setting was adopted.

## Listening tests

The listening was divided into two sections. The first involved using each deck in turn in a system which included a Philips CD850 CD player, a Pioneer A-400 amplifier, various loudspeakers including Tannoy DC3000s and a pair of Sennheiser HD560 Ovation headphones. Much routine listening was done with this system, along with all the functional work - which button did what and so on.

Finally, and most important of all, each deck was auditioned in a high grade loudspeaker based system. Equipment used included Krell KSL and KST-100 pre and power amplifiers, Meridian 602/603 CD player, Roksan Xerxes/Artemiz/Shiraz record player, with an Artaxerxes MkII step up and various loudspeakers including Monitor Audio Studio 15s bi-wired with Roksan cable.



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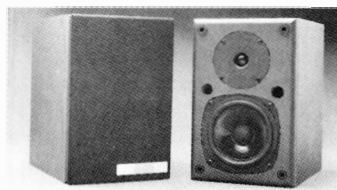


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# Reader Offers

Improve the sound of your hi-fi system with these top quality LC-OFC interconnects and PC-OCC speaker cables, available to Hi-Fi Choice readers at discount prices

## Furukawa Speaker Cables

Furukawa speaker cables are manufactured from PC-OCC, better known to its friends as Pure Copper by Ohno Continuous Casting. This means that the single crystal copper conductors have virtually no grain, and therefore no grain boundary to impede the flow of signals. The speaker cables are available in a choice of terminations, either banana plugs, spades, pins or a combination of them. All terminations are gold plated and attached using a solderless connection to the cable.

FS-2T14 Flatcap per 1m pair .....	£33.00
<i>Add £9.00 per stereo metre for other lengths</i>	
FS-2F09 per 1m pair .....	£36.00
<i>Add £12.00 per stereo metre for other lengths</i>	
FS-2T20F per 1m pair .....	£38.00
<i>Add £14.00 per stereo metre for other lengths</i>	
FS-2T30F Flatcap per 1m pair .....	£48.00
<i>Add £24.00 per stereo metre for other lengths</i>	
FS-2T35 per 1m pair .....	£50.00
<i>Add £26.00 per stereo metre for other lengths</i>	
FS-2T55P Flatcap per 1m pair .....	£69.00
<i>Add £45.00 per stereo metre for other lengths</i>	
FS-2T15S solid core per 1m pair .....	£124.00
<i>Add £100 per stereo metre for other lengths</i>	

Please state termination required when ordering.

## Furukawa Interconnect Cables

Furukawa interconnect cables are made of PC-OCC copper and come with hermetically sealed gold plated copper RCA phono plugs as standard. Two types of cable are available, the *FV1010* and the *FD1010*. Both are unbalanced digital interconnects, the *FV1010* designed for video recorders or between CD players and separate DACs, and the *FD1010* is for use between a CD player and amplifier. The *FA2010* is a balanced analogue interconnect for use between pre and power amps.

FV1010 per 1m single .....	£42.50
FD1010 per 1m pair .....	£75
FA2010 per 1m pair .....	£80

A plastic optical fibre interconnect is also available, priced at £33.50 for a 1 metre length terminated with TOSLINK plugs.

## Yfere Interconnect Cables

Multi purpose CD or analogue interconnects with copper, gold plated patented RCA plugs.

Twin per 1m pair .....	£50
<i>Add £10 per metre for longer lengths</i>	
Quad per 1m pair .....	£80
<i>Add £20 per metre for longer lengths</i>	

# CD Xtracts

Since we gave away a small pack of CD Xtracts free with our October issue, the *Hi-Fi Choice* office has been inundated with 'phone calls from readers asking where they could buy some more. Thanks to an exclusive deal with the manufacturer,

**To order any item from this page, simply fill in the order form (right)**



Design Logic, CD Xtracts are now available in packs of ten from our mail order department.

Please send me .....\* packs of CD Xtracts @ **£2.99** each (\* Insert quantity required. Each pack contains 10.) Please add **50 pence** postage & packing per order.

### TO ORDER CABLES

Please send me the following interconnect/speaker cables

Cable type .....

Length.....(m)

Termination required .....

Cost £ .....

I enclose cheque / PO made payable to Dennis Publishing for £.....

Please charge my Mastercard (Access) \* / Visa \* (\* delete as appropriate)

Credit card number .....

Expiry date .....

Signature .....

Name .....

Address .....

.....

..... Postcode .....

.....

*\* Offer available to UK readers only*

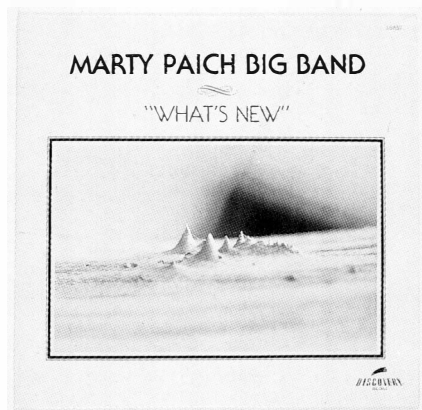
Please send order form with payment to:

**Hi-Fi Choice Mail Order, PO Box 320, London N21 2NB.**



# Audiophile Recordings

Our mail-order service allows Hi-Fi Choice readers to buy some of the world's best audiophile records and CDs.



As top-quality 'audiophile' recordings seem to be becoming more and more difficult to find in High Street record shops, Hi-Fi Choice is making a determined effort to source some of the best recordings from around the world and make them available to readers by mail order.

You might stumble across one or two of these records in some specialist record shops, but for the most part these records and/or CDs are not readily available in the UK. You certainly won't find them in your local record store!

We have already added many exciting discs from specialist American record labels such as Reference, Wilson and Sheffield - and we expect our catalogue of LPs and CDs to expand considerably during the next few months.

## **RADKA TONEFF: Fairytales**

Ref LP1 £12.95

Ref CD1 £14.95

The well known audiophile (digital) recording of female voice and piano. Worth the asking price alone for the opening song, *The Moon's A Harsh Mistress*. Odin CD03/LP03

## **ARNE DOMNERUS' KVARTETT: Blatoner fra Frolldhaugen**

Ref CD34 £14.95

A selection of Grieg 'miniatures', imaginatively arranged for a jazz quartet. Superbly vivid sound. (Available on CD only.)

For-X, FXCD65

## **RACHMANINOFF: Symphonic dances vocalise**

Ref LP38 £29.50

Athena records has taken the master tapes of a late sixties Turnabout recording of the Dallas Symphony orchestra conducted by Donald Johanos and mastered them to the highest audio standards. The performance is exemplary and the recording second to very, very few. The sonic result is spine chilling realism, you won't believe that your hi-fi system is this good! Athena ALSW-10001

## **SMITH/RICCI: Paganiniana**

Ref LP10 £14.95

Ref CD10 £17.95

Breathtaking purist analogue audiophile recording of classical works performed on piano and violin. On the American Water Lily Acoustics label, recorded by Kavi Alexander and sponsored by Conrad-Johnson. An essential addition to any audiophile's collection. Water Lily CJCD/CJLP

## **TOTTI BERGH: I Hear A Rhapsody**

Ref LP4 £12.95

Ref CD4 £14.95

On the Gemini label, saxophonist Totti Bergh plays a selection of jazz standards. *Jazz Journal* magazine described this as "A delightful 'wee small hours' album".

Gemini GMCD48/GMLP48

## **MARTY PAICH BIG BAND: The New York Scene**

Ref LP13 £12.95

Featuring Art Pepper, Victor Feldman, Jimmy Guiffre and Bill Perkins, this set includes extended modern stylings of some classic Broadway musical tunes by the likes of Cole Porter and Rodgers & Hammerstein.

Discovery DS-844

## **MARTY PAICH: What's New**

Ref LP14 £12.95

Another superb recording of big band 'swing' jazz, this time featuring mostly Marty Paich original compositions. It doesn't seem possible that this was recorded in 1957. Like *The New York Scene* LP, which dates from 1959, the sound is quite breathtaking: vibrant, dynamic, and with a superbly natural soundstage. They knew what they were doing in those days.

Discovery DS-857

## **OPUS 3 TEST RECORD 1: Depth Of Image**

Ref LP11 £12.95

Ref CD11 £14.95

Produced with the idea of analysing hi-fi systems and their ability to reproduce depth of image. This is Opus 3's best selling recording, containing examples of the work of many of its recording artists.

Opus CD7900/LP7900

## **OPUS 3 TEST RECORD 3: Dynamics**

Ref LP12 £12.95

Ref CD12 £14.95

Another compilation on the Swedish Opus 3 label, with musical extracts carefully chosen to illustrate what is



meant by musical dynamics and comprehensive liner notes to show you what you should be listening for. How good is your hi-fi system?  
Opus 3 CD8300/LP8300

**GREX VOCALIS: Renaissance For Kor**  
Ref CD15 £14.95

Acapella performances of Renaissance and medieval songs, beautifully recorded in natural acoustic environments for the Norwegian For-X label. (Available on CD only.)  
CD: For-X FXCD39

**YTRE SULOENS JASS-ENSEMBLE / BARBARA ANN SHORTS: A Stone For Bessie Smith**  
Ref CD16 £14.95

Blues and gospel singer Barbara Ann Shorts, backed by a small jazz ensemble with musical roots in the New Orleans tradition, pays tribute to the great US blues singer Bessie Smith who died in 1937. This collection of songs includes a fascinating re-working of Sting's *Moon Over Bourbon Street*. (Available on CD only.)  
For-X FXCD69

**ROAR ENGELBERG / STEIN-ERIK OLSEN: Mosaic**  
Ref CD17 £14.95

Scandinavia's only professional pan flautist, Roar Engelberg, plays a collection of arrangements with Stein-Erik Olsen (classical guitar) — pieces by Ravel, Bach, Faure, Desportes and more. Superb dynamics! (CD only.)  
For-X FXCD81

**JIM BROCK: Tropic Affair**  
Ref CD18 £18.99

Vibrant contemporary jazz, recorded live to two-track by Reference Recordings' Prof. Johnson. Remarkable clarity and a tremendous 3-D soundstage. RR31

**WILLIAM WALTON: Facade Suite**  
Ref CD19 £18.99

Ref LP19 £16.99  
One of the Reference label's earlier

analogue recordings (these days the company concerns itself with improving digital techniques), featuring the superb playing of Chicago Pro Musica. "A true state-of-the-art recording", said *The Absolute Sound* magazine.  
RR16

**STRAVINSKY: L' Histoire du soldat Suite**

Ref CD20 £18.99  
Ref LP20 £16.99  
Chicago Pro Musica again. The US underground magazine *The Absolute Sound* reckoned this to be one of the best (analogue) recordings ever made!  
RR17

**VIVALDI / BACH: Sinfonia in C; Trio Sonata in C, etc**

Ref CD21 £18.99  
Ref LP21 £16.99  
An exemplary digital recording of the Helicon Ensemble playing Baroque music from Vivaldi and Bach. The CD contains an extra track, Bach's *Prelude in C*.  
RR23

**COPLAND: Appalachian Spring Suite**  
Ref CD22 £18.99

Ref LP22 £16.99  
The *Appalachian Spring Suite* in its original version for thirteen instruments, recorded with a Nakamichi DMP-100 digital encoder. Plus the Pacific Symphony Orchestra in a world premiere recording of *Eight Poems of Emily Dickinson*. The CD contains an extra (analogue) recording of *An Outdoor Overture* (8m 50s). RR22

**NATIONAL SYMPHONIC WINDS: Winds of War and Peace**

Ref CD23 £17.99  
Ref LP23 £16.99  
Conductor Lowell Graham leads performances of John Williams' *Liberty Fanfare*, Samuel Barber's *Commando March* and many more. A pure analogue audiophile recording from 1988 using John Curl's Ultramaster recorder. W8823, WCD8823

**JAMES B. WELCH: Concert**  
Ref LP24 £16.99

**JAMES B. WELCH: Recital**  
Ref LP25 £16.99

Two of the Wilson Audiophile label's famous recordings of classical organ works. On a big system these discs are truly breathtaking — watch out for your woofers!  
Ref CD24/5 £17.99  
Tremendous value: both *Concert* and *Recital* on one compact disc!  
W177, W278, WCD177/278

**The Choir of Grace Cathedral, San Francisco**

Ref CD26 £17.99  
Ref LP26 £16.99  
W805, WCD794/805.  
Another breathtaking example of Wilson Audiophile's pure analogue recordings, used as reference discs by hi-fi gurus around the world. The discs are hard to find in the UK.

**THELMA HOUSTON & PRESSURE COOKER: I've Got the Music In Me**

Ref CD27 £18.99  
Ref LP27 £16.99  
One of Sheffield Labs' most famous recordings. The original direct-cut has been out of print for many years and is now highly collectable — but the recording sessions were of course taped, and this issue will still blow your socks off! Sheffield ST200, CD2. Listed below are further highly collectable Sheffield Labs discs which are astonishing in their sense of realism and truly awesome dynamics:

**CLAIR MARLO: Let It Go**

Ref CD36 £18.99  
Ref LP36 £16.99  
TLP29, CD29

**TOWER OF POWER: Tower Of Power Direct**

Ref CD37 £18.99  
Ref LP37 £16.99  
LAB17, CD17

**JIM KELTNER & RON TUTT: The Sheffield Lab Drum Record**

Ref LP30 £16.99  
LAB14

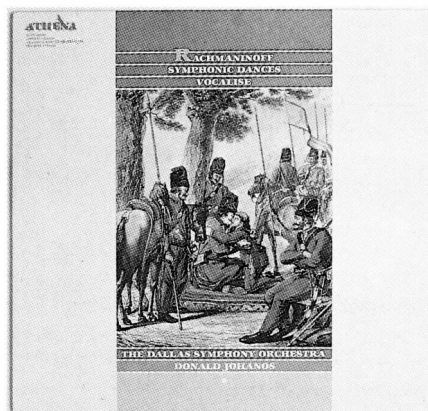
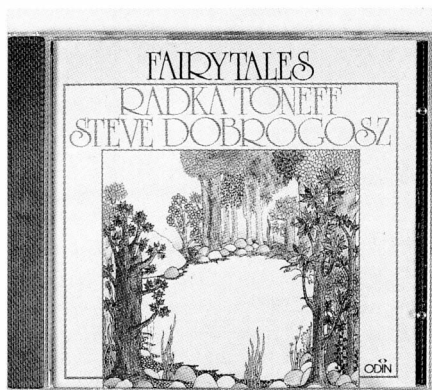
**The Sheffield Lab Track Record**

Ref LP31 £16.99  
LAB20

Both the **Track Record** and the **Drum Record** are available on a single CD -  
Ref CD32 £18.99  
CD14/20

**JAMES NEWTON HOWARD: James Newton Howard and Friends**

Ref CD33 £18.99  
Ref LP33 £16.99  
LAB23, CD23





# To Order Your CDs and LPs

**Radka Toneff: *Fairytales***

- Ref LP1 (£12.95)
- Ref CD1 (£14.95)

**Totti Bergh: *I Hear A Rhapsody***

- Ref LP4 (£12.95)
- Ref CD4 (£14.95)

**Smith/Ricci: *Paganiniana***

- Ref LP10 (£14.95)
- Ref CD10 (£17.95)

**Opus 3 Test Record 1: *Depth Of Image***

- Ref LP11 (£12.95)
- Ref CD11 (£14.95)

**Opus 3 Test Record 3: *Dynamics***

- Ref LP12 (£12.95)
- Ref CD12 (£14.95)

**Marty Paich Big Band: *The New York Scene***

- Ref LP13 (£12.95)

**Marty Paich Big Band: *What's New***

- Ref LP14 (£12.95)

**Greg Vocalis: *Renaissance For Kor***

- Ref CD15 (£14.95)

**Ytre Suloens Jass-Ensemble / Barbara**

**Ann Shorts: *A Stone For***

**Bessie Smith**

- Ref CD16 (£14.95)

**Roar Engelberg/Stein-Erik Olsen: *Mosaic***

- Ref CD17 (£14.95)

**Jim Brock: *Tropic Affair***

- Ref LP18 (£16.99)
- Ref CD18 (£18.99)

**William Walton: *Facade Suite***

- Ref LP19 (£16.99)
- Ref CD19 (£18.99)

**Stravinsky: *L' Histoire du soldat Suite***

- Ref LP20 (£16.99)
- Ref CD20 (£18.99)

**Vivaldi, Bach: *The Helicon Ensemble***

- Ref LP21 (£16.99)
- Ref CD21 (£18.99)

**Copland: *Appalachian Spring Suite***

- Ref LP22 (£16.99)
- Ref CD22 (£18.99)

**National Symphonic Winds: *Winds of War and Peace***

- Ref LP23 (£16.99)
- Ref CD23 (£17.99)

**James B Welch: *Concert***

- Ref LP24 (£16.99)

**James B Welch: *Recital***

- Ref LP25 (£16.99)

**Recital and Concert (on one CD)**

- Ref CD24/5 (£17.99)

**The Choir of Grace Cathedral San**

**Francisco: *Music for Easter, Ascension and Pentecost***

- Ref LP26 (£16.99)
- Ref CD26 (£17.99)

**Thelma Houston and Pressure Cooker:**

***I've Got The Music In Me***

- Ref LP27 (£16.99)
- Ref CD27 (£18.99)

**Jim Keltner and Ron Tutt: *The Sheffield Lab Drum Record***

- Ref LP30 (£16.99)

**The Sheffield Lab Track Record**

- Ref LP31 (£16.99)

**Jim Keltner and Ron Tutt: *The Sheffield Lab Drum Record and The Sheffield Lab***

***Track Record* on a single CD**

- Ref CD32 (£18.99)

**James Newton Howard & Friends**

- Ref LP33 (£16.99)
- Ref CD33 (£18.99)

**Arne Domnerus' Kvartett: *Blatoner fra Frolldhaugen***

- Ref CD34 (£14.95)

**Clair Marlo: *Let It Go***

- Ref LP36 (£16.99)
- Ref CD36 (£18.99)

**Tower Of Power: *Tower Of Power Direct***

- Ref LP37 (£16.99)
- Ref CD37 (£18.99)

**Rachmaninoff: *Symphonic dances***

- Ref LP38 (£29.50)

Please tick the recordings you require

## Payment

- I enclose my cheque/PO made payable to Dennis Publishing for £ \_\_\_\_\_  
Total number of items ordered: \_\_\_\_\_

- Please charge my Mastercard (Access)/Visa (delete as appropriate)

Credit card number \_\_\_\_\_

Expiry date \_\_\_\_\_

Signature \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

Postcode \_\_\_\_\_

Please send order form with payment to:

Hi-Fi Choice Mail Order, PO Box 320, London N21 2NB

*We endeavour to maintain stocks, however, by definition, some of these discs are extremely rare - so please bear with us the unlikely event of a delay.*

**Available to UK readers only**



# The Choice Dealer Directory

BRITISH AUDIO DEALERS ASSOCIATION



*Choosing a good hi-fi dealer is the most vital step in acquiring the system that is right for you. This unique directory gives full information on dealers in your area.*

## AVON

PAUL GREEN HI-FI LTD, Kensington Showrooms, London Road, Bath. (0225) 316197. Linn, Musical Fidelity, Krell, A&R, Creek, Rogers, Quad, Cust. car park. Best selection in the West  
RADFORD HI-FI, 52-54 Gloucester Rd, Bristol. (0272) 428247. Linn, Naim, Mission, Denon, NAD 3 demo rooms. Installation. Access, Visa credit. Service dept.  
PAUL ROBERTS HI-FI, 31-33 Gloucester Road, Bristol. (0272) 429370. Huge selection from the worlds leading names, comprehensive demo facilities including comparator demo rooms, and home trial. Total Total after sales care. Compact Disc specialists - gursnreed the best deal in the UK on any CD player from stock. Credit facilities. Open 9.30-7.30 Mon-Fri, 9.30-6 Sat. Best Price Promise.  
PAUL ROBERTS HI-FI, 203 Milton Road, Weston-Super-Mare. (0934)414423. For facilities see entry above.

## BEDFORDSHIRE

HYPERTEC, 66-68 Saint Lyses St, Bedford (0234) 325066. Pioneer Reference Point, Tannoy, Bang & Olufsen, Musical Fidelity, B&W, Rotel, Wharfedale, Dual, Marantz, Alphason. Demo facilities, Private demo room by appointment. Home trial facilities. Free installation, Service dept. Access, Visa, Hypertec, credit charge. 9.30-5.30 Mon-Sat, closed Thurs.  
WENTWORTH AUDIO, 83 High Street North, Dunstable. (0582) 663383. Pioneer, Marantz, Pink Triangle, Musical Fidelity, Yamaha, Ariston, m Linx, Acoustic Energy, Revox, Monitor Audio. 2 large single speaker dem. rooms. 1 general showroom. No appt. nec. Home trial. Free install. Service dept. Access & Visa. Tue-Sat, 10-6.

## BERKSHIRE

B&B HI-FI, 11-12 Market Place, Reading, Berkshire, RG1 2EG. (0734) 583730. Aiwa, Denon, Kenwood, Mission, NAD, Panasonic, Pioneer, Rotel, Sony, Technics. Free installation, Service dept. Access, Visa, Credit Facilities including interest free credit subject to status. 9.30-5.30, Sat 9-5.30. Also at:  
Bracknell, Maiden Head, High Wycombe, Newbury  
NEWBURY AUDIO, 2 Weavers Walk, Northbrooke Street, Newbury, Berkshire RG13 1A1 (0635) 33929. 6 days 9.30-6.00. Linn, Naim, Roksan, Exposure, Creek, Epos, Royd, Denon, Nakamichi. Single speaker dem. room. Appts. necessary. Home trial facilities. Free installation Service department. Late appointments. Access, Visa. Interest free credit subject to status. 6 days 9.30am-6.00pm.  
READING HI-FI CENTRE, 4 Queen's Walk, Reading RG1 7QF. (0734) 585463. The best equipment, advice and service from Berkshire's premier Hi-Fi emporium

## BUCKINGHAMSHIRE

AUDIO INSIGHT LTD, 53 Wolverton Rd, Stony Stratford, Milton Keynes (0908) 561551. Arcam, Audiolab, Heybrook, Ion, Linn, Meridian, Quad and more. Access, Visa, Finance. Dem. room etc.  
AYLESBURY HI FIDELITY, 98 Cambridge St, Aylesbury. (0296) 28790. Denon, Dual, Exposure, Heybrook, Marantz, Musical Fidelity, NAD, Roksan, Rotel, Systemdek. 2 Dem rooms, appointment reqd. Mon-Fri 10-6, Sat 9.30-5.30. Home trial, free installation, credit to £1,500. Access, Amex, Diner, Visa. Service dept.  
DEJAC HI-FI CONSULTANTS, 21 The Broadway, Old Amersham, Bucks, HP7 0HL. (0494) 431290. NAD, Rotel, Musical Fidelity, Quad, A&R, Cambridge, Denon, Monitor Audio, Tannoy, Celestion, Dual. Single speaker Dem. room. No appt necessary. Home trial facilities. Free intall. Custom remote controlled systems. Instant credit tricity finance. 9.30-5.30 Mon-Sat.  
TECHNOSOUND, 7 Graville Square, Willen Centre, G-Milton Keynes. (0908) 604949. Bang & Olufsen, Denon, Rotel, Technics, Yamaha and enthusiast hi-fi. Also at Luton and Dunstable.

## CAMBRIDGESHIRE

AUDIO FILE, 2 Foundry Walk, Market Hill, St Ives, Cambridgeshire, (0480) 66123. Linn, Naim, Rega, Quad, Cyrus, Arcam, Musical Fidelity 9.30am-6pm 6 days. 0% Credit.  
CAM AUDIO, 110 Mill Road, Cambridge, CB1 2BD. (0223) 60442. Linn, Naim, Rega, Arcam, Micromega, Denon, Marantz, Nakamichi, Creek, JPW. 2 single speaker demo rooms, appointments preferred. Free installation. Access & Visa. Interest Free Credit. 9.30-6.00 Mon-Sat, closed Thurs  
CAMBRIDGE HI-FI, 1-3 Hawthorn Way, Chesterton, Cambs, CB4 1AT (0223) 67773. Mission-Cyrus, Rotel, Kenwood, Pioneer, Manticore, Revolver, Ariston, ITL, KEF, Meridian, Technics, Ruark. Monitor Audio Single speaker dem room. Tues-Sat 9.30-5.30 closed Mon. Free installation. Service Dept. Visa. Access Credit facilities.  
HYPERTEC, 86 Bridge St, Rivergate, Peterbro' (0733)890533. Nakamichi, B&W, Denon, Marantz, Musical Fidelity, Rotel, Tannoy, Wharfedale, Linx, Alphason. Demo facilities including private demo room by appointment. Home trials, Free installation, Service dept. Access, Visa, Hypertec, Credit charge. 9.30-5.30, 6 day trading, late night Thurs 9.30-8.00

STEVE BOXSHALL AUDIO, 41 Victoria Rd, Cambridge CB4 3BW. (0223) 68305. 10-6 - 6 days. 3 dem rooms, home trial, appts. preferred. Free installation and service dept. Access, Visa & credit.  
STILTON AUDIO, 489 Lincoln Road, Peterborough PE1 2PE. (0733) 558838 897152. Linn, Mission, Arcam, Rotel, Teac, Meridian, TDL, Cambridge Audio, Musical Fidelity, Creek/Mordaunt Short. Home trial, free installation. G-Credit facilities. Access, Visa, Amex, Avco Finance-10.00-18.00 Mon-Sat.  
UNIVERSITY AUDIO, 1-2 Peas Hill, Cambridge, (0223) 354237. Quad, Sendor, Arcam, Yamaha, Rotel, ATC, Marantz, Aragon, Rowland, Pioneer, Oracle. 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.  
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.  
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\*\*\*  
NEW DAWN HI-FI, 1-3 Castle St, Lower Bridge St, Chester. (0244) 324179. Linn, Quad, Technics, National Panasonic, Denon, Rotel, Dual, Meridian, Aiwa, Philips  
SOUNDSTAGE, 99 brook str., Chester, CH1 3DX. (0244) 341172. For Facilities see entry below.  
SOUNDSTAGE, 21 Nantwich Road, Crewe, Cheshire CW2 6AF. (0270) 255488. Linn, Alphason, Creek, Onix, Royd, Epos, NAD, Denon, Mission, Rotel. Two dem rooms. Home trial. Free installation. All major credit cards. Credit facilities. 9.30-6, 6 days. Evening dems by appt. Part exchange welcome.  
SWIFT OF WILMSLOW, 4-8 St Annes Parade, Wilmslow. (0625) 526213. Arcam, Denon, Kenwood, Musical Fidelity, Marantz, NAD, Cambridge. 2 dem rooms. Tues-Sat 9.15-6pm. No pressure!

## CLEVELAND

GILSON AUDIO, 172 Borough Road, Middlesborough, Cleveland TS1 2EJ. (0642) 248793. Linn, Exposure, Quad, Mission, NAD, Rotel, Marantz, Denon, Audio Lab, Tannoy. Dem Room, appts. preferred. Home trial, free install. Service Dept. Access, Visa £1000 credit subject to status. 10-5 Mon-Sat.

## CORNWALL

DEFINITIVE AUDIO, Redruth, Cornwall, TR16 5NH. (0726) 844039. Voyd, Audio Innovations, Snell, Helius, Audio Note, System Dek, JPW, Deltac, Goldring, etc. Free Home Demo and Installations throughout Cornwall. Credit facilities. Open 7 days

## CUMBRIA

PETER TYSON, 6 Abbey St, Carlisle, Cumbria, CA3 8TX. "Cumbria's premiere hi-fi centre". Part exchange welcome. (0228) 46756. Linn, Musical Fidelity, Cyrus, Marantz, Denon, Philips, Nakamichi, Technics, Pioneer, Creek & more. Dem room. Dems without obligaton. Home trial. Free Install. In-house service dept. Visa, Access, HP. 9-5.30. Closed Thursday.

## DERBYSHIRE

ACTIVE AUDIO LTD., 12 Osmaston Rd, The Spot, Derby. (0332) 380385/385185. Arcam, Ariston, Celestion, Denon, Kef, Kef Reference, Cyrus, Marantz, Revox, Rotel, Rogers, etc. etc. Meridian, Musical Fidelity. Account and credit cards. Ring for opening times and free 'Fact Pack'. The only BADA MEMBER in Derbyshire.

## DEVONSHIRE

CHELSTON HI-FI, 38 Walnut Road, Chelston, Torquay, Devon TQ2 6HS. Tel: (0803) 606863. Denon, Marantz, Rotel, Musical Fidelity, Acoustic Energy, NAD, Castle, Heybrook, Celestion, JPW etc. 2 dem rooms. Home trial. Free installation. Access, Visa, Amex, Diners, Hi-Fi Markets Chargecard. Credit facilities. 9.30-7.30 Mon-Fri, 9.30-6 Sat.  
UPTON ELECTRONICS, 31 Torquay Road, Paignton, Devon. (0803) 551329. Pioneer, Denon, NVA, Musical Fidelity, Tannoy, Ruark, Arcam, Cambridge, Linx, Revolver etc. Single speaker dem room. Home dems Appts. nec. for dems. Free install. Own service dept. Access, Visa, inst. cred. up to £1000. 9-5.30 Mon-Sat 9-1 Weds.

## ESSEX

1ST AND FOREMOST HI-FI CENTRE, 49-55 North Station Road, Colchester, Essex CO1 1RQ. Tel: (0206) 549842. Fax: (0206) 762900. Tlx: 987873 SAIDG. Trio Kenwood, JVC, Akai, Aiwa, Sony, Pioneer, Technics, Nakamichi, Panasonic, Revox, etc. Home trial, free installation. Service dept. Instant credit available + all credit cards accepted. Monday to Saturday 9am-6pm.

AUDIO T, 442/4 Cranbrook Rd, Gants Hill, Ilford. (01) 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, hometrial, evening appts. (highend). 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. Tannoy, Rogers, Mission, Denon, Cyrus, Marantz, Audiolab, Rotel, NAD, Wharfedale, TDL. Dem facilities. Mon-Sat 9-6. Installations. Access, Visa, instant credit. Service dept available.  
RAYLEIGH HI-FI, 44a High Street, Rayleigh, Essex. (0268) 779762/747571. 216 Moulsham St, On-the-Parkway, Chelmsford. (0245) 265245. 132-134 London Road, Southend-on-sea. (0702) 435255. A&R, Creek, Cyrus, Denon, Epos, Ion, Linn, Mission, Naim, Quad, Rega, Roksan, Rotel, Royd, 0% finance.  
THOMSONS, 2 High Street, Great Baddow, Chelmsford, Essex. Tel (0245) 71465. JVC, Kenwood, Mitsubishi, Toshiba, Tannoy, Mordaunt-Short, Acoustic Research, Wharfedale, Philips, Audio-Visual dealer. Home trial. Free installation. Service dept. Access, Visa, HP. Open 9-1, 2-5.30 Mon-Sat. Open 9-1 Wed.

## GLOUCESTERSHIRE

AUDIO EXCELLENCE, 58 Bristol Road, Gloucester. (0452) 300046. Audio Research, Arcam, Mission, Quad, Linn, Naim, NAD, Yamaha and lots more. Closed Mon.  
ROBBS OF GLOUCESTER, 13/15 Worcester Street, Gloucester GL1 3AJ (0452) 419777. Sony, Technics, Aiwa, Pioneer, Denon, Bose, Celestion, Dual, Kenwood, JVC. Largest selection in Gloucestershire. Dem facilities Home trial. In house service dept. Access, Visa. 9-5.30 6 days.

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HAMPSHIRE AUDIO Ltd, 2-12 Hursley Rd, Chandlers Ford. (0703) 252827/265232. Quality CD and analogue agencies. 5 dem studios. Large free car park.  
HOPKINS HI-FI, 38/40 Fratton Rd, Portsmouth PO1 5BX. (0705) 822155. Technics, Quad, Monitor Audio, Tannoy, Denon, Nad, Heybrook, Onkyo, Dual, Marantz plus others. Dem facilities, appointments necessary. Access, Visa. 9-5.30. Open to 6 Thurs. Closed Wed. Service dept.  
JEFFRIES HI-FI (PORTSMOUTH), 29 London Road, Portsmouth PO2 0BH. (0705) 663604. 2 dem rooms. Closed Mon. Late night Wed. Parking Bus Route. Credit fac.  
MARTON MUSIC, 5 Ventnor Way, Fareham, Hants. (0329) 231773. AV International, Marantz, Kelvin Labs, Townshend Audio, TDL, Sendor, Grant Amplifiers, Audio Technica, Dynavector, Origin Live. Demos, by appointment. Home Trial Facilities, Free installation. Phone Anytime.  
STANS, 8 The Mall, Bridge Str, Andover, Hampshire, Fax: (0264) 361624. Aiwa, Harman-Kardon, Musical Fidelity, Pioneer, Monitor Audio, Dual, Bose, Kef, Celestion, Castle, Kenwood. Next day money back guarantee. Installation and delivery service, service dept. Access, Visa, credit facilities available- interest free on selected items. 9-5.30, late Thurs & Fri to 7pm, 6 days.  
TRU-FI SOUND & VISION, 10-12 Grosvenor Road, Aldershot, Hants. Tel/Fax: (0252) 26390/332424. Aiwa, Audio Technica, B&W, Nakamichi, Mission, Mordaunt-Short, Nagaoaka, Sony, Technics. Dem fac. Free install. Service dept. 0% finance. Access, Visa. Mon-Sat 9.30-6.

## HEREFORDSHIRE

ENGLISH AUDIO, 95 Whitecross Road, Hereford HR4 0DG. (0432) 355081. Musical Fidelity, Arcam, Pink Triangle, Denon, Marantz, Rogers, Audio Innovations, Rotel, Nakamichi, Heybrook and others. Dem room. Home trial. Free install. Service dept. Access, Visa. Credit arranged. Open Mon-Sat 10am-6pm.

## HERTFORDSHIRE

ACOUSTIC ARTS Ltd, 101 St Albans Rd, Watford, Herts. (0923) 245250. A&R, Audiolab, Audio Research, Apogee, Denon, Krell, Marantz, Meridian, Quad, Rogers, Roksan, TDL. Mon-Sat 9.30-5.30.  
DARBYS OF ST. ALBANS, 6 Market Place, near the clock tower, St. Albans, Herts. (0727) 50961. Alphason, A&R Cambridge, Bang & Olufsen, Denon, JBL, Harman Kardon, Musical Fidelity, Quad, Ruark, Sony. Home demonstrations, free delivery and installation. Sales rental service. In house credit. Lombard, Tricity. Mon-Sat 9-6.  
DYNAMICS, Welwyn, Herts. (0438) 714038. Mark Levinson, Threshokd, Oxford Acoustics, Meridian, Infinity, Mirage, Proac, Melos, Air Tangent, Roland, Brumester, Jay Lumley, J. Jarvis. We buy, sell & exchange all high end audio, special offers always. Demo room, available by appointment, Service, Installations, Access & Visa. Mon-Sat 10-7, Sun 10-1, or other times by appt.

HYPERTEC, 6 Bancroft Road, Hitchin, Herts, SG5 1JQ. (0462) 452248. B&W, Denon, Marantz, Musical Fidelity, Pioneer Reference Point, Rotel, Tannoy, Wharfedale, Bang & Olufsen, Linx, Alphason. 2 dem rooms without appoint. Private dem room + evening dem by appt. Home trial Free Install. Service dept. Access, Visa, Hypertec creditcharge. 9.30-5.30, closed Wed.

STUDIO 99, 82 High Street, Harpenden. (05827) 64246. Linn, Naim, Meridian, Rega, Nakamichi, Mission/Cyrus, Quad, Creek, KEF, Bang & Olufsen, Yamaha etc. Quiet single speaker dem room. Appts nec. Home trial, free install. Service Dept. Visa/c, Access/c & finance terms. 9-5.30pm (Mon-Sat), Closed Weds.

THE AUDIO FILE, 27 Hockerill St, Bishops Stortford, Herts CM23 2DW. (0279) 506576. 9.30-5.30 6 days. Dealer Of The Year 1988/89. Linn, Naim, Rega, Quad, Cyrus, Arcam, Musical Fidelity. 0% credit.

## NORTH HUMBERSIDE

MURRAY HI-FI, Princes Dock Side, Hull. (0482) 227867. Linn, Naim, Rega, Arcam, Yamaha, Royd, Epos, Creek, Nakamichi, Rotel. Full Demo Facilities. No appointments necessary. Free install & delivery. Service dept. Full 2 yr guarantee on all products. Access, Visa, Lombard Tricity, Licensed credit broker. 10-6 Tue-Sat.

## KENT

HI-FI CENTRE LTD., 65 King Street, Ramsgate, 0843 590321. A.R., Aiwa, Ariston, Celestion, Goodmans, Kenwood, Marantz, NAD, Radford, Tannoy, etc. etc. + guaranteed recon. equip. Dem room + home dems. Hi-Fi repairs & servicing. Trade in & Cred facs. Mon-Sat (9.30-5.30)

JOHN MARLEY HI-FI CENTRES, 2 Station Rd, West Canterbury. (0227) 769329. Also at Dover - (0304) 207562. B&W, Technics, Magnum, M.Y.S.T., Nakamichi, Pink Triangle, Rotel, Sansui, Heybrook, Quad. Dem and home trial fac. Mon-Sat 9-5.30 closed Thurs. Free install. Credit to £1,000. Access, Visa, Creditcharge. Service dept.

PHOTOCRAFT HI-FI, 40 High St, Ashford. (0233) 624441. No. 1 in Kent for Linn, Naim, Rega, Roksan, Exposure, Onix, Epos, Royd, Creek. But before you choose equipment choose where to buy it. Dem room, appts. necessary. Home trial and free installation. Visa, Access, Bada Chargecard. 9-5.30 Mon-Fri (Wed & Sat to 5 only). Service Dept.

PROGRESSIVE AUDIO, Rainham, Kent. (0634) 389004. Alphason, Audio Innovation, Conrad Johnson, Proac, Raymond Lumley, Rock Reference, Snell, TDL, Voyd and others. Dem by appt., please phone. Home trial. Free installation. Access, Visa.

STANDENS, 92a High Street, Tonbridge, Kent, TN9 1AP. (0732) 353540. Pink Triangle, Kelvin Labs, TDL, Ruark, Marantz, Quad, Musical Fidelity, Micromega, NAD, Arcam. 2 Demo rooms. Home trials. Free installation and Service dept. Access & Visa. HP terms, and Bada credit charge. 9.00-5.30 Mon-Sat except Wed 9.00-1.00.

TONBRIDGE HI-FI, 96 Woodlands Road, Gillingham, Kent. (0634) 52858 Linn, Naim, Rega, Pink Triangle, Exposure, Creek, JRT, Sony, Ruark, KEF, Arcam etc. If your interest is music pay us a visit + find out what we do. TONBRIDGE HI-FI, 31 High Street, Tunbridge Wells, Kent. (0892) 24677. Linn, Naim, Rega, Pink Triangle, Exposure, Creek, JRT, Sony, Ruark, KEF, Arcam etc. If your interest is music pay us a visit + find out what we do.

VJ 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. VJ 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

MONITORSOUND, 54 Chapel St, Chorley. (02572) 71935 A&R, Denon, Dual, Pioneer, Quad, Rogers, Rotel, Spondor, Technics, Thorens, Wharfedale, Yamaha, etc. 2 dem rooms. Open Mon-Sat, closed Weds. Free installation. Credit to £1,000. Access, Visa. Service dept.

NORMAN AUDIO, 131 Friargate, Preston PR1 2EE. (0772) 53057. Fax 562731. Sony Hi-Fi News Area Winner. Aiwa, B&W Loudspeakers, Denon, Marantz, Mission Cyrus, Monitor Audio, Nakamichi, Quad, Roksan, Rotel & many others! 2 lux. dem. Inge. Home trial by arrangement. Free install. Service dept. Inst. cred. facs. with several companies. Most credit cards accepted. 6 days 9-5.30.

## LEICESTERSHIRE

ALPHA AUDIO 1-3 Guildhall Lane, Leicester, LE1 5FQ. (0533) 530 330. Allison, AR, Denon, Luxman, Proton, Revox, Teac, Thorens, plus lots more. 3 demo rooms. Jovial, friendly, crazy staff. Relaxed atmosphere. Home trial facilities, free installation, service dept on premises. Credit facilities (sort of interest free). 10-5, closed Thurs afternoons (sometimes). MUS HI-FI, 80 Stapleton Lane, Barwell, Leicester LE9 8HE. (0455) 46977. The Rock, Audio Innovations, Kelvin Labs, Snell, Helius, Suggden, Ruark, Concordant, Valdi, JPW. Dem and home trial facilities. Mon-Sat 9.30-7.00. Free installation and service dept. Visa, Access.

THE LEICESTER HI-FI CO, 6 Silver Walk, St. Martins Square, Leicester LE1 5EW. Tel: (0533) 539753, Fax: (0533) 626097. Arcam, Creek, Marantz, Mission/Cyrus, Musical Fidelity, Nakamichi, QED HI-FI, Quad, Rogers, Roksan, "and oodles more". 2 dem rooms, home trial arranged, free installation service department, credit facilities, Access, Visa, Diners, Amex. 6 days 9.30-5.30. Leicestershire's only Bada member.

SOUND ADVICE, Duke Street, Loughborough LE11 1ED. (0509) 218254. Arcam, Creek, Linn, Epos, Mission, Cyrus, Naim, Rega, Rotel, Yamaha etc. Dem facilities. Appts required. Free installation. Service dept. Credit facilities, Access, Visa, Amex. Mon-Sat 9.30-6.

SOUNDS AROUND, 146A Clarendon Park Road, Leicester, LE2 3AE. (0533) 702442. (Specialists in used Hi-Fi), A.R., Celestion, TEAC, Mordaunt Short, Tannoy, Marantz, Wharfedale, Philips. No appts necessary, free installation, service dept. Access, Visa. Tue-Sat 10-5.

## LINCOLNSHIRE

BOSTON HI FI CENTRE, 65a Wide Bargate, John Adams Way, Boston, Lincs PE21 6SG. (0205) 365477. Quad, Nakamichi, Creek, Ariston, NAD, Denon, Marantz, Castle, Rotel, JPW, Rogers. Separate demo studio. Home trial, free installation, service department. Access, Visa, Hi-Fi Markets Chargecard. Tues-Sat 9-5.30 pm.

## LONDON

ANALOG AUDIO, 849 High Road, London N12. (081) 445 3267. Denon, Dual, JBL, NAD, Marantz, Rotel, Wharfedale, Cerwin Vega Teac, Mordaunt Short. Free install. Service dept. Instant credit up to £1000. Visa & Access. 9.30-6.6 days.

AUDIO ACOUSTIC, West Ealing. (081) 998 9041. Audio Dimensions, Audio Innovations, Audion, Audio Note, ATC, D.C.M., Glastonbury, Goldring, Helius, Infinity & Modulas, JPW, Lynwood, Mana Acoustics, Marantz Audiophile, Michell, Nova, Ongaku, Oracle, Originlive, Ortophon MC3000II + MC5000 + T3000, Pirates, Rata, Revox, Rotel, Rose Industries, Rock Reference, Snell, Supra, Systemdek, Target, Triangle Products, Valdi, Vecture, Voyd & Reference Voyd. Home Demos, Free Install, Single Spker Demo, Free System Design, Free Knowledgeable Service, Access, Visa. 9.30-6pm Till late Mon-Sat. Dem by Appt, please.

AUDIO CHOICES, 66 High Road, Leytonstone, Stratford E15. 081 534 6987. Marantz, A&R, Musical Fidelity, SD Acoustics, Rotel, Audio Technica, Ruark, Roksan, Moth, Nakamichi, B&W, Van den Hul, Dual, Pink Triangle, Alison Acoustics. Dem room, home dems within M25 area. 10.30-7.30

AUDIO VENUE, 24 Church Road, Crystal Palace, London SE19 2ET. (081) 771 7787. Linn, Naim, Nakamichi, Marantz, Dual. Credit available, 2 yr warranty, 2 Demo Rooms. Closed Weds.

BILLY VEE SOUND SYSTEMS, 248 Lee High Road, London SE13. (081) 3185755. Linn, Rega, Naim, Nakamichi, Quad etc. 2 dem rooms. Int. free credit. Access, Visa. Closed Thurs.

CORNFLAKE SHOP, 37 Windmill Street (just off Tottenham Court Road), London W1. (071) 631 0472. Mon-Sat 10-7. Rega, Roksan, Naim, Monitor Audio, Koetsu, Marantz, Yamaha, SME, DNM, Epos. Three dem rooms. Delivery and installation service. Credit facilities. Access, Visa. DOUG BRADY HI-FI, 14-18 Monmouth St, London WC2H 9HB. (071) 379 4010. Wide range of top specialist hi-fi from Britain, America and Japan. 3 Dem rooms.

GRAHAM'S HI-FI, Canonbury Yard, 190a New North Rd, London N1 7BS. (071) 226 5500. Winner Sony/HFN Greater London Dealer Award 1986-1989-1990. Linn, Naim, Rega etc. £400-£3,000-£13,000.

JUST MUSIC, 52 Upper Tooting Road, London SW17 7PB. (081) 767 1233. Aiwa, Dual, Denon, Marantz, Quad, Rogers, Thorens, Musical Fidelity, Suggden, Heybrook and many more. Dem facilities. Appts can be arranged. Home trial. Free installation available. Access, Visa, Amex, Hi-Fi Markets, Chargecard, Creditcharge, finance arranged. 10am-7pm Mon-Thurs, 10-6 Fri & Sat.

KAMLA ELECTRONICS, 251 Tottenham Court Road, London W1. (071) 323 2747. Amadens, Ariston, BLQ, Gale, Incatech, JPW, Linn, Mordaunt Short, SME, Systemdek, Thorens, Townshend, Ruark, Wharfedale.

KJ WEST ONE, 26 New Cavendish St, London W1M 7LH. (071) 486 8262/63. Fax (071) 487 3452. Arcam, Audio Research, Acoustic Research, Apogee, Arcam, Audiolab, Creek, Epos, Linn, Meridian, Musical Fidelity, Pink Triangle. Appts. nec. Home trial. Free installation. Service dept major credit cards. Mon-Sat 10-6pm. (Late night Thursday til 7pm.)

SOUND ORGANISATION LONDON, 1 Cathedral Street, London SE1 9DE. 071 403 2255/3088. Linn, Rega, Roksan, Micromega, Radford, Rotel, Nakamichi, Onix, Creek, Naim, Exposure, Royd, Heybrook, Epos. Interesting new equipment always under evaluation. Single speaker listening room. Credit facilities. Appts. preferred, free install., Service dept. Open Tues - Sat 10-6. Late dem. by appt.

SOUND SENSE, 350 Edgeware Road, London, W2 1DX. (071) 402 2100. Alphason, B&W, Nakamichi, Celestion, Cambridge Audio, Dual, Denon, Monitor Audio, Marantz NVA, Sony ES. Appointments preferred, Installations available. Access, Visa, Standard credit facilities. Mon-Sat 9.30-6.30.

SOUTH LONDON HI-FI & VIDEO, 210 Brixton Hill, Steatham, SW2. (081) 674 4433/2033. Denon, Rotel, Yamaha, Kenwood, Tannoy, B&W, Nakamichi, Dual, Thorens, Technics, Monitor Audio. Single speaker demo room, Appts. not nec. Installation available. Service Dept. Access, Visa, Amex, Interest Free & Standard credit. 9-6, 6 days.

STUDIO 99, 79-81 Fairfax Road, London NW6. (071) 624 8855. Linn, Naim, Meridian, Rega, Quad, Nakamichi, Mission/Cyrus, KEF, Bang & Olufsen, Yamaha, Creek etc. 2 single speaker dem rooms. Appts. nec. Home trials, free install. Service dept. Visa/c, Access/c & finance terms.

10-7 (Mon-Fri), 10-6 (Sat). TIME AND TUNE, 218/220 Whitechape Road, London, E1 1BJ. (071) 247 0567/8/9. Akai, Aiwa, Bose, Hitachi, Kenwood, Mitsubishi, Panasonic, Philips, Pioneer, Sony, Technics. Home Trial Facilities. Free Installation, Service Dept., Instant Higher Purchase. 9.30am-6pm Mon-Fri, 9.30am-2pm Sun, Sat Closed.

## 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. Licensed credit brokers up to £1000 instant credit. 10.00-5.30 Tues, Weds, Sat; 10.00-7.30 Thurs, Fri. Closed Mon.

CHRIS BROOKS AUDIO, 10-12 Oak Street, Hazel Grove, Stockport SK7 4EJ. (061) 419 9050. Tues-Sat 10-6, 2 dem rooms, credit facilities, All credit cards. Just like the Warrington Shop - total absence of bull\*\*\*.

MURRAY HI-FI, 19 Middle Hillgate, Stockport. (061) 429 7666. Linn, Naim, Rega, Arcam, Yamaha, Royd, Epos, Creek, Nakamichi, Rotel. Full demo facilities, free installation & delivery, service dept., full 2yr guarantee on all products. Access, Visa, Lombard Tricity, Licensed credit broker. 10-6 Tue-Sat.

SWIFT HIFIDEALITY, 12 Chapel Street, Cheadle. (061) 428 7222. Arcam, Denon, Kenwood, carantz, NAD, Cyrus, Rotel, Pioneer, Mission, Tannoy. Demo Room. 9.30-6, Closed Wed.

## MIDDLESEX

HARROW AUDIO, 27 Springfield Rd, Harrow. (01) 863 0938. Mon-Sat 9.30-5.30. A&R, Audiolab, Cyrus, Denon, Dual, Heybrook, Linn, Monitor Audio, Musical Fidelity, Quad, Rotel, Tannoy etc.

NORTHWOOD AUDIO, 126 Pinner Road, Northwood, Middlesex HA6 1BP. (0927) 420877. Exposure, Musical Fidelity, Pink Triangle, Manticores, Audio Innovations, Rotel, Ruad, Ruark, SD Acoustics, Moth. Dem. room. Home trial. Free Install. Access, Visa. 9-6 Mon-Sat.

RIVERSIDE HI-FI LTD, 422 Richmond Road, East Twickenham, Middlesex, TW1 2EB. Tel. 081 892 7613, Fax. 081 892 7749. A.R., Arcam, Audio Innovations, Castle, Dual, Denon, KEF, Luxman, Michell, Musical Fidelity, Micromega, Marantz, Nakamichi, Rotel, Spondor, 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 9-7.00.

UXBRIDGE AUDIO LTD, 278 High St, Uxbridge, Middx UB8 1LZ. (0895) 30404 (Multi-line). A&R, AR, Ariston, Creek, Cyrus, Denon, Dual, JPW, KEF, Manticores, Meridian, NAD, Nakamichi, Quad, Rotel, Wharfedale, Yamaha, etc. 2 dem rooms. Mon-Sat 10-6.

## MERSEYSIDE

BETTER HI-FI, 16 Cook St, Liverpool L2 9RF. (051) 227 5007. Linn, Naim, Quad, Arcam, Audio Innovations, Threshold, Creek, Denon, Yamaha, Mordaunt Short. 3 dem rooms. Home trial. Free install. Service Dept. Access, Visa. Instant credit up to £1000, 0% on certain items. 9-5 Mon-Sat.

W.A. BRADY & SON, 401 Smithdown Rd, Liverpool L15 3JJ. (051) 733 6859. Largest choice of specialist Hi-Fi in N.W. £100-£20K. All credit cards. 3 dem rooms. Closed Monday.

IN CONCERT HI-FI, 144 Seaview Road, Wallasey, Wirral, Merseyside (051) 630 5055. Denon, Kenwood, QED, G-Alexander, Spica, Shan Acoustics, Systemdek, Musical Fidelity, Audio Dimensions, Voyd. Single speaker dem room. Home trial free installation. 10-6 - closed Mon. Access Visa.

## 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. Established 1968.

MARTINS HI-FI, 85/91 Ber Street, Norwich. (0603) 627010. Established 1968.

SOUND APPROACH, 161 Unithank Road, Norwich. (0603) 622833. Kuzma, Ariston, Castle, Denon, Exposure, Ion, Royd, NVA, Roksan, Ruark, etc. etc. Dem and home trial facilities. Mon-Sat 9-6.30. Free installation. Credit to £1,500. Visa, Access, Diners Club. Service dept.

## NORTHAMPTONSHIRE

CLASSIC HI-FI + VIDEO, School Lane, Kettering, Northants. (0536) 515766. Rotel Musical Fidelity, Wharfedale, Monitor Audio, Yamaha, JBL, Dual, Marantz, Kenwood, Kef, Celestion, and many more. Home trial, free instal, service dept. Access, Visa, credit facs. 9.30-5.30pm.

THE AUDIO SHOP, Coffee Tavern Court, High St, Rushden. (0933) 56651. Audio Technica, Denons, Goodmans, Rotel, Tannoy, Ion Systems, Thorens, Gale, BLQ, Royd. Dem room. Home trial and free installation. Mon-Sat 9.30-5.30 (Thurs 9.30-2). Service dept.

## NOTTINGHAMSHIRE

CHANTRY AUDIO, Chantry Walk, 18a Eldon Street, Tuxford, Newark, Notts NG22 0LH. (0777) 870372. Pink Triangle, Royd, JPW, Rotel, S.D. Acoustics, NVA, Michell, Art Audio (valve), Kelvin Labs, Sumo, + much more. 2 Dem. Rooms. Appts preferred. Home trial, free installation.



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## WEST MIDLANDS

ALTERNATIVE AUDIO Ltd, 93-95 Hobs Moat Rd, Solihull. (021) 742 0254 (sales), 0248 (service). The widest range of quality hi-fi and CD in the West Midlands. Tues-Sat 10-6.

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AUDIO CENTRE MAINWAY, Sharing Asda Car Park, High Street, Bloxwich, Walsall, W. Midlands. (0922) 473499. Linn, Ariston, Aura, Arcam, Cambridge Audio, QED, Musical Fidelity, Rogers, QED, Systemdek, Moth etc. The Midlands most exclusive Hi-Fi Centre with private listening studio. Open evenings by appointment. Home trial. Free install. Own service department. Inst. credit, Chargecard. Interest free. Access, Barclaycard. Mon-Sat 9-5.30.

BRIDGE HI-FI, 3 Tudor House, Bridge St, Walsall. (0922) 640456. NAD, Dual, Yamaha, Kenwood, Technics, Pioneer, Mission, Celestion, Denon, Mordaunt Short. Appts required. Home trial & free install. Access, Visa, Diners, Amex. Credit to £1,000. 9.15-5.30 Mon-Sat. Service dept FIVEWAYS HI-FIDELITY LTD, 12 Islington Row, Edgbaston, Birmingham (021) 4550667. Alphason, Arcam, Denon, Meridian, Musical Fidelity, Quad, Revox, Spendor, TDL, Thorens, etc. Dem facilities. Tues-Sat 9.30-6. Free installation. Access, Visa. Service Dept FRANK HARVEY HI-FI EXCELLENCE, 163 Medieval Spon Street, Coventry. (0203) 525200. All major agencies. Free inst. Service dept. Part ex. 3 dem rooms. Mon-sat 9.30-5.30. Wed til 8pm

**BADA**  
GRIFFIN AUDIO LTD, 94 Bristol Street, Birmingham. (021) 692 1359/ (021) 622 2230. Castle, Creek, Cyrus, Denon, Linn, Marantz, Naim, Quad, Rega, Rotel. Tues-Sat 10-6.

**BADA**  
HORNTON ELECTRONICS (1987) LTD, 8-9 Lower Temple St, Birmingham B2 4JQ. (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.

NAAM HI FI VISION, 122-123 New Street, Birmingham, 021 633 4944. Pioneer, Akai, Aiwa, Panasonic, Toshiba, Hitachi, Bose, Wharfedale, Sony. Demo facilities available, appointments preferred. Access, Visa, 10 month interest, free credit, Amex, Lombard Tricity Creditcharge. Mon-Sat 9-6.00.

SUPERFI, 67 Smallbrook, Queensway, Birmingham, B5 4HZ. (021) 631 2675. Specialist Hi-Fi stockists of: Audio Lab, Musical Fidelity, Quad, Pioneer, Yamaha, Rotel, Wharfedale, Tannoy, Celestion and many more. Single Spkr Rooms by appt.

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ASTLEY AUDIO LTD, 3 Marketplace, Wallingford. (0491) 39305/34349 Technics, Panasonic, Pioneer, Kenwood, Sony, Yamaha, Denon, Dual, Mission, Tannoy. Home trial, free installation. Service dept. Access, Visa, Amex, Diners. Instant credit. Tue-Fri 9-5.30, Sat 9-5. Records & CDs stocked.

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WITNEY AUDIO VISUAL, 28 High St, Witney, Oxford. (0993) 702414 Aiwa, Akai, AR, Bose, B&W, Cambridge, Dual, Mordaunt-Short, NAD, Onkyo, Pioneer, Roberts, Sony & Sony ES, Tannoy, Wharfedale, Yamaha, Reference Point Dealer. Dem facilities. Mon-Sat 9-5.30. Free installation, credit to £1,000. Access, Visa. Service dept.

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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.

## SOMERSET

PAUL ROBERTS HI-FI, 32 North Str., Taunton. (0823) 270000. For facilities see entry under Avon.  
WATTS RADIO - the engineers, Jim Badman, 1 West Street, Somerton. (0458) 72440. Aiwa, Castle, Dual, Denon, KEF, Ortofon, Quad, Rogers, Tannoy, Thorens, Yamaha. Dem and home trial facilities. Mon-Sat 9-1, 2-5.30, Wed 9-1. Free installation. Credit to £1,000. Access, Visa. Service dept.

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INTERSOUNDS, 62 Bennett Precinct, Longton, Stoke on Trent. (0782) 336233. Arcam, Denon, Dual, Mission, Musical Fidelity, NAD, Nakamichi, Revolver, Rotel, Systemdek etc. G.000 8 different speaker manufacturers. 2 dem rooms. Free install. In-house Service Dept. Access, Visa. £1000 credit subject to status. 9.30-5.30 Mon-Sat, Closed Thurs.

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PJHI-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.

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SOUNDS EXCLUSIVE, 1 Kent House, High Street, Cranleigh, Surrey GU6 8AU. (0483) 268185. Marantz, Sumo, QED, Michell, Alphason, SME, Ortofon, Finestra, Proac, Bose. Home trial. Dems a pleasure. Appts. preferred. Service Dept. Free install. Access, Barclaycard.

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SURREY HI-FI, 45 High Street, Godstone, Surrey, RH9 8LS. (0883) 744755. Parking, easy access - just 2 mins off junction 6, M25. Marantz, Musical Fidelity, QED, Radford, Tannoy, TDL, Kelvin Labs, Gyrodec, Reference Imports, Acoustat. Single speaker demo room. Appts not necessary, home trial facilities, free installation, service dept. Access, Visa, Mastercard. 9-6 6 days a week.

TRU-FI SOUND AND VISION, 2 Central Parade, Redhill, Surrey. (0737) 767404/766128. Aiwa, Audio Technica, B&W, Nakamichi, Mission, Mordaunt-Short, Nakoaka, Sony, Technics. Dem. facilities. Free installation. Service dept. 0% finance. Access, Visa. Mon-Sat 9.30-6.

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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).

**BADA**  
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MOORGATE ACOUSTICS, 184 Fitzwilliam St., Sheffield. 0742 756048. Roksan, Linn, Musical Fidelity, Denon, Meridian, Krell, Quad, Audio Research, Exposure, Nakamichi. 2 Demo. Rooms. Free installation. Service Dept. Access, Visa, Credit. 9.30-5.30 Closed Mon.

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## SCOTLAND

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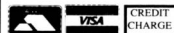
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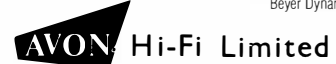
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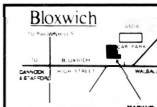
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# DEALER GUIDE

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Quad Electrostat Speakers ESL 63 Excellent Condition including factory manual £1000. Ph 071-433 1342 After 6.

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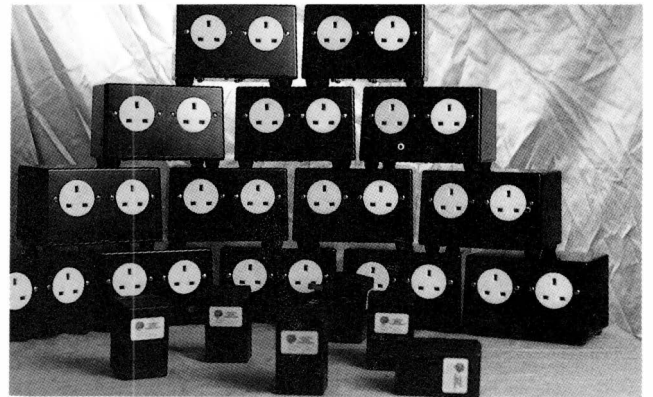
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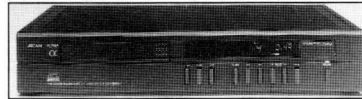
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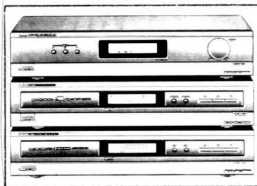
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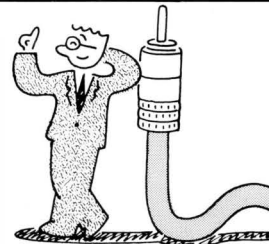
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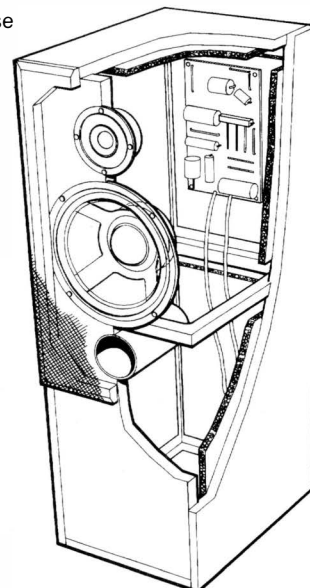
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# The Directory

The *Hi-Fi Choice Directory* was conceived as a reference guide to all the audio products reviewed by *Choice* that are currently available. The products are split into suitable categories, each with its own introduction containing information about the product type and its applications. They are particularly relevant to the uninitiated first time buyer and help sort out the order of priorities when buying a piece of equipment.

Each product along with its retail price is placed in its respective category in alphabetical order. For instance, the Acoustic Research *EB101* is presently at the beginning of the Turntables and Tonearms section; however, the Ariston *Superior* heads the Motor Units section as it is solid and was reviewed as a separate component - requiring a separate arm. Where there are several products with the same name but different model numbers these are in price ascending order.

Then come the ratings for the standard achieved in laboratory and listening tests, with the exception of certain product groups where lab tests were not carried out. One important point to remember is

that they cannot be used to compare products from different categories - for example a cassette deck rated 'excellent' in sound quality will not usually offer the same standard of fidelity as a similarly rated turntable or CD player (unless you can get hold of first generation copies of the master tape!)

The Comments column contains a potted summary based on the original review, emphasising the salient points of a product's character and sonic performance. The space available doesn't allow for great detail but in the 20 or so words we have attempted to put across the essence of the review, in some cases using quotes from the review itself. Obviously, important information on compatibility or auxiliary equipment used in the test cannot be included, and we would advise you to refer to the original review for this, of which more later.

The next column varies from category to category but is usually either features or specifications, the former being facilities available on a cassette deck or amplifier or the type of drive system on a turntable.

Specifications vary with product type

but usually relate to suitability or capability, for instance in the case of arm matching, figures are given with the cartridges, which tie in with the mass figures for the tonearms themselves, making it easier to avoid compliance/mass mismatches.

Perhaps the most influential letters in the *Directory* are those found in the Value column, the Rs and BBs denoting the Recommended and Best Buy ratings that are appended to products we consider meritorious. The Best Buy tag means that a product not only offers good sound quality but is reasonably priced as well. With source components a price limit of approximately £300 is usually used as a guide. Recommended means that either the performance of a product is particularly good irrespective of price or, alternatively that a good value standard is achieved but overall attainment falls short of Best Buy classification. An ideal situation would be to choose suitably priced Best Buy or Recommended products from relevant categories and create a Best Buy system, but, due to the variety in tonal balance that exists in much audio equipment

(especially the electromagnetical elements - that is to say the cartridge and the speakers), system building is unfortunately not quite that simple. These ratings make a useful guideline for shortlisting components, but only experiencing the actual combination will tell you whether it works for you

The final column contains a reference to the issue of *Hi-Fi Choice* which featured the complete review. If you wish to get a better idea of a product by reading the complete review it is possible to order a copy (if still in print) through our back issues department. Every *Choice* issue contains a Back Issues page for this purpose

The *Hi-Fi Choice Directory* is constantly updated with the latest reviews and price changes as well as having any discontinued products removed. If a listed product is updated to a 'mark two' form and the alterations are purely cosmetic or not too extensive, we sometimes leave the product in with its current model number, together with an asterisk in order to denote that it has changed since our original review was published.

## SYSTEM BUILDING

Pre-packaged one-make systems have been commercially very successful, with advantages like cosmetic consistency, competitive pricing, and (assumed) technical compatibility. However, despite the mass market clout of the consumer electronics giants, the hi-fi tradition of specialised separate components seems to be as strong as ever, and certainly represents the route taken by those who place sound quality first.

Yet those who choose the separates route still have lingering doubts - usually completely unjustified - over the compatibility of components from different manufacturers. Gross incompatibilities are very rare nowadays, only likely to rear their heads amongst the most exotic components. Here the delicate art of 'supercompatibility' really takes over the major role and might be regarded as the key to 'real' hi-fi.

There are now three different prerecorded music media competing for the attention of the hi-fi user, and to go for all three will either cost a lot of money or involve substantial compromises in the sound quality of each. For this reason many separates purchasers may start with just one source, adding others or a tuner when funds permit.

There will always be controversy over the relative qualities of LP, CD and cassette. LP is still the choice for ultimate sound quality - particularly for those prepared to spend a substantial sum on a good quality turntable system.

Cassette has never really challenged vinyl's superior quality, but it is a multiple role format, offering 'go anywhere'

flexibility, a uniquely useful recording capability, plus a broad catalogue of prerecorded music cassette material. As a hi-fi medium cassette suffers from prerecorded material which has been improving but is still patchy in quality, and can usually be bettered by a home recording. There is also the worry that a tape made on a specific machine usually plays best on that machine, which may cause aggravation when upgrading a few years hence.

CD is the latest challenger to these two established media, using a digital instead of analogue storage format. The sound quality remains controversial, hailed as near perfect by its fans but derided by vinyl freaks, so it is probably fairest to say that CD is fine for most listeners, but may not suit everyone; certainly the lack of background noise, defects and deterioration are major strengths.

While there will always be arguments about the different music storage and transmission formats available to the hi-fi listener, there is also controversy over the relative importance of the different components which make up the system chain - by which is meant the source, the amplification, and the loudspeakers (and for the pedantic the room itself, though there's often little that can be done here).

For many years the 'weakest link' theory proposed that the loudspeakers needed the most attention, that amplifiers merely had to have sufficient power, and that turntables were pretty well perfect. However, this perspective has become steadily discredited by an alternative 'theory of precedence', which stresses that

no subsequent component can make up for the inadequacies of its predecessors - all it can do is supply its own additional degradations. In such a context it is not uncommon to find more than half the system budget allocated to the record player, with scrimping and saving made on amplifiers and loudspeakers.

Choosing the components of a system is only part of the task of getting the system as a whole working as well as possible. Good turntables and loudspeakers both benefit to a surprising degree from proper support - from stands that enable them to give their best performance, whether floor-standing or wall mounted.

Siting of components within a room can play a significant role, as can the room itself. Some people may prefer an acoustically more 'live' room than others, but most will agree that the larger it is the better, because this tends to provide smoother and better extended bass reproduction. All rooms create reflections and standing waves, and the effects of these are more severe if all opposing walls are parallel, similar distances apart, and with hard reflective surfaces. Provided that the loudspeakers can be placed fairly symmetrically, slight asymmetry elsewhere in the room is usually helpful.

The loudspeakers are most critical of placement, because it is their job to create the stereo image, and it will be impossible to do this if the sound from each is not roughly similar at the listening position. Each loudspeaker should operate in a similar immediate acoustic environment, unencumbered by other furnishings and

structure, and a similar distance from each listener, nearby walls, and corners. Some loudspeakers are designed to operate close to a rear wall, others a metre or so out into the room, but all loudspeakers benefit from being closely mechanically coupled via proper stands to the floor.

Mixing and matching the components of a record player to get optimum results can be something of a black art, over and beyond the fairly simple business of choosing a cartridge of roughly the right compliance to suit the arm effective mass. Certainly the combining of turntables and tonearms is not a simple matter, and this is where a good specialist dealer will come into his own, both in terms of recommending good combinations from the models he holds in stock, and then in correctly carrying out the sometimes tricky set up procedures which are often required to get the best results.

The key to getting the best results from a separates system lies in finding an experienced and skilled dealer in the first place, one who takes the trouble to find out what you really want and then demonstrates some likely alternatives.

The *Directory* has been compiled so that it can be used by *Choice* readers as a buying guide. A guide in the sense that that you should use the information in it to make a shortlist of equipment suited to your needs and budget, and then audition it at a dealers' before taking the plunge. Because tastes inevitably differ it would be unwise to buy purely on the basis of our recommendation and dealers are the most experienced people around when it comes to making systems work as a whole.



# The Directory

## TURNTABLES & TONEARMS

The schizophrenic split between consumer electronics and 'real hi-fi' is most obvious amongst turntables. The former are supplied simply as a means of playing vinyl in a system context. Cheaply manufactured in the Far East, these are complete players with a variety of automatic facilities, sometimes tied into system remote control. But engineering compromises severely limit sound quality, cartridge choice may be P-mount restricted, and such machines are rarely stocked by specialist hi-fi dealers these days.

Specialist turntables offer big sound quality improvements, but lack so-called convenience features (that practised users often find irksome). Such turntables at the cheaper end of the market (sub-£350) tend to be supplied with matching tonearm, and often include a 'starter' cartridge. Still better quality is found at higher prices amongst the separate motor units and tonearms. Careful partnering and set-up is essential for these individual components, but 'naturally sympathetic' combinations do exist, and the good dealer can help.

Listed separately as integrated players and as turntable motor units and tonearms, our sound quality rating is based on results achieved using a high quality system – but in point of fact the turntable is usually the limiting factor soundwise in any system. Lab performance summarises the speed stability, vibration generation and environmental isolation of turntables, along with the friction, alignment and adjustment of tonearms. The tonearm's physical characteristics also define a range of compatible cartridges.

## INTEGRATED TURNTABLES

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES ARM EFF. MASS	VALUE	ISSUE
<b>Acoustic Research EB101</b> £230	Good Good	This genuine high fidelity product offers an impressive package at a competitive price	Subchassis, manual, 13.5g	BB	48
<b>Alphason Solo/Xenon MCS</b> £420/£300	Average Good	The deck is warm and euphonious with high levels of clarity. Wow artefacts occasionally just audible	Suspended motor unit, optional quartz PSU, 13g		67
<b>Alphason Sonata/HR-100S</b> MCS/Atlas £720/£480/£340	Very Good Very Good	Good sound in all areas - bass, clarity and neutrality all in the top class and bettered by very few decks. Atlas PSU expensive but worthwhile	Belt drive, suspended, optional PSU, 13g	R	79
<b>Alphason Super Nova</b> £300	Good Good	Informative, easy to listen to and quite lively deck with good detail and occasionally uneven bass. Build quality of review sample not perfect	Subchassis, manual, belt drive, detachable arm, 12g	R	91
<b>Ariston Forte</b> £350	Average - Average	Heavy on engineering, short of soul? The Forte almost makes it, losing out only because of some residual pitch variations and a lack of bass power. The arm is modestly good	Manual 2-speed belt drive player and detachable arm, 10g		67
<b>Ariston Icon</b> £215	Good Good	A thoughtful and efficient design that offers good sound, excellent value and semi-automatic operation too! Good vibration isolation eases siting	Belt drive, suspended, semi-automatic, 10g	BB	79
<b>Ariston Pro</b> £180	Good Good	Remarkably clear and detailed for the price, very neutral. Benefits from cartridge upgrade	Manual, belt drive, 12g	BB	91
<b>Ariston Q-Deck</b> £165	Good Average +	Well engineered and good sounding low cost package which is both easy to set up and to use	Semi-auto, belt drive, solid	BB	67
<b>Dual CS430</b> £100	Average Average -	Ragged, sometimes unpleasant cartridge mixes with a modest pleasing player in a very sharply priced package	Belt drive, with cartridge, auto return, 5g	R	67
<b>Dual CS5000</b> £230	Average Average +	The rare 78 facility may give grandma's collection a new lease of life but the player did not merit recommendation on price vs sound	Electronic, belt drive, subchassis, 10g		48
<b>Dual CS503-2</b> £140	Good - Average	Not wholly inspiring; generally coarse and wolly sound is at least not offensive, but easily bettered by the CS505-4. Good value in material terms	Semi auto, belt drive, 10g	R	91
<b>Dual CS505-4</b> £160	Good - Good -	The old-time favourite which never gives up. Sound is enjoyable if not perfectly clear, all-round value is excellent	Semi-auto, belt drive	BB	91
<b>Goldmund ST4</b> £4589	Very Good Excellent	The Studio turntable takes on a cheaper tonearm than the T3F, yet provides a similar reference standard objective and subjective performance at £2,000 less, in a neatly integrated though bulky package	Solid subchassis, direct drive, parallel arm, detachable h/shell	R	60
<b>Heybrook TT2 turntable &amp; arm</b> £424/£269	Average Good +	A gradual process of informed evolution and a sensibly designed arm combine to make this a good sounding middle of the road package. Well supported by dealers	Manual subchassis motor with arm, R belt drive, 14g	R	67
<b>JVC AL-FQ555</b> £170	Average - Poor	Clear midband sound but woolly bass and crude treble. Ease of use however ranks highly, and there's little to go out of adjustment	Auto, direct drive, 5.5g		67
<b>Kenwood DP-990</b> £400	Average Average	Smart, slick and massive player suitable for low compliance cartridges only. A good but not inspired performer	Semi-auto 2 speed direct drive, 16g		67
<b>Kuzma Stabi/Stogi Reference</b> £900/£700	Very Good Very Good	Beautifully made in a solid oak plinth, the Stabi also sounds very clear, detailed and extended. Stogi Reference is also most capable.	Manual, belt drive, subchassis, 12g	R	91
<b>Linn Axis/Akito</b> £399	Good - Average +	A neat, attractive and well-made package which delivers a rather harsh sound with a 'one-note' effect in the bass, but it's well suited to mid market systems	Belt drive, semi-suspended, electronic PSU, 10g		79
<b>Linn LP12-Lingo/Ekos/Troika</b> £1128/£1097/£798	Good + Good +	The classic reference is improved (at a price) by the Lingo but character remains the same - not as detailed or neutral as the best. Ekos arm, though pricey, is well made and suited to many decks	Manual, subchassis, belt drive, 9g -/R/-		91
<b>Manticore Mantra/Musician</b> £340/£170	Good + Good +	Well engineered deck with satisfying sound. The arm is particularly fine and very good value	Belt drive, suspended, 15g	R	79
<b>Marantz TT400</b> £150	Average - Poor	Everything one hopes a budget deck won't be; coarse, confused, muddled and woolly. Construction isn't wonderful, either	Manual, belt drive 16g		91
<b>NAD 5120</b> £90	Average Average	A number of running improvements have given this player a range and tautness denied its lazier sounding antecedents.	Semi-auto belt drive, detachable arm/tube/weight, 9g	BB	67
<b>Omega Point Silver/Black</b> £895/£295	Good Good +	An avowedly stripped down turntable that lacks even an on/off switch, the Omega Point Silver offers fine midrange clarity and good stereo, but some HF compression and a lack of 'wellie'	Manual, solid, belt drive, unipivot, 11g		55
<b>Opus 3 Continuo/Decca London</b> International (Revise) £599/£99	Poor Good	Heavyweight motor unit with many fine properties, but which needs further development. The idiosyncratic arm is a suitable (though not ideal) platform for the Decca cartridge. For all its faults though, the whole transcends the sum of the parts	Belt-drive manual, damped unipivot arm, 12g		67
<b>Rational Audio Aura 01</b> £189	Poor Good	Poor lab results reflect bad rumble, but midrange and treble are very pure and clean; idiosyncratic sound and styling should be tried!	Manual, belt drive, linear tracking arm 10g	R	91
<b>Rega Planar 2</b> £155	Average + Good	A remarkable product at the price, surprisingly articulate and confident	Manual, 11.5g	BB	48
<b>Rega Planar 3</b> £207	Good Good	A long time leader in its price category, the '3' (with its excellent RB300 arm) sounded nicely 'musical' in a balanced and coherent manner	Manual, 11.5g	BB	48
<b>Revolver Rebel</b> £185	Average Good -	Quite lively and detailed but not the strongest on subtlety, with slightly lumpy bass. Motor breakthrough audible, and watch for bent motor shaft on delivery!	Manual, belt drive, semi-suspended 12g	R	91
<b>Revox B291*</b> £892	Average - Average -	Sound quality ranks as below average. Subjective bandwidth is narrow and the music lacks grace and energy. Ease of use however is unrivalled	Automatic, remote controllable, direct drive parallel arm		55
<b>Rotel RP-855</b> £189	Good Good	Great sound for the money - detailed and clear with good bass and no irritating nasties	Belt drive, solid, speed adjust, 9g	BB	79
<b>Systemdek IIX</b> £248	Good Average +	Poised, clean sounding deck, forward and explicit in character. A good value deck under £250, and a relatively cheap and satisfactory suspended model	2 speed belt drive manual turntable and arm, 11g	R	67
<b>Technics SL-DD33</b> £110	Average Average	As with the QD33 though better value	Automatic, direct drive, solid plinth, 7.5g, P-mount	BB	48
<b>Technics SL-L20</b> £115	Poor Average -	A rather lightweight parallel tracker achieving a poor overall rating, with little to recommend it unless you dig facilities	Electronic, solid plinth, 5g, P-mount		48

# The Directory

## INTEGRATED TURNTABLES

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES ARM EFF. MASS	VALUE	ISSUE
<b>Technics SL-QD33</b> £140	Average Average	The quartz speed controlled version of the DD is short on sound quality but not features. But it did have fair focus and some depth	Automatic, Quartz, direct drive, solid plinth, 7.5g, P-mount	R	48
<b>Technics SLBD-22</b> £90	Average - Average -	Not bad for the price and a great improvement on the L20, it performs reasonably when not stretched	Semi automatic, solid plinth, electronic, 6g P-mount	R	48
<b>Thorens TD 166 Mk V</b> £200	Good Good	Classic suspended-subchassis deck with clear, stable sound of no particular character. Unlikely to make enemies	Belt drive, suspended, 12g	BB	79
<b>Thorens TD 280 Mk II</b> £180	Good - Good -	Legendary Thorens build quality on the cheap - slightly unsubtle sound but eminently liveable-with and very good value	Belt drive, solid, electronic PSU, 12g	BB	79
<b>Thorens TD 316 Mk II</b> £220	Good Good -	Very solid deck with neat split-chassis construction. Sound is a bit insecure in the bass, but it could suit classical music lovers well	Belt drive, suspended, electronic PSU, 12g	R	79
<b>Thorens TD2001</b> £630	Good Good -	Similar to TD320 but much dearer - why? Sound is comfortable but not very detailed	Semi-auto, belt drive, subchassis 15g		91
<b>Thorens TD320 Mk II</b> £350	Good Good	Good, consistent sounding deck with much improved (but not ideal) arm. A little expensive for performance offered	Semi-auto two speed belt drive, 14g		67
<b>Townshend Rock</b> Reference/Excalibur £1995/£695	Excellent Excellent	Overall the closest reproduction to master tape we've yet heard, with stunning real bass and excellent neutrality. Front end damping trough improves LF detail significantly	Belt drive, suspended, electronic PSU, front-end damping, 12g	R	79
<b>Voyd Reference/Helios Cyalene</b> £1066/£5299	n/a Excellent	Voyd's flagship is equipped with three of the biggest motors in the business, a Lexan platter and a real brute of a power supply (it dwarfs most power amps!). A strong contender for best turntable in the known universe	Belt drive, 3 motors, subchassis, outboard PSU, 12/14g	R	Coll. '90
<b>Well Tempered WTAT</b> £1690	Average Very Good	Intriguing and challenging design. Musically it is not ideal, but it has a limpid quality and a lack of artificiality that sets standards as well as turning the ear, though it's not uncoloured. A charmer yet mainstream enough in its virtues to be viable	Manual 2-speed, damped, suspended arm, 7.5g	R	67
<b>Zarathustra S4/Pluto 5A</b> Prestige/PSU £1500/£2500/£500	n/a Excellent	The very well made and finished heavy platter S4 with the superb Pluto arm make a devastating combination ranking up there with the very best	Subchassis, manual, available without PSU	R	72

## MOTOR UNITS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Ariston Superior</b> £598	Good + Good	Good but slightly damped sound quality, with powerful and stable bass. The pro quod is a certain lack of pace, energy and resolution	Belt drive, subchassis, electronic		55
<b>CEC ST930</b> £599	Good Very Good	A rarity - a serious hi-fi product that loses nothing to budget rivals in finish or convenience. Good clean sound, very stable and assured	Belt drive, external PSU, 78 speed inc.	R	79
<b>CS Audio Resan kit for Rega</b> £80	Good - Good	After-market kit to convert Rega 2 or 3 to semi-suspended subchassis style. Looks good and sounds tidier than original. Feedback is much reduced	Conversion kit, all work reversible	R	79
<b>Michell Gyrodec</b> £595	Good Good	Sweet and natural sounding player, well exploited by the Rega RB300 arm. Aesthetics, and the acres of acrylic, are unique	Manual, belt drive, suspended motor unit		55
<b>Michell Syncro</b> £265	Good Good	A happy blend of qualities endows the Synchro with a blend of subtlety and force - the mailed fist in the velvet glove. Easy on the ear in the best sense.	Manual, belt drive, suspended motor unit	R	67
<b>NVA Senior</b> £450	Good - Average	Very high sensitivity to low-frequency vibration, especially on NVA stand, gives strange subjective bass response and confused sound. Looks are unusual but pleasing	Belt drive, electronic PSU, two-part plinth		79
<b>Oracle Alexandria Mk III</b> £995 - £1095	Very Good Very Good	One of the most beautifully presented players made, and fully supported by superb separation, dynamics and a euphonious style of delivery.	Manual 2-speed belt drive	R	67
<b>Oracle Paris</b> £595	Good - Average	Looks good but sounds coarse, confused and uneven, with bass liable to thump	Belt drive, semi-suspended, electronic		91
<b>Origin Live Oasis A</b> £495	Good - Average	Rather coarse sound with lack of detail resolution - but lively presentation may appeal. Appearance is industrial	Belt drive, external mains filter, 33rpm only, suspended		79
<b>Origin Live Oasis B</b> £199	Average Average +	Aesthetics are not its strong point, but its lively and articulate - if idiosyncratic - sound will please some tastes. Highly resonant construction is very sensitive to feedback	Belt drive, 33Gy1/3Gyrpm only, solid plinth/subchassis		79
<b>Oxford Acoustics Crystal</b> Reference £2395	Very Good Excellent	This big, open and powerful sounding turntable works beautifully with Airtangent arm to give superb 3-D imagery	Manual, belt drive, subchassis, stand	R	60
<b>Pink Triangle Anniversary</b> £1175	Excellent Excellent	Possibly the most detailed, clear, neutral and therefore accurate deck around. Likeness to master tape is almost uncanny	Suspended, belt drive, electronic, motor on subchassis	R	91
<b>Pink Triangle Export</b> £620	Very Good Excellent	Basically a PT TOO with built-in power supply. Retains features of great transparency and neutrality. Review sample had highish motor noise - presumed untypical	Suspended, belt drive, electronic	R	91
<b>Pink Triangle Little Pink</b> Thing £345	Good + Very Good	Leads the field for clarity and neutrality at this price or a good bit more. It also looks very smart! Excellent value. Arm cut-out suits Rega or Linn style	Belt drive, semi-suspended, electronic PSU	R	79
<b>Revolver</b> £150	Average Average	Nicely balanced, but unimpressive timing and lightweight bass made this deck rather average for the price. Manufacturer has since made several changes, but not re-submitted for review	Manual, belt drive, solid plinth		48
<b>Systemdek IIXE</b> £248	Good Very Good	Fine, honestly specified and well built player which easily betters its closest stablemate, the IIX. Frankly, at the price it's a sonic bargain	Manual 2-speed, external PSU	R	67
<b>Systemdek IV</b> £495	Good Very Good	The level of wow is a theoretical concern at least, but elsewhere this player shines, combining euphony, information and imaging in a polished, untemperamental package	Two-speed manual belt drive	R	67
<b>Voyd "The Voyd Plus"</b> £2777	n/a Excellent	Based on the standard 3-motor Voyd but with upgrade options (better bearing, platter, etc) which take it half way to a Voyd Reference, so we've dubbed it The Voyd Plus. Superb build and finish; colourful, dramatic performance. A thoroughbred	Belt drive, 3 motors, subchassis, outboard PSU	R	72
<b>Voyd Valdi</b> £680	Good - Good +	Slight 'one-note bass' effect and lack of pitch stability compromise the performance of this well-made deck	Belt drive, suspended subchassis, electronic PSU		79
<b>VPI HW-19</b> £1317	Very Good Very Good	Built to accommodate parallel tracking arms, this large but elegant deck produced clean, smooth sound when fitted with an SME arm. Good bass	Belt drive, suspended subchassis	R	79

## TONERMS

MODEL PRICE	LAB SOUND	COMMENTS	ARM EFF, MAS	VALUE	ISSUE
<b>Airtangent 1B</b> £1990	n/a Excellent	A complex but superbly built arm for high quality systems, giving excellent stereo and resolution	7.5g (vertical)	R	60
<b>Alphason Delta</b> £190	Good Average +	A highly competent design from Alphason gives good sound quality but with slight blurring and treble fizz	16g	R	48
<b>Alphason HR100S</b> £420	Very Good Very Good	This S-shaped arm sounds smooth, but nevertheless reproduces transients with fine attack	10g	R	Coll. '86



# The Directory

## TONEARMS

■ MODEL ■ PRICE	■ LAB ■ SOUND	■ COMMENTS	■ ARM EFF, MAS	■ VALUE ■ ISSUE
<b>Alphason Opal</b> £130	Good Average	This is a straightforward adequate sounding low cost arm, priced just above where it rightly belongs	10g	55
<b>Alphason Xenon</b> £240	Good Good +	A trimmed down HR100S, the Xenon has inferior bearings and a simpler finish, but sounds crisp and coherent. Fits any Linn cutout	12.75g	R 55
<b>Ariston Enigma</b> £99	Average Average +	Good but not the best in its class: mid-band sounds a little uneven; treble a trifle "brash"	11.5g	48
<b>Audio Technica AT1130</b> £186	Good Good	Well suited to most cartridges including high compliance ones, the AT is smooth and tonally neutral, if slightly lacking in 'balls'	8.5g	R 67
<b>Decca London International</b> £49	Average + Average +	This uni-pivot design gives a rather rich tonal balance and some bass muddling. Could be good with Decca cartridges, but not well built	12g	48 Summ
<b>Eminent Technology</b> £1000	Good + Very Good	One of the best sounding tonearms around, the linear tracking Eminent delivers impressive stereo imagery, focus and transparent sound	9g (vertical)	R Coll. '86
<b>Goldmund T3F arm</b> £4400	Excellent Excellent	This complex parallel tracker created an "ear-opening" experience when tested with a (since updated) Goldmund Studio turntable	16.5g	R Coll. '87
<b>Helius Orion 2</b> £490	Very Good Very Good	Excellently engineered with rigid bearings, free from slack. It remains expensive but the level of performance deserves Recommendation	12g	R 48
<b>Kuzma Stogi Reference</b> £699	Very Good Very Good	A large, solid and well-made arm that holds the cartridge firmly, giving exceptionally clear sound with just a hint of brightness	12g	R 79
<b>Linn Ekos</b> £895	Very Good Very Good	Superb, state of the art design which builds significantly on Linn's strengths	9g	R 67
<b>Mission Mechanic</b> £900	Good Good +	Nearly right, but inconsistency with level and vague imagery spoil what is otherwise a firm, powerful advocate for black vinyl	11g	55
<b>Moth Arm</b> £78	Good Good +	The ultimate budget arm? Refined, detailed, sweet and natural - performance improves in line with the rest of the system	12g	BB 60
<b>Naim Aro</b> £700	Good Good -	Designed for use on the Linn LP12, the Aro is a little bright and congested.	10.5g	91
<b>Rega RB300</b> £115	Very Good Very Good	Despite its modest price this sets exceptional performance standards and could be used on a number of high-quality turntables	10-11g	BB 60
<b>Roksan Artemiz</b> £595	Average Good	Interesting design which works a treat on the Xerxes deck. Fits Rega cut-out.	8g	67
<b>Roksan Tabriz</b> £150	Good Good +	Though obviously targeted at Roksan's own Xerxes, it is also a good alternative to the Rega arms in many applications. A trifle bright.	9g	R 91
<b>SME 3009 Series III</b> £253	Good Average +	Comprehensively adjustable and very well made, suited to MM and high compliance MC cartridges	5g	48
<b>SME 3009 Series IIIS</b> £182	Good Average +	A simplified less flexible (as regards adjustment) Series III with a similarly 'soft' sonic character	5g	48
<b>SME 3009R</b> £335	Average + Average +	A higher mass version of the Series III designed for low compliance MC cartridges	12g	48
<b>SME 309</b> £495	Very Good Very Good	Beautifully made, finished and presented, this arm is fully and easily adjustable and a highly neutral performer	10g	R 79
<b>SME Series IV</b> £810	Excellent Very Good	Superb engineering and finish with a finely balanced sound giving impressive stereo focus and low coloration	10.5g	R 60
<b>SME Series V</b> £1247	Excellent Very Good	Excellent in terms of design engineering and sound quality, this arm arguably sets a new reference standard regardless of price	10.5g	R 60

## CARTRIDGES

Very much the 'slave' of turntable and tonearm and to some extent undermined by the supply of free 'starter' cartridges on many turntable systems, the cartridge is still worth taking seriously. The quality of both the stylus itself and the cartridge's tracking performance are important in preserving that most important part of the hi-fi system – the record collection – and the cartridge also plays a significant role in determining the overall balance of a system

Cartridges fall into two groups: high output models, capable of working directly into any amplifier, and more expensive low output models.

Stereotypically, low output cartridges use the moving coil principle of operation, have better mechanical integrity and tighter tolerances, and give better performance but at much higher cost. Most under-£150 amplifiers and many valve designs need either an extra head amp or

transformer to cope with the low output.

Cartridge/amplifier interfacing can be very subtle, but even basic high output moving magnet designs benefit in overall balance from optimised amplifier capacitance loading. Still more important, the mechanical cartridge characteristic of cantilever compliance ('springiness') needs to be considered in the light of the effective mass of the tonearm which will be used.

■ MODEL ■ PRICE	■ LAB ■ SOUND	■ COMMENTS	■ ARM ■ OUTPUT/TYPE	■ VALUE ■ ISSUE
<b>Arcam C77</b> £22	Average + Average +	A sensible moving magnet package with good bounce at a competitive price	6-16g Normal, MM	BB 48
<b>Arcam C77Mg</b> £30	Average - Average	Punchy sound quality with plenty of extra energy to liven things up. The solid body seems well worth the extra £10	4-8g Normal, MM	BB 67
<b>Arcam E77Mg</b> £50	Average Average	Our sample had a disappointing stylus, but gave a coherent, rich and laid back sound, with good 'scale'	3-8gN Normal, MM	R 48
<b>Arcam P77Mg</b> £60	Average + Average +	Cautiously recommended, the P77Mg was preferred to its cheaper partner by virtue of a better tip. Channel balance could have been better	4-9g Normal, MM	R 48
<b>Arcam PMX10</b> £100	Good + Very Good	Not the very clearest in complex high-frequency sounds, but lively and exciting, good transients	5-11g Low, MC	R 85
<b>Audio Technica ART1</b> £800	Good + Very Good	This is a delicate and very fluid-sounding MC that tracks well, offers very low distortion and exceptionally good stereo separation	9-18g Low, MC	R 72
<b>Audio Technica AT-420E OCC</b> £31.50	Average Average	Better suited to pop recordings, this MM bears some of the sonic hallmarks of the Linn K5	7-14g (damp) Normal, MM	R 67
<b>Audio Technica AT-430E OCC</b> £44.50	Average + Average	A rising high frequency response yields something of a treble sting, not a good all-rounder	3-7g Normal, MM	67
<b>Audio Technica AT-F3/OCC LE</b> £74	Average + Good	Though the 'limited edition' badge is a trifle tongue-in-cheek, the 'F3 still offers excellent value	8-15g Low, MC	BB 67

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# The Directory

## CARTRIDGES

MODEL PRICE	LAB SOUND	COMMENTS	ARM OUTPUT/TYPE	VALUE	ISSUE
<b>Audio Technica AT-F5/OCC LE</b> £106	Average Good +	This latest sample demonstrated some technical weaknesses but its spacious, fluid sound quality still represents a benchmark at this price	4-10g Low, MC	BB	67
<b>Audio Technica AT95E</b> £18	Average - Average	Clear, dynamic if richly balanced, the magnetic '95E is a definite Best Buy	8-14g Normal, MM	BB	48
<b>Audio Technica ATOC7</b> £265	Good + Good +	The OC9 is better if you can afford the extra. But OC7 is at least a taste of the high-end at a sensible price	6-13g Low, MC	R	54
<b>Audio Technica ATOC9</b> £400	Average + Very Good	Tonal colours are reproduced faithfully and it rarely puts a foot wrong. Slightly less transparent than more costly MCs but it has got real wellie. Good value (really!)	6-14g Low, MC	R	60
<b>Audionote I02VDH</b> £895	Good Very Good	One of the best, giving 'an extraordinarily relaxing midrange clarity', needs a transformer	8-18g Very low, MC	R	43
<b>Audioquest AQ 404i-L</b> £400	Very Good Good +	Slight harshness detracted from the performance of this otherwise clear-sounding and detailed cartridge	8-16g Low, MC		84
<b>Audioquest AQ 7000</b> £1200	Good Good +	Stunning stereo imaging and good detail at low levels are spoiled by less-than-perfect tracking and high sensitivity to arms.	6-20g Low, MC		91
<b>Audioquest MC5</b> £220	Average Average	Offers high-output benefits but the drooping frequency response and severe VTA error preclude recommendation	10-20g Normal, MC		54
<b>Cello Chorale</b> £750	Average + Good	Now available through a new distributor at a saving of some £300, the Chorale is still blessed with a delicate but highly detailed treble. Arm matching is a problem	3-9g Low, MC		72
<b>Denon DL 103</b> £99	Average Good	This classic spherical stylus model gives a lively sound with powerful bass, and is popular in broadcast studios	6-16g Low, MC	R	48
<b>Denon DL110</b> £69	Good Good	Firmly recommended as a fine all-rounder, this high-output moving coil model is likely to perform well in nearly all circumstances	6-16g Normal, MC	BB	48
<b>Denon DL160</b> £89	Average + Good	Although listeners just preferred the 110, its brother here proved a twin in lab tests and is still "thoroughly competent"	6-16g Normal, MC		43
<b>Dynavector 17D2</b> £280	Very Good Very Good	Clear, detailed, neutral and generally very informative - excellent .	6-18g L ow, MC	R	91
<b>Dynavector DV-50X</b> £99	Good Average	A high-output MC model with impressive lab performance, but whose tip and sound quality both disappointed	6-14g Normal, MC	R	48
<b>Dynavector DV10X IV</b> £125	Average Average +	Fine sounding and realistically priced, damping is recommended to ensure successful tracking ability	8-18g N Normal, MC	R	48
<b>Dynavector DV23RS</b> £230	Average + Good	Sound quality was described as "shut-in", lacking energy and sparkle but with some "edginess" in high frequencies	10-22g Low, MC		28
<b>Dynavector XX-1</b> £680	Very Good Good +	Good, but not immensely competitive at the price, and not helped by comparison with the low output version	7-15g Normal, MC		84
<b>Dynavector XX-1L</b> £680	Very Good Very Good	Very clear, very detailed, no troubles with tracking; response lift around 20kHz seems to do no harm	7-13g Low, MC	R	84
<b>Empire 800 Mk II</b> £33	Good Average	This very high output MM appears to be based on the classic Ortofon VMS series. A trifle uninspiring overall	7-17g Normal, MM		67
<b>Empire Benz Micro MC-2</b> £600	Average Good +	Similar to both the Empire MC1000 and vdH MC2 in design, the Benz offers a warmer and very transparent account of the music. Its tracking prowess is slightly limited	5-12g Low, MC	R	72
<b>Empire MC-5M</b> £110	Average + Good	A very low compliance renders this MC best suited to heavy tonearms while its sweet, non-aggressive sound quality earns it a recommendation	13-20g L ow, MC	R	67
<b>Glanz GMC-10EH</b> £50	Good Good	The rising HF trend of this high o/p MC may cause problems in certain systems but with a favourable wind its seductive qualities will win out	8-14g Normal, MC	R	67
<b>Glanz GMC-10LX</b> £80	Average + Average +	Bearing some of the hallmarks of the '10EH, the '10LX is still less competitive in the sonic stakes	7-15g L Low, MC		67
<b>Glanz GMC-20E</b> £129	Good + Good +	Very good tracking, smooth sound and good detail. Very slight surface noise enhancement	5-10g Low, MC	R	91
<b>Glanz MFG-110EX</b> £25	Average Average	A little bright but giving detailed bass and clear treble, this was competitive at the price	6-16g Normal, MM	R	43
<b>Glanz MFG-310LX</b> £50	Good + Very Good	Detail and treble outstanding for sub-£100 cartridge. Slight coloration may be due to body resonance	6-10g Normal, MF	BB	85
<b>Glanz MFG-610LX</b> £90	Good + Good +	Similar to cheaper '310 but slightly clearer transients and bass. Benefits from lowish impedance loading	3-10g Normal, MF	R	85
<b>Goldmund Clearaudio</b> £1500	Average + Very Good	Something of a mixed bag overall, its sonic character bears a strong resemblance to the Pradikat though it shares some of the hallmarks of the more expensive Accurate	5-12g Low, MC		60
<b>Goldring 1012</b> £40	Good + Good	Slightly harsh sound but plenty of life and quite good detail. Some very high frequency coloration apparent	6-12g Normal, MM	R	85
<b>Goldring 1022</b> £60	Good + Good	As with 1012, a touch harsh; detail and transient purity improved, though, and it goes well with electric guitar!	5-11g Normal, MM	R	85
<b>Goldring 1042</b> £85	Good + Good	Not terribly subtle, and not such good value alongside 1012 and 1022. Quite lively, though	7-12g Normal, MM		91
<b>Goldring Elan</b> £16	Average + Average	A lightweight and frisky-sounding MM that appears to be based upon the same body as the Nagaoka mm4	7-15g Normal, MM	R	67
<b>Goldring Epic II</b> £26	Average Average +	An excellent budget choice though the limitations of the stylus are rather obvious at higher frequencies	5-12g Normal, MM	R	67
<b>Goldring Eroica</b> £100	Good Good -	More confused and coloured than its low-output sibling - high output less of an issue in these days of cheap MC-compatible amplifiers	8-15g Normal, MC		84
<b>Goldring Eroica LX</b> £115	Good + Good	Not the most subtle cartridge in the world; can sound edgy at times, but lively and informative	8-14g Low, MC	R	84
<b>Goldring Excel</b> £500	Average + Good	Goldring's most expensive cartridge to date errs on the warm and heavy side of neutral. Strong bass lines are its forte though its ability to resolve subtle treble details is weaker	6-13g Low, MC		72
<b>Grado ZF3E + *</b> £47.50	Average - Average	Downtilting balance disguises the brightness of this cartridge; bit of a mixed bag at this price	9-20g (damping) Normal, MM		54
<b>Grado ZTE +1</b> £26.50	Average - Average	Bass and treble are a trifle coloured but the midband proved highly enjoyable. Ideal for budget systems	6-13g (damping) Normal, MM	R	54
<b>Kiseki Blackheart</b> £1795	Good Good	This cartridge demonstrated refined poise and a delicate but at once potent security, however, the price did seem a little on the high side compared to other Kisekis	6-16g Low, MC		60
<b>Kiseki Blue Goldspot</b> £450	Very Good Good +	Good bass and imaging, but hints of spit and coloration let the side down slightly	8-15g Low, MC		84
<b>Kiseki Lapis Lazuli</b> £4000	Good Very Good	Combining very sensible design concepts at a silly price, the Lapis Lazuli is best thought of as combining the detail of the MC3000 and the fluidity of the Clearaudios	4-12g Low, MC		60
<b>Kiseki Purpleheart Sapphire</b> £799	Good + Good +	Rare, beautiful to look at and sweet to listen to, our review of this high-flyer conjured up images of Japanese art	5-14g Low, MC		48

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MODEL PRICE	LAB SOUND	COMMENTS	ARM OUTPUT/TYPE	VALUE	ISSUE
<b>Koetsu Black S</b> £612	Average Good +	The S is an OEM design built to Koetsu's blueprint. It features a sturdier fixing plate and offers a brighter, faster and more tactile sound than the earlier K	8-15g Low, MC	R	72
<b>Linn Asaka</b> £365	Good + Good +	Disciples of Linn who are trying to realise their true "Karma" may find that saving money is not a short cut to heaven	9-18g Low, MC	R	Coll. '86
<b>Linn K5</b> £37	Average Average +	Not as crisply focused as the costlier Linn magnetics, the K5 offers a smoother presentation	7-16g Normal, MM	R	67
<b>Linn K9</b> £89	Average Good	Linn threw this model into the leading pack by beefing up the Basik's bodywork, adding a super stylus, and keeping the price fair	6-15g Normal, MM	BB	Coll. '86
<b>Linn Karma</b> £552	Very Good Very Good	A specialist which is strongly recommended for Linn-based systems; results may be less predictable in more general application	9-18g Low, MC	R	Coll. '86
<b>Linn Troika</b> £798	Very Good Good +	Good all-rounder, but still some hint of unhappiness at very high levels. Good imaging and bass.	6-18g Low, MC		91
<b>London Maroon</b> £149	Average Average +	Now manufactured under the London brandname this Decca cartridge is as iconoclastic as ever	9-20g (damp) Normal, MM		67
<b>London Super Gold</b> £300	Poor Average -	Immediate and (in the midrange at least) detailed, but very coloured, very nonlinear and questionable effect on records. Devotees swear by it	9-15g, damp Normal, fixed stylus MM		84
<b>Milltek Aurora</b> £249	Good + Good +	An overall feeling of relaxed ease characterised this clear and atmospheric Kiseki-built cartridge	8-16g Normal, MC	R	Coll. '86
<b>Milltek Olympia</b> £349	Average + Good +	Warm and detailed sound - packs the punch of the best MCs with high output as a bonus	12-20g, (damping) Normal, MC	R	54
<b>Nagaoka MM4</b> £9	Average - Average -	Clear punchy sound that delivers the rudiments of a good performance	6-16g Normal, MM	R	54
<b>Nagaoka MP10</b> £18	Average Average	High frequencies sounded "shut-in" with this spherical-stylus model, but mid and mass were energetic, bouncy and punchy	5-13g Normal, MM	R	48
<b>Nagaoka MP11 Boron</b> £40	Average Average +	Responding well overall in PM's equipment and listening room, this model was mildly criticised for low level and dynamic limitations	5-13g Normal, MM	BB	48
<b>Nagaoka MP11 Gold</b> £47	Average - Average +	There were mild criticisms directed at most areas, but in general the sound was clear, open and even	3-8g Normal, MM	R	48
<b>Nagaoka Stilton TS10</b> £50	Good - Good	Stilton-designed solid body (with three-point mounting) certainly gives remarkably resonance-free sound, but tip and generator are less good - a little rough at times.	5-10g Normal, MM	R	85
<b>Nagaoka Stilton TS11</b> £70	Good - Good	Differs from TS10 in having Vital stylus with better tracing but still some high frequency harshness.	5-10g Normal, MM		85
<b>Ortofon 510</b> £30	Good Good +	For the price, a good blend of virtues - weight, clarity and neutrality.	3-11g Normal, MM	BB	85
<b>Ortofon 520</b> £50	Average Average +	Very sensitive to load capacitance this new Ortofon maintains the company tradition for a lively, effervescent SQ	7-16g Normal, MM	R	67
<b>Ortofon 530</b> £80	Good + Good +	Very clean and assured sound; transients not quite perfectly pure but plenty of detail.	4-11g Normal, MM	R	85
<b>Ortofon 540</b> £100	Average - Average	Graced with an advanced FGII stylus our sample possessed too high a compliance for broad arm matching. It could also sound a little unforgiving	3-8g Normal, MM		67
<b>Ortofon MC10 Super</b> £70	Average Good	"What a delightfully sweet-sounding cartridge this is . . ." we said	5-15g Low, MC	BB	48
<b>Ortofon MC20 Super</b> £200	Average + Good +	An "inviting" sound quality; polite rather than exciting it approaches much more expensive models, but does not better them	6-15g Low, MC	R	Coll. '86
<b>Ortofon MC30 Super</b> £270	Very Good Good +	Beautifully engineered and well-balanced, it was slightly criticised as bland, though some may appreciate the lack of rough edges	5-14g Low, MC		Coll. '87
<b>Ortofon MC3000 MkII</b> £850	Very Good Excellent	Low levels of body resonance are a real ear-opener. Nothing to criticise elsewhere; one of the very best	9-16g Low, MC	R	84
<b>Ortofon MC5000</b> £1500	Good + Good	Review sample could not be fully run-in, which might explain limited tracking ability and bright and forward sound, though imaging is excellent. Fussy about s.	12-20g Low, MC		91
<b>Ortofon OM10</b> £20	Average Average	One of the leading "cheapies", this gives a fine level of sound quality for the price, with good matching compatibility	5-15g Normal, MM	BB	48
<b>Ortofon OM20</b> £45	Average Average +	This turned out to be the listening panel's favourite among Ortofon's moving magnet models	5-16g Normal, MM	R	48
<b>Ortofon OM40</b> £90	Average Average +	Highly competent engineering, secure tracking and decent sound quality are major strengths. But it's a little cold, a little polite	3-8g Normal, MM		48
<b>Ortofon OM5E</b> £15	Average - Average -	The OM10 is a hi-fi cartridge - the OM5E is not	5-16g Normal, MM		43
<b>Ortofon Quasar</b> £300	Very Good Very Good	Many of the qualities of the MC3000, although a touch bright. Good detail and delicacy	8-15g Low, MC	R	84
<b>Ortofon X1</b> £50	Average Average	The cheaper X1 scored higher marks with our listening panel than the X3, but both were a disappointment	6-15g Normal, MC		48
<b>Ortofon X3</b> £70	Average Average	A lack of bass power, definition and a "zitty" top end makes this competent but uninvolving	5-15g Normal, MC		48
<b>RATA RP20</b> £22	Average - Average	Good integration, a clear dynamic midrange and the beginnings of fine stereo imagery merits clear recommendation	6-14g Normal, MM	R	48
<b>RATA RP40</b> £44	Average Average +	The '40 did a good job of sorting out the layers and complexity of the mix, with good focus, excellent stereo spread and fine scale	6-15g Normal, MM	R	48
<b>RATA RP70</b> £77*	Average Average +	Clearer and sweeter than the '40 this also seemed heavier and less lively. For £99 you can have a van den Hul stylus	6-14g Normal, MM		43
<b>RATA RP70vdH</b> £99	Average + Good	Able to retrieve bags of musical detail (thanks to the vdH stylus), RATA's top cartridge ranks as one of the most articulate MM's available	11-18g Normal, MM	R	67
<b>Rega Bias</b> £34	Average Average +	Difficult to mount in some arms due to its shallow build, the bias offers a gentle, refined SQ that certainly makes it worthy of audition	4-10g Normal, MM		67
<b>Rega Elys</b> £74	Good Good	Clearly superior to the Bias, despite their common heritage, the Elys is both more detailed, accurate and musically convincing	8-15g Normal, MM	R	67
<b>Revolver</b> £20	Average + Average	This modified AT-95E enjoys a very lively mid and treble even if the bass is somewhat 'slower' in comparison. A firm budget buy	8-16g Normal, MM	BB	67
<b>Roksan Corus Black</b> £100	Good + Good	Recognisably related to Corus Blue, but distinctly more civilised and smoother.	7-12g Normal, MM	R	91
<b>Roksan Corus Blue</b> £60	Good + Good	Roksan-specified modified Goldring 1012; slight harshness detracts from otherwise good sound.	7-11g Normal, MM		91



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MODEL PRICE	LAB SOUND	COMMENTS	ARM OUTPUT/TYPE	VALUE	ISSUE
<b>Shure M104E</b> £36	Average - Average	Capable in many ways, but giving no substantial improvement over the 92E in our view	5-15g Normal, MM		38
<b>Shure M105E</b> £49	Average Average -	A slightly 'spitty' sound lacking deep bass and dynamic contrast, but can be used in virtually every system where it will perform "unobtrusively"	5-12g Normal, MM		38 Summ
<b>Shure M110HE</b> £60	Average Average	Sound quality was thought eminently presentable, but not exciting; smooth clear high frequencies, but a loss of bass definition	5-10g Normal, MM		38 Summ
<b>Shure M111HE</b> £72	Average Average	Early reviews of this cartridge complained principally of the price - which has since come down	5-10g Normal, MM		38 Summ
<b>Shure M92E</b> £17	Average - Average	Though lacking depth, the overall sound quality was competent, but treble was not its forte	10-15g Normal, MM		43
<b>Shure M99E</b> £29	Average - Average -	Sister to the 92E this is a solid but not particularly exciting cartridge	5-10g Normal, MM		38 Summ
<b>Shure ME75ED</b> £26.50	Average Average -	Rather bright and splashy in the high frequencies but nevertheless a competent model	5-10g Normal, MM		38
<b>Shure ME97HE</b> £49	Average Average +	It won't turn a sow's ear of a turntable into a silk purse, but will at least keep going and produce an acceptable result	8-20g Normal, MM	R	48
<b>Shure ML120HE</b> £95	Average + Average +	Quite decent sound quality and a generally fine balanced performance	6-18g Normal, MM		48
<b>Shure ML140HE</b> £120	Average + Good	Qualitatively the treble of this well-balanced moving magnet model was a match for many moving coil cartridges	6-16g Normal, MM		43
<b>Shure Ultra 500</b> £499	Good Good	There was no doubting the accomplishments of what could well be the finest moving magnet cartridge around	6-14g Normal, MM		48
<b>Shure V15 VMR</b> £215	Good Average +	Initial familiarity gave promising results, but extended familiarity gave the feeling of a lack of energy and a "shut-in" sound	5-12g Normal, MM		38
<b>Shure VST V</b> £158	Very Good Very Good	Quite exceptional assurance with difficult material; very stable and clear sound. One of the best. Dynamic Stabilizer actually works!	4-11g Normal, MM	R	85
<b>Stilton/AT-F3</b> £110	Good + Good +	At a premium of some £40 this modified AT-F3 offers a startlingly refined performance and is strongly recommended	8-18g Low, MC	R	67
<b>van den Hul MC One</b> £699	Good Very Good	This extended all the positive qualities of the '10 but added greater authority and scale - worth it for the extra money	6-12g Low, MC	R	60
<b>van den Hul MC Two</b> £899	Good Very Good	Connected directly to any standard MM input the vdH MC Two rewards with a highly detailed yet fluid and musically convincing portrayal	6-13g Normal, MC	R	72
<b>van den Hul MC1 Super</b> £800	Very Good Very Good	Slight softening effect on transients was the only real flaw, but it didn't quite seem to have that special touch one expects for the money	8-15g Low, MC		84

## AMPLIFIERS

The amplifier sits at the heart of the system, processing the outputs from all the various music sources as necessary and then driving the loudspeakers. These two (quite separate) functions are integrated into a single box at the low-to-middle price points; separated pre- and power amplifiers become increasingly common as one moves upmarket. At the upper end of the specialist market, valve amplifiers provide a popular alternative to the transistor types amongst enthusiasts.

There is a substantial difference between specialist (sound quality oriented) amplifiers and the consumer electronics style models. The

former are bleakly simple, avoiding all unnecessary features to provide the most direct signal path in the interests of best sound quality. The latter range from models with just basic tone controls and tape recorder switching, to those with elaborate facilities such as graphic equalisers, remote control (including volume), surround sound options etc. etc.

Lab measurement provides some useful data, particularly in regard to an amplifier's ability to drive a wide range of different types of loudspeakers, but this is only obliquely related to sound quality. We also include our measured power output (RMS, 8ohm load, 1 channel

driven) - but again, paradoxically, this doesn't necessarily correspond to the loudness capability of the amplifier, which has as much to do with the elegance of the overload characteristics within a given system (valve amplifiers invariably sound more powerful than their rating would suggest). The listing of features provides some indication to the complexity of an amplifier: many users prefer to retain the option of tone controls to 'shape' the overall sound according to taste; many others have found living without tone controls surprisingly easy, with additional benefits in terms of transparency.

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Acoustic Research A03</b> £160	Average + Average	New slimmed down version of the A04 with less power and facilities but also a slightly 'fuzzy' sound	38W, MM disc, CD direct and 3 aux inputs		74
<b>Acoustic Research A07</b> £299	Very Good Average +	Relatively smooth but ineffectual sound quality that lacks some weight and impetus at very low frequencies	75W, 4 line, 2AV and MM/MC inputs		68
<b>Aiwa XA-005</b> £130	Good + Average -	A technically competent amp with big, friendly but not overly engrossing sound quality	61W, MM 5 line inputs, source-direct		80
<b>Aiwa XA-006</b> £130	Good Average	Competent enough performer with plenty of facilities. A gutsy sound though one that's rougher via CD than MM.	67W, MM and 5 line i/p's plus independent rec out.		92
<b>Akai AM-52</b> £230	Average + Average -	Basically equipped, this amplifier offers a comfortable but hardly over-detailed sound	95W, MM/MC disc, 5 line inputs, loudness		74
<b>Akai AM-65B</b> £299	Good Average	On-board 18-Bit DAC's actually give better sound than standard CD inputs! Punchy via MM disc	101W, MM, 6 line, digital inputs		80
<b>Akai AM-93</b> £550	Average Average -	Unfortunately Akai's on-board D/A convertors were less successful than its conventional analogue CD input.	112W, coax and optical dig inputs. MM/MC		68
<b>Amadeus Gold</b> £360	Average - Good	There is some indication of instability but otherwise sounds very rich, warm and musical. High-ish IMD	56W, MM/MC plug-in cards, 3 line inputs	R	74
<b>Amadeus Silver</b> £270	Average - Good	Limited headroom via disc but still offers a sweet, lush sound. Limited current delivery	37W, MM/MC, 3 line inputs	R	80
<b>Aragon 4004</b> £1795	Good Good	Despite its imposing bulk, the Aragon is something of a softy at heart. It can deliver oodles of power but its musical presentation is more laid-back	231W power amp		72
<b>Arcam Alpha II</b> £180	Good Good +	Very confident, convincingly musical and punchy sound that sets the standard for other budget amps	41W, 4 line and MM inputs	BB	68

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## AMPLIFIERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Arcam Delta 110/120</b> £700/£500	Good+ Good	Overall performance is limited by the power amp - in isolation the PDM-preamp offers a remarkably open and detailed sound, particularly in 'digital' mode.	112W power amp, MM/MC + four line inputs + coax/opt digital input.	R/-	92
<b>Arcam Delta 60</b> £280	Good Good +	Very refined and highly detailed sound via MM and CD without any of the hardness noted via the MC stage	59W, 4 line, MM/MC inputs, no tone controls	R	68
<b>Arcam Delta 90.2</b> £400	Average + Average +	Dark but slightly dead or conservative sounding version of the original Delta 90. Improved disc stage	73W, MM/MC, 4 line inputs, tone bypass, bi-wire	R	74
<b>Ariston Amp</b> £219	Average Average +	Slightly veiled and thin sound but proved suitably attractive in the listening tests	32W, full logic control, MM and 4 line inputs	R	68
<b>Audio Innovations Series 1000/2nd Audio Amplifier</b> £1379/2950	Poor Excellent	This valve combination offers awesome dynamic range with superb transparency and power to match. Compatibility with other brands is unpredictable	15W, MM, 6 inputs, monobloks	R	63
<b>Audio Innovations Series 200</b> £429	Poor Very Good	Like most 'Innovations valve power amps, compatibility with other brands is unpredictable. Hardly a powerhouse, but nicely 'open', transparent and dynamic sound in small(ish) systems	12W	R	77
<b>Audio Innovations Series 300</b> £479	Poor Very Good	Something of an anomaly, the 300 is an integrated valve amp that looks awful in the lab but sounds remarkable in a system	10W, MM, 6 inputs	BB	63
<b>Audio Innovations Series 400</b> £625	Poor Very Good	Superior styling and better build quality than the Series 300 make for a very attractive integrated valve amp. Capable of fine results in the right system, but can sound too 'thin' and lacking in welly with ineficient speakers	12W, MM and 4 line inputs	R	77
<b>Audio Note Ongaku</b> £29,950	n/a Excellent	An out and out audiophile product, a single ended, zero negative feedback, triode, line level integrated amp. Probably the best amplifier in the world!	7 line inputs, 27W	R	Coll '90
<b>Audiolab 8000A</b> £350	Very Good Good +	Exceptionally detailed, tactile and transparent via CD but slightly more clouded via disc. A stalwart design	72W, MM/MC, 4 line and full record out selection	R	74
<b>Audiolab 8000C</b> £325	Excellent Good	A well established preamp with a highly controlled sound, though it could do with more life and depth	MM/MC, 5 inputs, hdph, tone controls	R	62
<b>Audiolab 8000P</b> £495	Excellent Good +	A dynamic powerhouse, load tolerant and sonically reliable	100W	R	62
<b>Audion CD-1</b> £399	Average + Very Good	Nicely presented valve (line-only) preamplifier with fine bandwidth and enjoyable, musical sound. Great - if you can justify the cost. Well worth hearing	5 line inputs		77
<b>Aura VA-40</b> £190	Average Average +	Based on ITL's earlier MA80, this amp sounded slightly withdrawn or 'dead' if inoffensive	55W, MM 4 line inputs, MOSFET output		80
<b>Beard 506</b> £1195	Good + Good +	A versatile valve preamp - the bass sounded lively if a touch softened, while the treble was detailed but lacked a little sparkle and air.	4 inputs MM/MC		50
<b>Beard Audio CA35/P35mkII</b> £695/£895	Average + Very Good	Good build quality and a very smart finish combine with a characteristic valve sound to make a first class amplifier capable of giving hours of musical enjoyment	35W, MM/MC, 4 inputs	R	63
<b>Beard M70</b> £1995 pair	Good Good +	A substantial British monoblok power amplifier, but not a great deal more impressive than the P35 at half the price	70W		50
<b>Bryston 0.5B/2B</b> £695/£695	Very Good Good	Very rugged Canadian pre/power combo that sounds cool, confident and punchy. Headamp available to suit MC cartridges	65W, MM and 4 line sources, overload LEDs on power amp	R	74
<b>Bryston 12B/4B</b> £1295/£1395	Good + Good	Bryston's massive 4B power amp stood out as the backbone of this combo, the preamp sounding a trifle unbalanced between MM and MC inputs	272W, bridgeable to 800W, 6 line, 2 disc inputs, subsonic filter		68
<b>Cambridge P50</b> £200	Good Average +	A pleasant enough sound with full bass yet with a slightly mechanical quality that reduced its sense of 'naturalness'	56W, 4 line inputs + MM/MC + tone		85
<b>Cello Audio Suite</b> £1200	Excellent Excellent	Cello's preamp represents a whole new ball game in flexibility and sound quality (or war of attrition on your wallet)	Optional inputs MC etc	R	50
<b>Chord SPM-900</b> £1725	Average + Good +	Technically very interesting, this mini-powerhouse uses a switched-mode supply to deliver a crisp and refined sound	236W with protection into lower loads	R	85
<b>Concordant Excelsior</b> £856	Very Good Excellent	Cottage industry styling might not inspire confidence, but sonically this preamp is tremendously vivid and detailed. Real high-end performance. We loved it!	MM plus 3 line inputs. External power supply	R	77
<b>Conrad Johnson Motif MC-8</b> £1995	Very Good Very Good	A cheaper alternative to the '7, this preamp is an undoubted success in maintaining the Motif sound but does not compare on sound quality	MM/MC	R	50
<b>Conrad Johnson MV50</b> £1995	Good + Good +	Coupled with the PV5, this CJ power amp performed well on audition	50W		Coll. '87
<b>Conrad-Johnson Premier Seven</b> £8995	n/a Excellent	Price has increased since we tested it - but at this price who cares? The 'Seven is designed without compromise, and it's clearly one of the finest (valve) preamplifiers money can buy. Absolutely gorgeous!	MM, 4 line inputs, sep. Rec Out, versatile cartridge matching	R	72
<b>Conrad-Johnson PV10</b> £1395	Excellent Excellent	Pricey, yes, but a fabulous preamplifier which confirms C-J's high reputation in the States. Beautiful imaging, superb detail, plenty of gain on the phono stage - classy build quality too.	MM plus 4 line inputs	R	78
<b>Creek CAS 4140S2</b> £220	Average Good	Disc headroom still poor but the open and detailed, if slightly bright, sound wins through	40W, MM/MC, 3 line inputs, mono and mute	R	80
<b>Croft Series IV(S)</b> £850	Good Good	The original IV is still available now supplemented by the higher price and power (S); both are fine performers	40(60)W channel	R	57
<b>Croft Series IVSA</b> £1000	Good Very Good	Featuring tuned components chosen for their sound quality, the 'A' variant is an impressive example of Croft's technique in valve design	60W special supply regulation	R	57
<b>Croft Super Micro A</b> £549	Average + Very Good	The looks are somewhat improved, while this 'hot rod' version with tuned components performed very well indeed. There is still no gain on the line inputs	4 inputs, MM, straight line	R	57
<b>Cyclone Catalyst</b> £1995	Good + Very Good	Exceptionally load tolerant and very refined in delivery. Extra options available in future	74W, external MM or MC stages, 3 line inputs	R	80
<b>Deltac DPA 100S</b> £2200	Very Good Very Good	A top-quality transistor power amp, sounding fast, articulate and well controlled, though maybe a touch clinical for some tastes	80W	R	50
<b>Deltac DSP-50S DPA-50S</b> £725/£925	Excellent Excellent	Remarkable pre/power combo based around the highly linear DH-OA32 hybrid op-amp. Unmatched detail resolution, control and transparency	63W, external feedback wiring, 3 line, MM/MC no tone controls	R	68
<b>Denon DAP-2500/POA-4400A</b> £549/£599 pr.	Very Good Good	Denon's fully-fledged preamp also incorporates D/A convertors 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
<b>Denon PMA-250II</b> £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
<b>Denon PMA-350</b> £160	Average+ Good	Bold claims were made at its launch but the sweet and inoffensive sound, though very pleasant, is not mould-breaking at the price.	88W, 5 line and MM disc inputs + source direct.	R	92
<b>Denon POA-6600</b> £1000 pr.	Excellent Very Good	Delivers abundant high quality sound, solid engineering expertise and content clearly compensating for any compromising of purist audiophile principles	250W monoblok, remote power	R	60
<b>DNM 3A</b> From £1000	Good + Very Good	The DNM3 in its acrylic case is a remarkably revealing and neutral state of the art preamp	5 inputs MM/MC twin vol controls	R	44



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## AMPLIFIERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Dual CV5600</b> £150	Good+ Very Good	Made by Rotel and possessing the highly articulate vocal/string quality of their best budget amps. Very communicative, especially with a good CD player.	57W, 3 line, 2 tape and one MM input. CD direct	BB	92
<b>E.A.R. 549</b> £3628 pr	Very Good Very Good	A valve monoblok that measures like a solid state amp is itself an achievement, but exceptional power delivery and bass 'slam' is not fully matched by delicacy and transparency elsewhere	200W monoblok, bias setting		60
<b>E.A.R. 802/509mkII</b> £1098/£1868	Average Very Good	Extremely well made and combining the sonic strengths of both transistors and valves this EAR combo warrants attention	100W, MM, 6 inputs, monobloks	R	63
<b>Entire Sound EX50</b> £500	Average- Average+	A new and fairly costly 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
<b>Exposure VI/VII*/VIII</b> £320/£500	Good Very Good	An established company like Exposure could do more to improve the 'look' of these amps which, nevertheless, sounded confident, dry and musical. Dual version no longer available	63W, Super mod. 4 line and 2 disc inputs with full rec-out switching	R	68
<b>Exposure VII/VIII</b> £430/£470	Very Good Good	Supplied as a combination without the separate preamp power supply, this pre power combination performed satisfactorily especially on the moving coil input	50W, MM/MC, 3 inputs, straight line		62
<b>Exposure XI/XII/VIII Super</b> £1600	Good Very Good	New preamp and improved power amp led to a smooth and refined sound, MM/MC less transparent than CD	61W, MM/MC, 5 line inputs	R	80
<b>Grant G60AMS</b> £948 pr.	Good Very Good	This neat and compact 60W valve monoblok gave good sound on the 8ohm tap, better still on 4ohms. The midrange was particularly natural	60W monobloks 8ohms	R	57
<b>Hafner DH120 assembled</b> £360	Very Good Average	Sound quality results were decent enough, but this power amp won't set the world on fire at this price.	60W		44
<b>Hafner DH120 kit form</b> £295	n/a Average	Er, we didn't build one; see assembled version below	60W		44
<b>Hafner XL-600</b> £1145	Very Good Very Good	Sounds remarkably open, transparent and inherently 'musical'. XL-600 is tremendously powerful and very compatible	426W in stereo mode, 1.5kW in bridge	R	74
<b>Harman Kardon Citation 25/22</b> £649/£899	Good Average +	Not as outrageous as previous Citation amplifiers but neither as punchy nor exciting in the sonic stakes. A good all-rounder but lacks sparkle	138W, MM/MC full range of input and record out		74
<b>Harman Kardon HK6100</b> £159	Good Good	Re-packaged version of the popular PM635. Still offers very up-beat and exciting sound	47W, MM, 5 line inputs, tone controls	R	80
<b>Harman Kardon HK6800</b> £600	Good + Good	Smoother and more evenly paced than previous H/K superamps, this model sounded both confident and nimble. A fine result	115W, 4 line + 2 tape i/p's + MM/MC	R	85
<b>Heybrook C3/P3</b> £400/£500	Average + Average -	There's a chance our power amp was a dud for the combo sounded very disappointing on the whole - glassy and uncouth	138W with plenty of current. Passive line inputs		85
<b>Jadis JP30/JA30</b> £4145/£4200	Average Excellent	Two-box preamp plus monoblok power amps, classic valve design gives stereotype valve sound. Beautiful build, nostalgic styling and delightful sounding midrange transcend limitations at frequency extremes, in lab, and re cartridge matching	30W 2-box pre-, monoblok power, MM-only, 4 line inputs	R	60
<b>Jeff Rowland Coherence</b> One/Model 7 £3950/£9900	Very Good Very Good	The technical design of these amps is very elaborate but ensures they achieve an extraordinarily transparent and potent sound. However, the CD i/p is clearly superior to the disc inputs	448W monoblok MM/MC with variable loading options. Balanced topology	R	72
<b>Kelvin Digital Integrated</b> £550	Good + Very Good	Not so Class A as before but now fitted with a PDM DAC which offers a smooth, detailed and naturally 'musical' sound	34W, digital, line and MM i/p's only	R	85
<b>Kelvin Integrated</b> £449	Good Good	Recent mods have reversed the Integrated's previous good fortune, this unit was just too syrupy	21W with 10-12W in Class A. Four line + MM/MC.		92
<b>Kelvin Labs Absolute Zero/M30</b> £395 + £295/£595pr.	Good + Average +	Latest versions of the M30 offers a true 30W Class A and a slightly muddled but very comfortable sound. MC preamp is a very linear design	33W monoblok MC only + 4 line inputs. Separate L/R balance	R	74
<b>Kenwood KA-4010</b> £170	Good Average +	A flexible design at moderate cost. Smooth and cultured sound if slightly lean in balance	81W, MM/MC, 4 line inputs, source- direct	R	80
<b>Kenwood KA-5020</b> £210	Very Good Good+	Something of a powerhouse on the cheap this amp can keep pace with the most challenging of dynamics. Its sound is vibrant but some fine detail is lost	115W, 3 line, 3 tape and MM/MC. Source direct.	R	92
<b>Kenwood KA-550D</b> £130	Very Good Average	Having dropped its moving coil input, this latest version has British style dynamics and rhythm but is not first grade yet	35W, MM, 4 inputs, hdph, tone controls	R	62
<b>Kenwood KA-7010</b> £300	Average + Average +	More powerful version of the 5010 but less successful in the listening tests. RF IMD is the likely cause.	123W, as above plus -20dB mute facility		74
<b>Klyne SK5a</b> £2590	Very Good Very Good	Beautifully made and presented, this American thoroughbred has a good lab performance, but although versatile, is rather expensive for the quality of sound offered	Balanced output, versatile cartridge loading		72
<b>Lectron JH50</b> £2300	Average Very Good	Sexily presented valve power amplifier from France. Lovely valve sound too, with delicate and airy top end. Not especially powerful and rather expensive - but very desirable!	50W		78
<b>Linn LK1/LK280 Pre/Power</b> £545/£695	Good Good -	A very modern, logic-controlled amp with distinctive and inoffensive sound quality. Its restrained sound could do with extra insight and zip.	84W, compact amp CMOS sw. for 2 tape, 2 line and MM/MC. xlr sockets.		68
<b>Linx Nebula</b> £500	Average + Average +	Ambitious both in style and design this amp was less impressive in the sonic arena — positive but two-dimensional	88W, logic-controlled i/p switching		85
<b>Magnum MP150/MF150</b> £320/£320	Average + Good	This is no technical masterpiece but the strain-free, fluid sound augers well for CD-based systems. Excellent value	89W, 3 line + MM/MC i/p's. No tone cont.	R	85
<b>Marantz PM-30SE</b> £180	Very Good Good+	The breathed-on version of Marantz' PM-30 offers an engagingly detailed and spacious sound though one that's warmer via MM disc than CD.	50W, 3 line, 2 tape and MM disc. Source direct	R	92
<b>Marantz PM-50</b> £250	Good + Average +	One of Marantz's new breed, the PM-50 has a big and beefy sound yet one that lacks refinement	92W, MM/MC, 4 line inputs, source- direct		80
<b>Marantz PM-75</b> £500	Good Average	More successful than most amps with on-board DACs but still not as balanced as other Marantz products	136W, opt/coax dig inputs, 6 line + MM/MC		68
<b>Marantz PM-80</b> £400	Very Good Good +	Technically robust with an equally beefy and tactile sound. Great sense of power and control but spatially a little flat	133W, 3 tape, 4 line + MM/MC. Class A option	R	85
<b>Marantz PM-95</b> £2000	Very Good Average +	Beautifully constructed, this amp was less convincing via its digital input than via line. Class A option best suited to sensitive speakers. Costly	151W with 30W available in Class A. Opt + coax inputs		74
<b>Meridian 201/205</b> £599/£425 each	Very Good Good +	A fine preamp with additional luxury option of full system remote, plus competent and attractive monoblok power amplifiers with generally good performance	100W MM/MC 6 line inputs remoteR/-capable straight line		62
<b>Mission Cyrus One II</b> £200	Very Good Very Good	Crisp, meaty and exquisitely detailed, this latest Cyrus amp had us enthralled via CD. MM/MC enjoyed a lesser clarity	34W, 4 line + MM/MC i/p's with dual-conc vol.	R	85
<b>Mission Cyrus PSX</b> £230	Very Good Very Good	The PSX does make the Cyrus Two sound better; and also improves the PCM II CD player giving more wallop and clarity	Auxiliary power supply	R	62
<b>Mission Cyrus Two II</b> £330	Very Good Very Good	Recently updated this popular favourite captured our attention, once again, with its robust and very convincing sound.	60W, 4 line and both MM/MC disc. R No tone controls	R	92
<b>Musical Fidelity A1</b> £269	Average + Average +	Just scraping a recommendation, this current A1 sounded lush but sleepy — lacking the bite and sparkle of old	26W with 9W of Class A. 4 line + MM/MC inputs	R	85



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# The Directory

AMPLIFIERS					
MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Musical Fidelity A100</b> £459	Good + Very Good	This is another one recommended for fine sound with which you could keep your Chinese carry-outs warm	50W MM/mc 5 inputs straight line	R	62
<b>Musical Fidelity B1</b> £200	Average + Good +	The subject of much controversy, this 50W wonder offers a very deep, solid and powerful sound	50W, MM/MC, 5 line inputs, tape monitor	R	80
<b>Musical Fidelity B200*</b> £349	Very Good Good +	Running cooler than other MFs, the B200 delivered fine musical and dynamic sounds with plenty of power	80W MM/mc 4 line inputs straight line	BB	62
<b>Musical Fidelity MA-50</b> £875 pair	Good Excellent	An audiophile bargain. One of the best sounding power amplifiers made	50W, monoblok	R	62
<b>Musical Fidelity MVX/A370</b> £2399/£2399	n/a Excellent	In its latest guise, the A370 confirms its status alongside the MVX as amongst the best indigenous components for both sound and presentation	MVX - MM/MC/4 line/phase invert. R A370 - 150W	R	72
<b>Musical Fidelity P270</b> £1399	Very Good Very Good	If the hot-box aspect is not a deterrent, this is something of a bargain. A big amplifier scale of sound which is just a little rough-edged	135W	R	50
<b>NAD 3020i</b> £140	Very Good Good +	The most balanced and communicative of NAD's 3020 series. Great at revealing subtle musical clues without aggression	31W with tone controls, 3 line + MM inputs	BB	85
<b>NAD 3225PE</b> £160	Average + Average +	Light and detailed if not as rich or weighty sounding as others. MM input sounds warmer than CD	42W + 70W dyn. headroom; soft-clipping, MM only	R	68
<b>Naim NAIT 2*</b> £339	Average + Average	Well built with good load tolerance, the NAIT delivered a fully competitive sound in spite of its modest measured power output. Recent modifications as yet unchecked	15W pc MM 3 inputs	R	50
<b>Naim Separates</b> £560 - c£8000	Very Good Good	A consistent and coherent series of 'building blocks' for conventional passive or active operation. Sound quality ignores conventional audiophile standards of presentation, but achieves fine musical communication	40-70W, MM/MC etc	R	60
<b>Nikko Beta 400/Alpha 800</b> £225/£800	Very Good Good	Big, bold and gutsy, these are indestructible amps with a sound quality to satisfy all but the most demanding users	358W(!) with every feature necessary	R	85
<b>NVA P70MC/A60</b> £830	Average Average +	NVA's speaker cables are a must, the amp offering well-integrated but not particularly crisp sound	68W, MC, 3 passive line inputs		80
<b>Oakley S</b> £499	Good Very Good	Much improved version of the original Image preamp from Yugoslavia. This one won't disgrace itself even in top-notch systems. Image Six model ( £150 more) is really fabulous	MM plus 3 line inputs	R	78
<b>Onkyo A-8000</b> £140	Good + Good +	A rare combination of style, features and very acceptable sound quality. Free of compression and 'grain' - undemanding	64W, 5 line + MM disc i/p's + full tone cont.	R	85
<b>Orell SA-040</b> £359	Good Good +	This promising newcomer from a brand new company sounded pretty good and should improve as production settles	45W MM/MC, 4 line inputs, straight line	R	56
<b>Orell SA-040SE</b> £400	Average Average +	Very natural, relaxing if not overly exciting via CD, the sound closed-in to become 'pinched' or fettered via disc	64W, 5 line + MM/MC i/p's. Tweaky components.		71
<b>Philips DFA-888</b> £300	Good Average	As above but including a modified disc input and onboard DAC. Sounds tight but also slightly thin	107W, as above + opt and coax digital inputs		74
<b>Philips FA-880</b> £200	Good Average	A new and cheaper design from Philips that sounds best via MM disc. Can appear soft and unbalanced via CD	108W, MM/MC source-direct tone		74
<b>Philips FA960 MkII</b> £300	Good + Average	The MkII '960 still failed to grasp our listeners' attention, but it remains a competent amp nonetheless	122W, 6 line & 2 disc inputs + tone controls		68
<b>Pink Triangle PIP</b> £2670	Excellent Excellent	This state-of-the-art preamp is one of the few truly high end products to come out of this country this year. It will most certainly worry the competition	MM/MC, 4 inputs, battery supply	R	62
<b>Pioneer A-300</b> £180	Very Good Good	The cheapest of Pioneer's dynamic duo gives off its best with CD rather than MM disc which failed to shine quite so brightly.	55W, 3 line, 2 tape and MM. Independent rec out facility.	R	92
<b>Proton 520</b> £115	Average Average	Very well equipped budget amp with a slightly flat and undynamic sound - acceptable at the price though	31W, MM/MC with variable MC gain, 4 line inputs	R	74
<b>Proton AP-1000/AA-1150</b> £250/£395	Good + Average +	Bags of headroom available from this pre/power combo, but can seem bloated or unrefined via MM	67W, MM/MC, adjustable MC gain, 5 line inputs		80
<b>QED A240 CD II</b> £199	Good + Good	Latest 240CD is fine value for CD and has competent MM disc input as well	45W MM 5 line inputs straight line	BB	62
<b>QED A240 SA II</b> £259	Very Good Good +	Redesigned 240SA has significant improvements over its predecessor, and provides a good moving-coil disc input in a competitive price	45W MM/MC 5 line inputs straight line	BB	62
<b>QED A270</b> £299	Good - Good +	Building on the strengths of the '240, the '270 sounds weighty, fast and dynamic. A bit 'lumpy' via MC	51W, 5 line and 2 disc inputs, pre-out	R	68
<b>QED C300/P300</b> £300/£300	Good Good	A cost-effective combo, limited in its resolution but no less beguiling as a result. Disc stage is sweeter but samey	58W, 2 tape, 3 line, MM/MC + mono/biamp opt.	R	85
<b>Quad 34</b> £299	Very Good Average	This well-built durable preamp has useful filtering and above average tone controls but was found lacking in sound quality (viz: detail/dynamics)	4 inputs MM/MC tone controls		44
<b>Quad 405</b> £389	Very Good Average	Not an impressive power amp but easy on the ear if not pushed and very reliable	100W		44
<b>Ray Lumley Model 75</b> £1995 pr	Average Good +	Monstrous valve monobloks which represent good value. What they lack in musical subtlety they make up for in sheer muscle. And these are Lumley's small monobloks!	75W monoblok		78
<b>Revox B150</b> £1047	Very Good Average +	Beautifully constructed but hampered by Revox's convoluted logic control. Open and smooth sound. Still costly.	117W, CMOS sw. for 3 line, 2 tape and MM		68
<b>Revox B250</b> £1467	Very Good Good	With much improved sound over its predecessors plus amazing remote control facilities, this could form the heart of a round-the-dream-house system	150W MM/MC system/house remote tone controls		56
<b>Rose RV-23</b> £395	Good Very Good	Beautifully built classy British 'hybrid' preamplifier. You can spend more to get a more transparent sound - but it's hard to criticise the Rose given the competitive price	MM plus 3 line inputs	R	77
<b>Rotel RA-810A</b> £120	Very Good Average	As a cut price RA820All this is a very successful little amp that loses little in sound quality to its predecessor. Excellent value	20W, MM, 5 inputs, hdph, tone controls	BB	62
<b>Rotel RA-820AX</b> £150	Very Good Very Good	The spacious, detailed and very musical performance of this budget amp is almost too good!	47W, MM, 4 line inputs	BB	80
<b>Rotel RA-820BX4</b> £190	Good + Good +	Very authoritative but creamy-smooth and delightfully musical. Spatially convincing too, yet not as open as RA-820AX	39W, 4 line + MM/MC, dual-conc. R volume.	R	85
<b>Rotel RA-840BX4</b> £250	Good Good +	Very sedate and controlled in presentation but check phasing for optimum stereo effect	63W, MM/MC, 4 line inputs, tone controls		80
<b>Rotel RA-870BX</b> £300	Very Good Good +	A powerful blockbuster with solid and well focused sound, good versatility and fine load tolerance	85W MM/mc 7 line inputs tone controls	R	56
<b>Rotel RC/RB-850</b> £160/£140	Very Good Good +	Quality separate pre and power amplifiers at near budget integrated amplifier prices. A notable achievement	60W MM/mc 4 line inputs tone controls	BB	62
<b>Rotel RC/RB-870BX</b> £219/£230	Excellent Good +	Reduced price makes the 870 combo better value but, despite mods to the preamp, it is the power amp that must take the lion's share of credit	128W or 208W bridged CD direct, R 4 line, 2 tape and MM/MC	R	68
<b>SAE P102/A202</b> £499/£599	Average + Average +	Microprocessor-controlled pre and power amp that sounds much better at low rather than high volume levels. Pro-oriented aesthetics	151W, MM/MC + CD tuner and 2 tape tone memory, spk switching		74

# The Directory

## AMPLIFIERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Sansui AU-X111</b> £99	Good Average	Sansui has engineered an amp that's both solid and flexible for the price, but its sound is rather bland compared to competition in the £110 sector	5 line inputs, MM, 52W		92
<b>Sansui AU-X911DG</b> £480	Very Good Good +	At its best when used with the on-board MASH/PWM DAC where it sounds technically neutral but still emotionally charged	112W, 4 dig, 3 line and MM/MC i/p's. Rec-out	R	85
<b>Sony TA-F410R</b> £170	Average + Average +	Over-zealous protection circuitry limits continuous power but sound is still agreeably focused despite being tonally lean	84W, 2 tape, 3 line + MM i/p's. Tone + Rec-out		85
<b>Sony TA-F630ESD</b> £350	Good Average	Based on the '530 but equipped with PDM D/A converter. Amp is competent but DAC sounds truly magnificent!	130W, as above + opt. and coax digital inputs	R	74
<b>Sony TA-F730ES</b> £450	Very Good Good	A very stable and coherent amp but one that lacks a crucial sense of involvement	133W, MM/MC, 3 tape, 2 line, full rec-out		80
<b>Sumo Athena/Polaris</b> £695/£695	Very Good Very Good	Very good value US pre/power combo with transparent, detailed and gutsy sound via all inputs	128W, MM/mc, 2 tape and 3 line inputs	R	80
<b>Teac A-X400</b> £115	Average Average	Sibilance and a lack of crisp vitality hamper the performance of this amp, as does the stringent protection circuitry	59W, 4 line + MM + tone + mic i/p level control		85
<b>Technics SE-M100</b> £550	Very Good Good +	An unusual disc-less poweramp with volume control. Standard line input sounds very open and clean. Digital input is harsher and less convincing	123W, coax and opt digital inputs, var and direct CD no disc	R	74
<b>Technics SU-810</b> £130	Average + Average	Our sample started off sounding fast, taut and well-integrated yet eventually failed on the MM disc input	66W, 2 tape + 3 line + MM. Tone + loudness		85
<b>Technics SU-V660</b> £250	Good Average	Chunky build but integrated output stage infers a weak, insubstantial and rather monophonic sound	107W, MM/MC, cd aux, tape + tuner + power amp-direct		74
<b>Technics SU-V900</b> £500	Very Good Good+	Massively built but with a light, fresh and essentially very neutral sound. Bulk notwithstanding it's not particularly suited to life with a difficult speaker.	125W, 5 line and both MM/MC inputs. Tone controls + power amp.		92
<b>Threshold FET Ten/SA-4/Stasis</b> £2500/£3200/£5900	n/a Very Good	Almost valve-like limpidity and excellent soundstaging are star qualities of the Threshold amps. Line input resistive loading is too low	Component FET pho stage, line pre, FET power amp 100w		Coll. '90
<b>Yamaha AX-330e</b> £130	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
<b>YBA 1 power amp</b> £2995	Good Excellent	This equally well finished power amp offers front rank stereo staging and transparency, and is capable of driving the most difficult loads	85W	R	62
<b>YBA 1 preamp</b> £2895	Very Good Excellent	A front line French audiophile product. Great stereo and a fine Krell style finish	MM/MC, 3 inputs, straight line	R	62
<b>YBA 2 pre &amp; pwr</b> £1395/£1695	Very Good Very Good	Superbly finished French separates, with very good space and transparency, slightly softened bass. Needs extra transformer (£300) for MC cartridges	70W MM (MC extra) straight line	R	56
<b>YBA Model 3</b> £995/£995	Good Good	Suited to highish sens. loudspeakers this duo produced see-through, ethereal stereo images that were more convincing towards the centre of the soundstage than at the edges	56W stereo amp MM only with 3 line i/ p's.		72

## LOUDSPEAKERS

Last item in the hi-fi chain, to some extent the loudspeaker is merely the slave of what has gone before, capable only of reproducing a signal as good as it is fed. Nevertheless the distortions (colorations and stereo effects) introduced by loudspeakers (and rooms) tend to be more immediately obvious than those anywhere else in the chain, so careful choosing according to taste is very important.

The average loudspeaker consists of a smallish enclosure, much of which may have begun life as part of a tree, plus a couple of drive

units hidden behind a removable grille. Inside the box lurks a simple electrical circuit known as a crossover, which divides the incoming (full range) signal into the right bits for the drivers to handle. Variations on the above formula are specifically identified in the entries. The designer's primary task is to balance the sensitivity of the loudspeaker (how loud it goes for a given electrical input) against the bass extension (how low does it go) for the given box size. After that such subtleties as coloration and dispersion come into the equation.

Careful placement of the loudspeakers within the room is as important as the initial choice of model.

For good stereo they need to be more or less the same distance from nearby walls, and preferably on rigid stands. The listener should be about the same distance from and listening angle to each loudspeaker. The ideal placement depends on the way a particular model has been balanced (not to mention a number of other factors), and our recommendation is given in the entries.

MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY	VALUE	ISSUE
<b>Acoustic Energy AE1</b> £696	Good Very Good	To the author's knowledge, the most awesomely dynamic and articulate miniature ever made	29.5 x 18 x 25cm semi-open space	88dB/w 60Hz	R	59
<b>Acoustic Energy AE2</b> £1138	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 in space	88.5dB/w 45Hz	R	66
<b>Acoustic Energy AE3</b> £1650	Very Good Very Good	Solid, authoritative and impressively accurate - if a shade ponderous and slow - AE's latest 'big one' is a much better bet than the earlier '4, combining traditional monitoring virtues with the latest metal diaphragm technology	63 x 26.5 x 37cm low stands in free space	85dB/w 23Hz (in room)	R	86
<b>Acoustic Energy AE4</b> £1800 (stands £552)	Good Good	Magnificent but also seriously flawed, the AE4 possesses tremendous dynamic realism but a very mid-dominant balance. Large rooms and wallets only need apply	54 x 32.5 x 44cm own stands in free space	90dB/w 40Hz		71
<b>Acoustic Research AR112</b> £125	Average Average -	Nicely presented and engineered, but sounds a bit small and boxy without true coherence	36 x 19 x 18.5cm stands near rear wall	87dB/w 75Hz		66
<b>Acoustic Research AR122</b> £150	Average Average	Despite a promising enough list of ingredients, the 122 failed to excite real enthusiasm amongst the listening panel	38.5 x 19 x 22cm stands near rear wall	87dB/w 68Hz		68
<b>Acoustic Research AR132</b> £200	Average + Average -	Good presentation and detail engineering was not sufficient to counter bass heavy balance problems on auditioning	44.5 x 23 x 25.5cm stands 1ft from wall	87dB/w 50Hz		66
<b>Acoustic Research Red Box</b> £100	Average Average	Lively and balanced if a bit crude and uneven, this econobox succeeds partly because of its simplicity, and works well with some rear wall assistance	32 x 19.5 x 17cm close to rear wall	87dB/w 85Hz	R	74
<b>Alexander SE11</b> £299 (stands £69)	Good Good	Clearly better than its cheaper stablemates, the metal jacket delivers a different - and in some respects superior - sound than the wood-based competition	52 x 14 x 17.5cm stands close to wall	86dB/w 25Hz (in room)	R	82
<b>Alexander SE5</b> £199	Average Average	Particularly well suited to surround sound A/V applications, the SE5 can give any miniature a run for its money on bass performance; hardness and coloration mar good detail and clarity, and price is a little high	40.5 x 12 x 15cm ALS stands near wall	82dB/w 50Hz (in room)		78
<b>Allison AL105</b> £150	Average Average -	Pretty enough in appearance, sonically the AL105 doesn't really make the grade at the £150 asking price	37 x 24 x 21cm high stands against wall	87dB/w 45Hz (in room)		78
<b>Allison CD6</b> £290	Average Good -	An unusual cube-shaped model designed for wall mounting gives exceptional bass extension from a small box, though it's also a bit heavy, coloured and slow	28.5 x 28.5 x 28.5cm stands against wall	88dB/w 45Hz	R	71



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MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY	VALUE	ISSUE
<b>Alphason Amphion</b> £680	Good Good	This fine-sounding, nicely finished compact wall-mount is just a little too expensive for formal Recommendation, but is a good performer for all that	44 x 23 x 27.5cm high stands against wall	88dB/w 47Hz (in room)		78
<b>Alphason Orpheus</b> £1000	Good Good +	Large hi-tech two-way features unusual, sweet-sounding isodynamic tweeter; well engineered and balanced if a shade odd in appearance	65.5 x 28 x 34cm stands near rear wall	87dB/w 43Hz	R	71
<b>Apogee Caliper Signature</b> £3350	Good + Very Good	Pretty but power hungry full range panels have remarkable transparency and delicacy, though loudness and bass 'grunt' are both a bit lacking	122 x 59-70 x 6.5-28cm floor, free space	81dB/w 30Hz (in room)	R	81
<b>Arcam Alpha</b> £199	Good Good	It has its own colorations to be sure, but delivers a fine room balance with unusually good dynamics, timing and 'life', and is fine material value	46 x 26.5 x 26cm stands close to wall	89dB/w 30Hz (in room)	BB	82
<b>Arcam One</b> £380	Good Average	Provides a solid, weighty and rich sound, but is a little raw in the treble and indefinite in the midband	22.3 x 28.1 x 37.8cm open space, on stands	88.5dB/w 60Hz		59
<b>Ariston Image</b> £180	Average - Average -	Despite a sweet treble character, the Image fails to impress with a 'lumpy' over-rich balance that has room integration problems	42 x 22 x 27.5cm stands in free space	89dB/w 28Hz (in room)		82
<b>Ariston Q</b> £395	Average + Average	The prettily shaped Q delivers a good impression of scale from a small box, but a rather laid back, ponderous and over-rich overall sound	35 x 16.5-25 x 20-27cm high stands in free space	85dB/w 30Hz (in room)		86
<b>ATC SCM20</b> £1320	Very Good Good +	Massively built to no-compromise Pro monitoring standards, the SCM20 is invariably informative but the rather forward presentation can be uncomfortable	44 x 24 x 31cm stands close to rear wall	82dB/w 28Hz (in room)		86
<b>Audio Electronics TC10 II</b> £599	Good - Good +	Oddball appearance is rescued by a respectable technical performance, interesting and impressive engineering and fine sound quality	70 x 33.5 x 33.5cm low stands in free space	87.5dB/w 40Hz	R	68
<b>Audioplan Kontrapunkt</b> £799	Good Good +	Cute little German miniature sounds as sweet as it looks, dressed expensively in real wood with matching stands. Not for bass or loudness freaks	31 x 24 x 13cm free space, matching stands	83dB/w 48Hz (in room)	R	86
<b>B&amp;W CM1</b> £400	Good Average	Cleverly thought out luxury design package is also fundamentally well engineered, if a shade pricey on 'sound for pound' basis	24.5 x 16 x 22cm close to rear wall	84dB/w 90Hz		74
<b>B&amp;W DM550</b> £149	Good + Average -	Beautifully presented, well engineered near-miniature with precise sound but a distinct lack of 'wellie'. Ideal for considerate flat dwellers	35 x 20.5 x 22.5cm stands in free space	86dB/w 70Hz		71
<b>B&amp;W DM560</b> £199	Average + Average -	Fine cosmetic presentation and good engineering for the price; overload protection may be handy but listening panel was underwhelmed	49 x 23.5 x 30cm stands in free space	88dB/w 55Hz		66
<b>B&amp;W Matrix 801</b> £3295	Good + Good +	Lacks the transparency of the best panels, and the drama of the best dynamics, but is something of an acoustic tour de force, with low coloration and fine imaging	77/99 x 56 x 43cm floor or stands, free space	86dB/w below 20Hz (in room)	R	81
<b>B&amp;W Vision DS1</b> £120	Average Average -	Although significantly hampered by upper bass cabinet coloration, the DS1 cleverly combines high sensitivity with a rich and generous soundstage	36 x 21 x 19cm stands quite close to wall	91dB/w 40Hz (in room)	R	82
<b>B&amp;W Vision DS2</b> £180	Average Average -	Although the box is generous for the price, the DS2 is a rather uneven performer, both on the measurement and listening. Careful stand selection and placement is needed to control the enthusiastic mid bass	50 x 24 x 25cm stands in free space	89dB/w 43Hz (in room)		86
<b>Bose 305</b> £350	Average Good -	A bit of an oddball, fine dynamic liveliness and a good room match more than make up for the strange stereo imaging and treble	28 x 45 x 23cm high stands near wall	88dB/w 40Hz (in room)	R	78
<b>Bose 901 MK6</b> £1600	Good Average	Still controversial after all these years, the pre-equalised multi-driver 901 is cleverly engineered to deliver exceptional loudness with a modest amplifier, but mid bass tends to dominate the sound and transparency is notably lacking	33 x 54 x 32cm rigid stands in free space	(92dB/w midband) 28Hz (in ro		86
<b>Bose Interaudio 3000XL</b> £150	Average Average -	Lots of perceived value and well enough balanced, but low cost cabinet and driver engineering results in a crude and unsubtle sound	46.5 x 29 x 23cm stands in free space	89dB/w 45Hz		71
<b>Boston A120</b> £349	Average + Good +	Ugly but cleverly engineered, the 120 combines a tiny main driver with much larger ABR to give a generous, bighearted and lively sound despite little genuine bass extension and a few rough edges	62.5 x 31.5 x 25cm stands in free space	89dB/w 48Hz	R	86
<b>Boston A4011</b> £120	Average Average -	Competent performance for size and price but below average relative to the UK competition	34 X 21 x 20cm on stands near wall	88.5dB/w 63Hz		41
<b>Boston Acoustics T830</b> £399	Good Good	A lot of speaker for the money, the T830 is a smooth and accomplished performer with a big and easy - or alternatively a lazy and laid back - sound	82.5 x 25.5 x 24cm floor, away from walls	87dB/w 30Hz (in room)	R	82
<b>Castle Clyde</b> £159	Average + Average	A tidy little performer packing punch, but beginning to show its age in the light of new competition	37 x 21.5 x 22cm open space on stands	89.5dB/w 64Hz	R	46
<b>Castle Durham</b> £209	Average + Average	Listening results were encouraging, well engineered and finished, but lean on treble and a bit weak on bass; still recommended	41 x 21.5 x 25cm near rear wall	89dB/w	R	46
<b>Castle Pembroke</b> £229	Good Average +	Comfortably recommended, a sweet smooth sound with good overall balance of engineering-based performance	55 x 37.5 x 30.5cm open space on stands	88dB/w 46Hz	R	31
<b>Castle Warwick</b> £179	Good Average -	Excellent presentation and fine engineering with overload protection, but a sonic disappointment in bass and dynamic qualities	46.5 x 25 x 23cm stands 1ft from rear wall	88dB/w 50Hz		66
<b>Castle Winchester</b> £1250	Very Good Very Good	This unconventional and beautifully crafted model is physically large for its bass extension but is engagingly agile and sounds attractively open and airy	114 x 24 x 47cm in free space	87dB/w 25Hz	R	90
<b>Celef CF2 Nimbus</b> £230	Good - Good -	Nicely balanced overall but a little uneven with it, this lively and dynamic largebookshelf model came close recommendation	46 x 25.5 x 24cm stands in free space	88dB/w 55Hz		71
<b>Celef Cirrus</b> £180	Average Good	It's nice to see Celef back in the UK, with this decent sounding small reflex box that seems unusually tolerant of siting	39 x 20.5 x 23cm stands in free space	84dB/w 60Hz	R	66
<b>Celestion 3</b> £109	Average + Average	This attractive little wall-mount gives good balance and stereo imagery, with a character which leans more towards inoffensiveness than excitement	31 x 18.5 x 21cm high stands against wall	86dB/w 55Hz (in room)	R	78
<b>Celestion 5</b> £149	Good Average	Cunningly conceived and balanced, the 5 may be a little slow for some tastes, but is well suited to CD-oriented budget systems	35 x 20.5 x 26cm heavy stands close to wall	89dB/w 30Hz		90
<b>Celestion 6000</b> £1470	Very Good Very Good	A genuine fullrange audiophile quality speaker system - with Star Wars styling to suit a high tech environment	Complex, on floor in free space	82.5dB/w	R	60
<b>Celestion DL6 Series Two</b> £159	Good Average	Good tonal colouring and plenty of bass for the enclosure size; the metal dome tweeter is excellent, but bass and mid lack clarity and 'bite'	45.4 x 24.5 x 26.2cm near wall, on stands	87dB/w 65Hz		59
<b>Celestion DL8 Series Two</b> £199	Very Good Good	A refined middle market speaker has a smooth but slightly dull quality, with good definition and deep, if slightly boxy bass	50 x 27.5 x 27.8cm open, stands	87.5dB/w 60Hz	R	59
<b>Celestion SL12Si</b> £579	Average Average	Careful setting up does reveal elements of fine sound quality, but this 'grown up' SL6 variation has a lumpy response alongside its improved power handling	53 x 20 x 27cm matching stands clear of walls	85dB/w 50Hz		66
<b>Celestion SL600Si</b> £799	Good + Good	This Aerolam high tech miniature has certain remarkable qualities that some will find irresistible, but needs careful system and room matching	27 x 20 x 23cm free air on tall stands	82dB/w 52Hz		68
<b>Celestion SL700</b> £1349 inc stands	Good Good	Very sophisticated, mostly smooth and accurate transducer, with fast but not very deep bass and a rather bright treble	37.5 x 20x 23.5cm free air on tall stands	83dB/w 45Hz		60
<b>Creek CLF20</b> £200	Good Average -	Looks good material value, but sound is distinctly over-rich and thick in the mid-bass region; maybe the box is a little too large.	49 x 24.5 x 24cm open frame stands, free space	88dB/W 30Hz		90
<b>Dali 700</b> £600	Very Good Average	Good material value and fine bass extension for size and price, but overall sound is disappointing, perhaps due to complexity of driver array	110 x 28 x 35cm clear of walls	88dB/w 20Hz		90
<b>DCM Timeframe TF250</b> £350	Average + Average	Neat and unusual floorstanding presentation, marred by indifferent build and cuddly but rather coloured sound, especially on spoken word	86 x 32 x 16cm close to rear wall	88dB/w 45Hz		90

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<b>Doxa 5 - 2</b> £900	Average Good	The high sensitivity and seductive midband makes an obvious partner for valve amplifiers, though obtaining a good room match may prove a little tricky	98 x 21 x 28cm floor well away from walls	91dB/w 30Hz (in room)	R	82
<b>Duntech PCL1000 Crown Prince</b> £6120	n/a Excellent	Immensely 'listenable', refined sounding speaker capable of creating lifelike musical images. Not overly transparent to source, but very civilised nonetheless	180 x 30.5 x 43.5 free standing away from walls	90dB/w 42Hz	R	72
<b>Duntech PCL500 Marquis</b> £3998	n/a Very Good	Better value for money than the Crown Prince - and arguably more dynamic, with real bass 'slam' but a little less refined in the higher registers	147.5 x 27 x 40cm free standing away from walls	92dB/w 48Hz	R	65
<b>Equation 0</b> £1250	Average + Very Good	Expensive but most attractive floorstanding miniature. Bass is limited and mid tends to shout but sound is fast and lively with fine dynamics and timing	85 x 20 x 35.5cm floor, c1ft from wall	85dB/w 45Hz	R	90
<b>Goodmans B-Max/Maxim Two</b> £90/£90	Poor Average -	Stick with the Maxims on their own until you can afford some real grown up loudspeakers	60 x 21 x 26 see above, suck and see	89dB/w 55Hz (in room)		78
<b>Goodmans HIM 440</b> £350	Good Average -	Amazing perceived value, sensitivity and good bass extension, marred by serious cabinet coloration, a nasty tweeter and a difficult amplifier load	87 x 38 x 40cm low stands clear of walls	94dB/w 24Hz		90
<b>Goodmans M100</b> £79	Average + Average -	Effectively a Maxim on the cheap, the M100 measures more smoothly but sounds somehow less involving than its more famous stablemate.	20 x 17 x 26cm close to rear wall	85dB/w 50Hz (in room)	R	86
<b>Goodmans M300</b> £99	Average Average -	Conveying much of the charm and life which has made the Maxim 2 so popular, the M300 is sensitive, but hampered by upper bass cabinet coloration	38.5 x 21.5 x 17cm stands close to rear wall	89dB/w 50Hz (in room)	R	82
<b>Goodmans Maxim Two</b> £90	Average + Average	More wham-bam-thank-you-mam sound that imitates much bigger speakers when you let these babies yell. (A well-controlled yell)	26 x 17 x 19cm near wall on shelf or stand	86dB/w 85Hz	BB	59
<b>Harbeth HL Compact</b> From £539	Very Good Average	The clean and neutral sound lacks resolution and gives rather unobtrusive though well differentiated stereo. Can be bi-wired to advantage	52 x 27.2 x 28.1cm open space, on high stands	87.5dB/w 65Hz		59
<b>Harbeth LS3/5A</b> £343	Good Average	Still a classic miniature, though not to every taste, and none the better for the recent update under our listening conditions. Limited dynamic range	30.5 x 19 x 16cm stands in free space	81dB/w 60Hz		66
<b>Heco Interior 120</b> £169	Good Average	Drab appearance belies a lively enough character, though the balance is altogether a bit bright for UK tastes	32 x 23 x 23cm high stands against wall	88dB/w 50Hz (in room)		78
<b>Heco Interior 430s</b> £429	Good Good -	This tall floorstanding enclosure delivers an impressively even sound balance with good bass extension, if not the lively dynamics to satisfy enthusiasts	85 x 24 x 27.5cm free space	88dB/w 43Hz	R	71
<b>Heco Interior 90S</b> £159	Good Average -	Neatly finished and engineered miniature, but the disappointingly 'lifeless' sound left the listening panel decidedly underwhelmed	27 x 18 x 16cm on high stands	87.5dB/w 90Hz		74
<b>Heco Superior 740</b> £599	Good Good -	A similar sonic package to the cheaper Interior 530, these Superior clothes are very pretty indeed, though spikes are still awaited	84.5 x 22 x 25cm on floor in free space	88dB/w 30Hz (in room)		78
<b>Heco Superior 940</b> £1000	Good Good	This large and beautifully finished floorstander has an impressively smooth and attractively transparent midband. Bass is well extended but follows rather than drives the music along.	110 x 26 x 31.5cm free space	88dB/w 20Hz		86
<b>Heybrook HB1</b> £199	Good Average +	No longer an over-bright character, a strikingly clear sound and fine transient performance now merits recommendation	47 x 29 x 23cm on stands near wall	88dB/w 61Hz	R	46
<b>Heybrook HB100</b> £255	Average + Good	Well matched for wall siting, the HB100 is a lively and informative performer in the tradition of the popular HB1	47 x 26 x 28cm stands near rear wall	86dB/w 50Hz	BB	66
<b>Heybrook HB150</b> £319	Average Good	Convincingly communicative but a bit coloured and congested, this lively compact wall-mount is nicely finished but a little costly for the content	40.5 x 23 x 22cm stands close to rear wall	89dB/w 42Hz (in room)		82
<b>Heybrook HB200</b> £399	Average Average	This luxury successor to the HB2 is lively and informative, but sounded insufficiently balanced to convince our listening panel	x 26cm stands against rear wall	87dB/w 55Hz		66
<b>Heybrook Point 5</b> £139	Average Average	"Uncouth yet still satisfying", the Point 5 gives good dynamics and bass for a compact wall-mount, but is burdened by a somewhat unhappy treble	37.5 x 23 x 24cm high stands against wall	85dB/w 32Hz (in room)		78
<b>Heybrook Point 7</b> £185	Average Average	Physically an attractive package, but not entirely convincing in lab or listening panel test; interesting for all that	40.5 x 23 x 23cm stands against rear wall	85dB/w 60Hz		68
<b>Heybrook Solo</b> £149	Average + Average +	Discreetly styled wallmount sounds a little untidy in both bass and treble but handles complex rhythmic material much better than most	36 x 23 x 22cm HBS1 stands close to wall	87dB/w 28Hz	R	90
<b>Infinity Kappa 6</b> £795	Good Good	Interestingly styled US loudspeaker has unusual high tech drivers and good neutrality, but the sound seriously lacks excitement	63 x 38 x 24cm stands, free space	85dB/w 35Hz		66
<b>Infinity Kappa 8</b> £1850	n/a Very Good	Very nicely made and unobtrusive but large four-way speakers which have a tendency to sound bass heavy unless used with solid core cables	118 x 51.5 x 17.5cm floor standing, open space	89dB/w 33Hz		72
<b>Infinity Modulus</b> £695	Good Average +	Luxury high-tech miniature is carefully conceived and beautifully executed. Undeniably attractive in the midrange and treble, the Modulus failed to handle the bass end of the spectrum as successfully	30 x 18 x 26cm high stands 1ft from wall	84dB/w 45Hz (in room)		86
<b>Infinity RS2001</b> £180	Average Average +	A little coloured and unruly in the treble, the 2001 nevertheless retains the lively dynamic bounce of its predecessor; pity the price has gone up	36.5 x 22.5 x 20cm lightweight stands	87dB/w 50Hz (in room)	R	78
<b>Jamo Concert 2</b> £230	Good Average -	A thoroughly respectable 'bookshelf' performer that needs free space siting but includes attractive cabinetwork and a neat grille	41 x 24 x 25cm stands in free space	85dB/w 48Hz		66
<b>Jamo Cornet 40</b> £99	Good Average	Prettily styled Danish miniature is good perceived value and delivers solid bass and midrange performance but is let down by an indifferent tweeter	31.5 x 19.5 x 21.5cm about 1ft from wall	87dB/w 48Hz		90
<b>JBL Control 1 Plus</b> £229	Average Average	Sub-miniature with forward midrange and no real bass; highish price partly justified by cute, near-indestructible Pro styling and build	23 x 15.5 x 14cm close to rear wall	89dB/w 50Hz		90
<b>JBL LX33</b> £259	Average + Good	A bit of a cheat, but a lot of speaker for the money, which manages a better room balance than many 'large bookshelf' rivals, and delivers a fine acoustic performance	80 x 25 x 21cm floor, 1ft from wall	89dB/w 48Hz	R	82
<b>JBL LX44</b> £340	Good - Average	This generously built model offers good power handling, bass extension and dynamic range, but suffers from the 'three-way syndrome', with middle muddle	58.5 x 30 x 29cm stands in free space	89dB/w 40Hz		71
<b>JBL TLX12</b> £149	Good - Average	This smart near-miniature has a 'boppy', lively bottom end, but beware of the fizz in its top	37 x 23 x 23cm stands 0.5m from rear wall	87dB/w 55Hz	R	71
<b>JBL XPL 90</b> £699	Good Average +	Though undoubtedly pretty and very expensively engineered, this elaborate near-miniature didn't really convince our listeners that it could deliver a sound quality to match its elevated price	39.5 x 24 x 24cm stands in free space	85dB/w 45Hz (in room)		86
<b>JPW AP2</b> £165	Good Good	Few grounds for criticism but purchasers should check out the treble qualities to avoid hammering the ear anvils	46 x 26 x 25cm 40cm from wall on 45cm stands	89dB/w 65Hz	R	53
<b>JPW AP3</b> £219	Good Average +	Pretty good stereo and well balanced overall it had its own character which is well suited to vinyl replay	52 x 25 x 29.5cm near wall on stands	90dB/w 57Hz	R	46
<b>JPW Minim</b> £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/w 28Hz (in room)	R	82
<b>JPW P1</b> £139	Good Average +	Honest and basically articulate if not very sophisticated, resolution is good but it can sound a little wearing in bright systems or with rough sounding material	44 x 25.9 x 26.1cm free space on stands	89dB/w 60Hz	R	59
<b>JPW Sonata</b> £99	Good Average +	Well balanced and integrated, this near-miniature offers fine sound if limited bass and dynamic range, plus real tree wood at a nearly silly price	32 x 23 x 20cm stands near rear wall	86dB/w 55Hz	BB	71



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<b>JPW Sonata Plus</b> £129	Average Average -	This luxury variation on the redoubtable Sonata theme features a metal dome tweeter, and is not the better for it	32 x 23 x 21cm about 1ft from wall	87dB/w 30Hz		90
<b>JRT AD1</b> £500 (stands £100)	Average + Good +	A most auspicious Choice debut for relative newcomers JRT. A fair share of cosmetic deficiencies do little to spoil the impressive coherence and timing that makes this beautifully finished and generously proportioned model so enjoyable.	59.5 x 28 x 36cm own stands near to rear wal	86dB/w 28Hz (in room)	R	86
<b>KEF 103/3</b> £750	Good + Good	Technically impressive, excellent bass/power handling for size, but not for the audiophile system. Better among cheaper components, and good in a large room	56 x 27 x 30cm supplied stands free space	90-95dB/w 35Hz		53
<b>KEF 104/2</b> £1,150	Very Good Very Good	A reference point for dynamics, preferred without KUBE, suited to many rooms. Good stereo, high sound level	90 x 28 x 41.5cm floor standing in free space	92dB/w 50Hz	R	60
<b>KEF C15</b> £119	Good Average	One of the tiniest around delivers a surprisingly 'big' and well balanced sound, with excellent stereo from free space siting	26.5 x 18 x 14cm stands in free space	85dB/w 60Hz	R	71
<b>KEF C25</b> £149	Average + Average -	Very safe and competent, but rather short on inspiration, the '25 lacks the brio and flair of its smaller C15 brother	34 x 20.5 x 17cm high stands near wall	87dB/w 60Hz (in room)		78
<b>KEF C45</b> £219	Good Average -	Conventional and competitively priced, C45 delivers an impressively consistent and competent sound. As one listener commented: "Offensively inoffensive whether it be love or loathing, give me some emotion"	47.5 x 28 x 24cm uncritical	87dB/w 30Hz (in room)		86
<b>KEF C55</b> £249	Good Average +	Similar to but less good value than C75, the '55 provides Uni-Q stereo stability but not real wood veneer or good low frequency room match	48 x 24.5 x 25cm stands, free space	91dB/w 30Hz (in room)		82
<b>KEF C75</b> £339	Good Good	Compact floorstanding model's Uni-Q driver provides fine crossover integration, giving stable stereo and fine dynamic range within a slightly 'rich' balance	72 x 24.5 x 25.5cm floor in free space	90dB/w 45Hz	R	71
<b>KEF C85</b> £549	Good Good	Essentially a simplified vinyl finish version of C95, the 85 delivers a similarly coherent, neutral, rich and slightly lazy sound	88 x 25 x 22cm well clear of walls	89dB/w 27Hz	R	90
<b>KEF C95</b> £649	Good Good	Rich and lazy, but nonetheless very endearing in a cosy sort of a way, the '95 is a lot of speaker for the money, and delivers a big sound with grace and subtlety	88.5 x 24.5 x 31cm floor in free space	90dB/w 30Hz (in room)	R	78
<b>Lindley New Age</b> £1100	Average - Average +	Attractively different presentation with classy finish, this tall cylindrical floorstander has fine bass extension but a rather uneven overall balance	105 x 23 x 23cm clear of walls	86dB/w 25Hz		90
<b>Linn Helix</b> £279	Average + Good	Attractive presentation is coupled with an attractively lively sound which is more neutral if less committed than earlier Linn loudspeakers	51 x 25.5 x 28cm Cyrus stands 1ft from rear wall	88dB/w 53Hz	R	66
<b>Linn Index II/KuStone</b> £344 inc stand	Good Good	Combination of stand and speaker looks and sounds very good for the price, with good bass extension and control, and fine dynamic range. Clean, clear if a shade slow	44 x 21 x 23.5cm (box only) close to rear wall	86dB/w 28Hz	BB	90
<b>Linn Kaber</b> £989	Average Good +	Discreet wall-mount package trades sensitivity for fine bass extension and midbass performance; can be a little relentless but has prodigious dynamic capabilities	93 x 19 x 28cm floor against rear wall	86dB/w 28Hz (in room)	R	82
<b>Linn Kan 2</b> £339	Average + Average +	A niche product for those prepared to tolerate its strong character for the sake of its fine bass performance and near invisibility	30.5 x 18.5 x 16.5cm Kan stands against wall	82dB/w 35Hz (in room)		78
<b>Linn Nexus</b> £379	Good Average	Good features include a solid, meaty bass plus good imagery and tonal balance. The catch is that Nexus lacks resolution and timing	49 x 23.5 x 30.4cm near rear wall supplied stands	89dB/w 60Hz		59
<b>Magneplanar MG1.4</b> £1190	Good + Good +	Replaces the stalwart MGic with a revised panel layout. Offers a very crisp and articulate sound, particularly revealing of upper mid vocal details	155 x 8 x 57cm open space	88dB/w 40Hz	R	72
<b>Magneplanar MG2.5R</b> £1998	Good Good	Offers the low coloration and profound musical insight of better electrostatic loudspeakers but without loss of low frequency extension	183 x 56 x 4.5cm Open space	83-85dB/w 35Hz	R	60
<b>Magneplanar MGIIIa</b> £2700	Good Very Good	Another excellent true-audiophile loudspeaker this American panel speaker helps to convey much of the original character of the music	180 x 62 x 38cm well clear of walls	84-86dB/w 35Hz	R	46
<b>Magneplanar SMGa</b> £675	Average - Average	Tonally 'rich', in the right room it proved a satisfactory musical experience	122 x 48 x 4.5cm on floor clear of wall	85dB/w 56Hz		46
<b>Marantz LD-50DMS</b> £230	Very Good Good	Well behaved larger two-way has fine balance, stereo and integration with good bass extension, albeit with mild boxy, chesty and fizzy effects	106 x 22 x 32cm floor, free space	88dB/w 30Hz (in room)	R	71
<b>Martin Logan CLS II</b> £3998	n/a Very Good	Much improved high resolution design, fussy about system set-up and demanding of ancillaries and software alike. It rewards the efforts though	60 x 28 x 7.5cm open space	86dB/w 45Hz	R	72
<b>Meridian M30</b> £775	Average + Average	Pricy but easy on the ears and worth considering especially where space is at a premium	38.5 x 18 x 32cm free space on stands	Active 40Hz		46
<b>Mission 760</b> £99	Good Average +	Smart presentation and an engaging sound, this sensitive budget miniature sounds notably more lively and less boxy than most of its peers	29 x 18 x 20cm stands close to wall	88dB/w 50Hz	BB	90
<b>Mission 761</b> £130	Average Good	One helluva speaker for the price, if a shade small and short of subtlety and refinement - should prove a worthy successor to the 70 and 700	38 x 21 x 21cm stands near rear wall	87dB/w 60Hz	BB	66
<b>Mission 762</b> £200	Average Average -	Mission's 'bookshelf middleweight' offers high sensitivity and loudness capability, but at the expense of a somewhat untidy and rather 'heavy' sound	50 x 25 x 27cm stand, experiment advised	91dB/w 55Hz		66
<b>Mission 763</b> £300	Average + Average +	A very artful combination of generous volume and good bass extension at a modest price. Works well in the listening room despite a few rough edges	77 x 25 x 32cm near rear wall	86dB/w 40Hz	BB	68
<b>Mission 764</b> £450	Good Good -	Large floorstander has fine bass extension but limited dynamic range, and sounds 'lazier' than Best Buy 763	86 x 25 x 32cm 0.5m from rear wall	86dB/w 43Hz		71
<b>Mission 767</b> From £2500	Very Good Very Good	Magnificent and massive part-active monoliths have fine acoustic subtlety and impressive loudness capability, ultimately limited by partnering (Cyrus)	138 x 29 x 43cm floor, flexible electronics	91dB/w below 20Hz (in room)	R	81
<b>Mission Cyrus 780</b> £169	Good Average +	Pricy but very pretty miniature based on Mission 760 but with beefed up box and crossover network to enhance sound quality still further	29 x 18 x 26cm light stands close to wall	88dB/w 50Hz	R	90
<b>Mission Cyrus 781</b> £250	Average + Good	Properly run in, the pretty little 781 delivers a fast, dynamic and informative sound which more than justifies its price. Take care to adjust placement to suit room and system	43 x 22.5 x 28cm matching stands 1ft from wall	88dB/w 28Hz (in room)	R	86
<b>Mission Cyrus 782</b> £350 (stands £80)	Good - Good -	Lively, articulate and beautifully finished, this compact wall-mount model with twin main drivers has good integration but a rather rich, 'Loudness' balance	50 x 25 x 32.5cm Cyrus stands near wall	90dB/w 50Hz		71
<b>Monitor Audio 1200 Gold MD</b> £900	Average Average +	This smooth and civilised slimline floorstanding loudspeaker is well built and nicely presented. But it is also expensive	94 x 20 x 26cm in free space	85dB/w 48Hz		68
<b>Monitor Audio MA1800/Gold</b> £1400	Good Average +	Attractive and beautifully finished, even when ballasted with lead shot the 1800 inclines towards upper bass richness and lacks genuine extension	106 x 22 x 32cm floor, free space	88dB/w 30Hz (in room)		81
<b>Monitor Audio MA700/Gold</b> £400	Good Average +	Lacks bass authority and timing, but could suit the smaller room, at the end of a CD-based system used primarily for classical music at modest levels	35 x 21.5 x 25cm stands, free space	87dB/w 48Hz (in room)		82
<b>Monitor Audio Monitor 7</b> £170	Average - Average	This lively and punchy near-miniature looks pretty enough and is good value but is let down by an unruly and indifferently integrated tweeter	34 x 16.5 x 17cm stands 1ft from wall	84dB/w 70Hz		74
<b>Monitor Audio Monitor 9</b> £200	Good Average	Despite a much better treble balance than the 7, the Monitor 9 is less engaging and lively at low frequencies than its smaller sibling	37 x 20 x 21cm high stands near wall	85dB/w 30Hz		78
<b>Monitor Audio R352/MD</b> £299	Average + Good	A good value large box that sounds more engaging than subtle, providing a good compromise between bandwidth and sensitivity	64 x 25 x 32cm stands in free space	89dB/w 45Hz	R	66

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## LOUDSPEAKERS

■ MODEL ■ PRICE	■ LAB ■ SOUND	■ COMMENTS	■ SIZE ■ PLACEMENT	■ SENSITIVITY	■ VALUE	■ ISSUE
<b>Monitor Audio R852/Gold MD</b> £500	Good Good	Luxury build and 'high tech' tweeter or not, this compact model offers good refinement and detail on an open soundstage. Now in mk II form	45 x 25 x 26cm stands in free space	86dB/w 50Hz	R	66
<b>Monitor Audio Studio 10</b> £1100	Average Average +	Expensive, luxury build/finish and all-metal driver diaphragms provide engagingly transparent midrange and treble, spoilt by over-strong mid-bass.	40 x 20 x 25cm heavy stands clear of walls	87dB/w 45Hz		90
<b>Mordaunt-Short MS 3.10</b> £110	Average Average +	Probably the liveliest and most communicative miniature around, this beautifully presented design is probably better suited to budget 'real hi-fi' than the blandness of the midi system	28.5 x 17.5 x 20cm	88.5dB/w 48Hz	BB	78
<b>Mordaunt-Short MS 3.20</b> £130	Average Average +	All the charm of its BB-rated £99 baby 3.10 brother, plus a smidgeon more bass for those in a suggestible frame of mind	35.5 x 18 x 20cm open stands against wall	85dB/w 50Hz (in room)	R	82
<b>Mordaunt-Short MS 3.30</b> £190	Average Average +	A little too mid-forward for neutrality or formal recommendation, this attractive, good-sized model nevertheless has more than enough appealing qualities to merit serious consideration	46 x 23.5 x 27cm high stands 1-2ft from wall	87dB/w 38Hz (in room)		78
<b>Mordaunt-Short MS 3.40</b> £250	Average + Average	It looks pretty and sounds civilised, but the 3.40 failed to ignite any degree of enthusiasm amongst our listeners. Low frequency stand and room matching is a bit tricky	57 x 23.5 x 27.5cm stands in free space	87dB/w 30Hz (in room)		86
<b>Musical Fidelity Reference 2</b> £199	Good - Good -	This compact wall-mount design with advanced drivers has good dynamics, balance and stereo, plus flashy styling and some midband 'boxy' coloration	38 x 25 x 20cm stands near rear wall	88dB/w 50Hz		71
<b>NAD 8225</b> £150	Good Average +	Notwithstanding lacklustre styling and an unprepossessing appearance, this NAD miniature has a smooth and even midband plus an appealing overall jauntness. The whole turns out to be worth more than the sum of its parts.	34 x 20 x 18cm stands close to wall	87dB/w 45Hz (in room)	R	86
<b>NVA Cube 1</b> £600 (stands £200)	Good - Good +	Attractive, cube-shaped semi-omni is very sturdily built, and gives an idiosyncratic but unusually open, spacious and informative sound	33 x 32 x 32cm own stands c0.5m from wall	85dB/w 52Hz	R	71
<b>NVA Cube 2</b> £380	Average Good	A rude but exciting miniature, with unusually accomplished bass capabilities for its size	28.5 x 27 x 28.5cm NVA stands against wall	85dB/w 48Hz (in room)	R	82
<b>NVA Cubix</b> £1100	Average Good	Too idiosyncratic for formal recommendation, the Cubix possesses remarkable bass extension for its size, but is tricky to optimise and has aggressive tendencies	60 x 32.5 x 32.5cm	84dB/w 28Hz (in room)		78
<b>Opus 3 Capella</b> £599	Good Good	The sound of this Scandinavian curiosity certainly benefits from the crushed marble enclosure, though presentation is strictly DIY	32 x 40.5 x 26(ave)cm amongst books in bookcase	86.5dB/w 45Hz		66
<b>Opus 3 Credo</b> £399	Average Average	Credo's odd-shaped silicate-based cabinet confers good box and bass performance, but the sound could be more neutral for the price	32 x 28 x 32cm stands in free space	88dB/w 65Hz		74
<b>Pearl &amp; Oakley Victoria 200</b> £1099	Average - Average -	Extraordinary - and to many very attractive - 'ginger jar' presentation in Staffordshire ceramics, but let down by need for further acoustic and mechanical development	93 x 33 x 33cm on floor in free space	87dB/w 30Hz (in room)		78
<b>Philips FB815</b> £230	Average Average	An impressively - indeed imposing - physical package for the price, clever engineering gives a very competent if slightly hard and brittle sound quality that somehow lacks genuine authority	63 x 27 x 27cm low stands in free space	85dB/w 30Hz		86
<b>Philips FB825</b> £650	Good Good	Generous sounding and impressively uncongested for the type, loudness and bass extension don't quite match the large and rather plasticky box	110 x 29 x 41cm on cones clear of walls	88dB/w 25Hz	R	90
<b>QLN Model One</b> £700	Good Average	Similar to Signature at 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 stands, free space	85dB/w 28Hz (in room)		82
<b>QLN Signature</b> £1100	Good Good	Beautiful but expensive luxury compact has a rather laid back and 'heavy' sound, but coloration is low and stereo imaging very good	37 x 18 x 36cm heavy stands in free space	83dB/w 30Hz (in room)		78
<b>Quad ESL-63</b> £1860	Good + Very Good	With its unusual but subtle characteristics this classic electrostatic may not be punchy in the bass, but has strengths that some cannot live without	92 x 66 x 27cm open stand well clear of wall	84dB/w 34Hz	R	60
<b>Richard Allan CD5</b> £184	Average - Average -	This neatly presented small reflex design can sound engagingly communicative, but is flawed sonically and technically and quite expensive too	38 x 19 x 23cm on rigid stands	88dB/w 80Hz		68
<b>Rogers LS2a</b> £180	Average Average	Provides very good engineering and stereo performance for the price, alongside some 'boxiness' and certain dynamic constraints	36 x 23 x 21cm low stands 1ft from wall	88dB/w 50Hz (in room)		82
<b>Rogers LS4a</b> £219	Good Good -	This artfully voiced and well balanced compact gives a fair flavour of the classical 'BBC sound' at a very reasonable price	43 x 25.5 x 24.5cm stands 1ft from wall	87dB/w 32Hz (in room)	R	78
<b>Rogers LS6a</b> £285	Good Good	Stereotypically a Rogers model with impressively even balance, prospective purchasers will have to weigh the fine midband naturalness against slightly lazy dynamics and timing.	51 x 27.5 x 28cm stands in free space	86dB/w 25Hz (in room)	R	86
<b>Rogers LS7t</b> £399	Good + Good +	A fine combination of classic qualities at reasonable price produces the "R" tag, but try to get a pair home on approval to check for bass 'heaviness'	56 x 27 x 28cm free space on 40cm stands	88.5dB/w 48Hz	R	59
<b>Rogers Studio 1a</b> £579	Very Good Good -	The classic BBC monitor style sound sensitively updated - transparent and natural with fine stereo, but a touch 'heavy' in balance	63.5 x 30.5 x 30.5cm stands in free space	87dB/w 36Hz	R	66
<b>Roksan Darius</b> £1395 (£345 integral stand)	Good Very Good	Now totally realigned, the current Darius provides an exceptionally impressive combination of transparency and delicacy with fine information retrieval and speed. The problem is affording the amplification to do it justice.	47 x 27 x 40cm own stands angled in space	82dB/w 20Hz	R	86
<b>Rotel RL850 II</b> £140	Average + Average +	Strongly recommended. Well-balanced, clear, with decent focus and fine stereo, but tendency to 'heaviness' needs decent stands and space	44 x 25 x 24cm free space on 40cm stands	86.5dB/w 50Hz	BB	59
<b>Royd A7 Series 11</b> £115	Average + Average	Lively clear sound; good upper bass and dynamics, but treble "ramp" made vocals sound shut in. Try before you buy	31 x 20 x 17cm shelf or 50cm stands near wall	86dB/w 75Hz	R	53
<b>Royd Apex</b> £485	Average + Good	Not the smoothest sound around, it more than compensates with an impressively communicative and informative musical presentation	85.5 x 20 x 30cm on floor close to wall	87dB/w 33Hz (in room)	R	78
<b>Royd Eden</b> £235	Average Average +	Delightful mid/treble speed and transparency but determinedly bass light, this oddball miniature threatens cult status but could use a sweeter tweeter	31 x 20.5 x 18.5cm stands close to wall	87dB/w 85Hz	R	66
<b>Royd Sintra</b> £330	Average + Good	Balance is bass light and a little bright, but superb dynamics, speed and timing make this luxury miniature musically very informative and satisfying	30.5 x 20.5 x 19cm stands close to wall	88dB/w 50Hz	R	90
<b>Ruark Swordsman</b> £219	Good Average	Very attractively styled and finished, the Swordsman is a well built 'small bookshelf' model that delivered better test than listening results	38.5 x 20 x 27.5cm stands 0.5m from wall	84dB/w 50Hz		71
<b>Ruark Talisman</b> £629	Average Good	Clever and beautifully finished compact floorstander has some coloration but is impressively informative and communicative, with fine pace and timing	83.5 x 21.5 x 31 (max) cm close to rear wall	86dB/w 30Hz	R	90
<b>SD Acoustics OBS</b> £695	Average Good	Recent changes have added some refinement to a seductive midrange, good timing and fine sensitivity, though bass extension is limited and coloration obvious	102 x 35 x 25cm floor, angled, away from walls	92dB/w 30Hz (in room)	R	82
<b>SO Acoustics Ribbon</b> £2000	Average Good +	Entertaining but a little underdeveloped and rather amplifier sensitive, the Ribbon is a lively and loud hybrid marred by some colorations; some like it, others don't	152 x 30 x (15-30)cm floor, angled, away from walls	91dB/w 30Hz (in room)		81
<b>SD Acoustics SD1</b> £1150	Average Very Good	A large scale, airy and unusually detailed system with excellent dynamics. Current model has more civilised top-end and warmer balance than original model	123.5 x 38.2 x 31.9cm free space	90dB/w 50Hz	R	60
<b>SD Acoustics SD3</b> £500	Average Good	Neither cheap nor perfect, this near miniature is unusually lively and dynamic within inevitable physical constraints, and is ultimately both engaging and entertaining	38x19x29cm on stands 10cm from wall	83dB/w	R	86



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## LOUDSPEAKERS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY	VALUE	ISSUE
<b>Seventh Veil System IV</b> £1290 (£340 integral stand)	Average Good +	Lacks welly and loudness but delivers astonishing results with female vocals in particular. Antithesis of the 'good allrounder', this oddball design has considerable charm that the committed enthusiast might find irresistible	72 x 44 x 21 x 29cm own-stands close to wall	84dB/w 28Hz (in room)	R	86
<b>Shan Shimna</b> £280 (stands £75)	Average + Good	Pretty little miniature in cast mineral/plastics has limited dynamic range and could sound smoother, but integration is good and box effects slight	31 x 16 x 17cm stands near rear wall	84dB/w 65Hz	R	71
<b>Snell Type C</b> £2350	n/a Very Good	Pricey, yes, but an extremely capable loudspeaker. Musical and transparent; excellent bass extension which improves with the addition of a Pirate plinth	112 x 38 x 33cm free standing, free space	90dB/w 35Hz	R	65
<b>Sony APM-101ES</b> £100	Good Average	Big hearted sound from small bookshelf successor to BB '10ES, sounds a little untidy at frequency extremes, so suits CD better than vinyl	39.5 x 22.5 x 23.5cm stands, free space	86dB/w 52Hz	R	71
<b>Sony APM-121ES</b> £150	Average Average -	Good perceived high tech value, but the balance has an artificial 'loudness' character, too rich in the bass and too strong in the treble	43 x 25 x 28cm stands, free space	86dB/w 25Hz (in room)		86
<b>Sony APM-141ES</b> £200	Average Average	A great deal of loudspeaker for the money, the rich sounding '141 needs a big room and still shows significant 'loudness' (boom'n'tizz) tendencies	61.5 x 26 x 32cm stands in plenty of free space	88dB/w 30Hz (in room)	R	78
<b>Sony APM-181ES</b> £300	Very Good Average	Big and beefy but equally fat and bass heavy, this well engineered 3-way has notable strengths but lacks transparency and sounds better at lower levels	57.5 x 29 x 36cm low stands, free space	87dB/w 40Hz		71
<b>Sony APM-66ES</b> £700	Average + Average +	Powerful heavyweight sound with a brilliant midband - clear articulate and transparent. But bass is on the boomy side and the treble can sound grainy	66 x 38 x 36.5cm low stands, free space	89dB/w 60Hz		59
<b>Spendor SP1</b> £800	Very Good Good	A very subtle and musical performer that works particularly well with digital material. An exceptional allrounder	63.5 x 29.5 x 30.5cm stands, free space	87dB/w 41Hz	R	60
<b>Spendor SP2/2*</b> £500	Very Good Good +	Conceding little to the SP1, this 30 litre model displayed good tonal balance with a highly articulate midrange, only slightly marred at frequency extremes	50 x 25 x 30cm stands, free space	87dB/w 45Hz	R	59
<b>Spica Angelus</b> £1295	Good Average	A little bass shy and soft in the bass and lower mid, the free standing Angelus is otherwise tidy, extremely lively and fluid, if uneven overall	116.8 x 53.3 x 26cm away from walls	86.5dB/w 50Hz		60
<b>Spica TC50</b> £599	Good - Good	This triangular-profile 'grown up' miniature is a shade boxy and laid back but has good rhythmic and musical integrity	40.5 x 33 x 29cm stands in open space	88dB/w 55Hz		71
<b>Spica TC50SE</b> £799	Good - Good	A heavily UK-modified TC50, the SE sounds less boxy and more spacious, but lacks some of the urgency of the standard model	40.5 x 33 x 29cm stands in open space	88dB/w 55Hz		71
<b>Studio Power DMS100</b> £249	Average + Average +	Close to a BB rating, and in many respects remarkable value for money. Delivers an impressively smooth and large sound, but sheer ugliness will limit its appeal	51 x 26 x 32cm open stands 1ft from wall	86dB/w 25Hz (in room)	R	82
<b>Tannoy DC1000</b> £200	Average Average -	The smaller of two DC models with dual concentric drivers, the '1000 is much less well balanced than the larger, floorstanding '2000	50 x 24 x 25cm	91dB/w 53Hz		71
<b>Tannoy DC2000</b> £330	Good Good	Remarkably high sensitivity from unique dual concentric driver that has an involving but characteristic sound. Bass could be better	68.5 x 26 x 27cm floor in free space	93dB/w 55Hz	R	66
<b>Tannoy DC3000</b> £650	Good Good	Giving new meaning to terms like dynamic range and headroom, the magnificent '3000 is a must for those who enjoy high-level monitoring. But spare a thought for the neighbours	94 x 26 x 31cm Floor 1ft+ from wall	94dB/w 30Hz (in room)	R	78
<b>Tannoy E11</b> £130	Average Average -	Fundamentally turgid and slow, thanks to leaden upper bass and 'shut in' treble, though stereo images are convincing, as are the reasonably uncoloured vocals	39 x 21 x 22cm stands, free space	87dB/w 45Hz (in room)		82
<b>Tannoy E11LE</b> £150	Average + Average	Limited luxury edition of E11 is a total contrast - sonically good in parts, but tricky to optimise in set-up, and rather presence forward. Good material value	39 x 21 x 22cm stands quite close to wall	87dB/w 30Hz		90
<b>Tannoy M15</b> £180	Good Average +	Somehow lacking the magic of its predecessors, the M15 remains a fine value compact that needs careful set-up to give optimum results	50 x 25 x 21cm Blu-tack to stands 1-2ft from wall	88dB/w 40Hz (in room)	R	78
<b>Tannoy M20</b> £250	Good Good	Alongside fine build and presentation, the M20 provides an unusually clever combination of the 'traditional' virtues of transparency and low coloration with more trendy strengths of speed and pace	50 x 25 x 22cm stands in free space	87dB/w 25Hz (in room)	R	86
<b>Tannoy Westminster</b> £3600	n/a Good +	These awesome horn loaded speakers are remarkably controlled and impressive, if only suited to a few pockets and rooms	Huge, flat against rear wall, away from corners	96dB/w (manuf.)	R	Coll '87
<b>TDL Monitor</b> £1799	Very Good Very Good	Fine solidity and good accuracy, with enough bass extension to satisfy even organ freaks. Needs a big room and can sound a bit lazy and a shade tinkly	118.5 x 30 x 47cm 0.5m from walls	85dB/w 28Hz	R	66
<b>TDL Studio 1</b> £549	Average + Good	Delivering genuinely extended bass from a compact floorstanding enclosure, the Studio is very detailed but a shade clinical and detached in presentation	76 x 23 x 33cm	84dB/w 25Hz (in room)	R	78
<b>Technics SB-CS5</b> £70	Average Average	Clearly fine material value for money, the CS5 nevertheless betrays its midi system heritage, the quest for size for its own sake compromising the performance of both enclosure and main driver	42.5 x 25 x 24cm Stands in free space	86dB/w 48Hz	R	86
<b>Technics SB-RX50</b> £500	Very Good Average +	With its unique coaxial drive unit the RX50 proved a smooth and well balanced loudspeaker, its minor weakness being a mildly excessive low bass	48 x 30 x 26cm free space on 40cm stands	86dB/w 40Hz	R	46
<b>Technics SBC 250</b> £140	Average + Average -	Despite a fairly even tonal balance, the 250EK sounded muddled in the midrange and dull in character	36.5 x 23.5 x 20.5cm free space, stands	86dB/w 60Hz		46
<b>Toshiba SS33-M</b> £100	Average Average	Providing a benchmark for budget loudspeakers, this Toshiba-inspired but UK designed and manufactured model is a lot of loudspeaker for the money, if a shade on the cheap	40 x 26 x 21.5cm stands in free space	86dB/w 55Hz	BB	68
<b>Townshend Glastonbury IIS*</b> £1700	n/a Very Good	What? No bass? Actually, like the KEF 107, the Glastonbury IIS goes down so low you might not notice how good it is. A truly remarkable performer. Superb soundstaging	91.5 x 28 x 4.6 free standing in room corners	88dB 27Hz	R	65
<b>Townshend Glastonbury Tor</b> £1495	Average - Very Good	Prodigious bass extension, stunning stereo focus and low cabinet coloration, but limited loudness from low sensitivity and power handling, and some imbalance coloration.	99 x 26.5 x 33cm well clear of walls	82dB/w below 20Hz	R	90
<b>Vandersteen Model One</b> £1000	Average + Average +	This compact American floorstander's elegant staggered baffle arrangement contributes to a refreshing freedom from boxiness, but the price is quite high in view of the additional mid forwardness and bass imprecision.	100 x 30.7 x 25.6cm floor clear of walls	87dB/w 23Hz (in room)		86
<b>Videotone Minimax 2</b> £80	Poor Average -	Cheap in build and QC as well as price, but cheerful (if coarse) with it - if a little too cheerful after extended listening	27.5 x 17 x 20cm near rear wall	84dB/w 90Hz	R	74
<b>Visonik David 6001</b> £173	Average - Poor	Sharp styling a classy looking miniature makes, but the complex grillework worsens a sound which starts off with too much top and not enough bottom	20 x 12 x 13cm against rear wall	87dB/w 130Hz		74
<b>Wharfedale 505/2</b> £190	Average Good	This lively Wharfedale provides plenty of speaker with unusual refinement for the money, and should be fairly tolerant of room siting	44 x 25.5 x 24cm stands 1ft from wall	86dB/w 55Hz	BB	66
<b>Wharfedale Coleridge</b> £499	Average Good	Compact, beautifully finished and extravagantly engineered box sacrifices bass extension in the cause of high midband sensitivity; communicative, but can be a little unforgiving	48 x 26 x 26.5cm stands 1ft from wall	91dB/w 48Hz (in room)	R	82
<b>Wharfedale Diamond IV</b> £109	Good Average +	Thanks to a new metal dome tweeter, the new Diamond is much more civilised than its predecessors, with an attractive lively bounce but some boxiness	27 x 18 x 18.5cm stands close to wall	86dB/w 48Hz	R	90
<b>Yamaha NS 1000M</b> £900	Good Good +	Living up to its monitor label, and tonally well suited to digital material, the NS 1000M is superbly crafted and capable of high levels	67.5 x 37.5 x 32.5cm 30cm from wall, stands	90dB/w 40Hz	R	46

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## CASSETTE DECKS

The bad odour of copyright theft hangs around the compact cassette, but there is no doubt it is the world's most versatile and ubiquitous music storage medium. Hi-fi buffs may wrinkle their noses pointedly, but are still happy to use cassette decks to make up tapes for the car or personal – at the same time complaining loudly about the quality of pre-recorded material. (In fact the very best decks can do a surprisingly good job with musicassettes.)

There is no problem in connecting a cassette deck to any normal amplifier, but some care needs to be taken in choosing the best tapes for a

specific machine. (Trial and error is one effective technique, but many decks have manual bias adjustment and some match up to the tape automatically.)

Lab performance and sound quality often go hand in hand, and are frequently somewhat dependent upon factory alignment. The mechanical integrity of the mechanism itself is another crucial factor, that is often reflected in the asking price.

All modern hi-fi decks have Dolby B and the majority have Dolby C besides; the very worthwhile HX Pro system is becoming steadily

more widespread. Remote control remains rare, though sometimes it is available as a system option.

Three-head recorders allow simultaneous checking of the recording being made. Auto-reverse is a useful convenience feature, but usually with some mechanical compromise, while double-mechanism 'dubbing' decks of dubious quality are fashionable at the bottom end of the market. The welter of different 'music search' systems available is some indication of their frequent ineffectiveness

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Acoustic Research RD-06</b> £280	Average Average	Acceptable middle market player with very simple facilities and cramped control section, but unusually good looks	Dolby B/C/HX Pro, fine bias, counter memory, repeat	BB	69
<b>Aiwa AD-F270</b> £90	Average Average	An excellent budget machine, adequately equipped and satisfactorily built. Sound quality is in severe danger of transcending the price category	Dolby B/C, fine bias adjust	BB	75
<b>Aiwa AD-F370</b> £130	Average Average	Adequate but uninspiring recorder with detail shortcomings but good control layout and successful sounding with recorded musicassettes	Dolby B, C, HX Pro, bias adjust		63
<b>Aiwa AD-F500</b> £150	Average Good	Noise levels are a little higher than usual, but sound quality is otherwise very good - open, explicit and very neutral tonally.	Dolby B/C/HX Pro, cue/review, fine bias, record sensitivity adjust	R	93
<b>Aiwa AD-F700</b> £199	Good Average	Somewhat less than the sum of the (most fine) individual parts, this deck has an artificial quality which spoiled the efforts of a fine transport	Dolby B/C/HX Pro, fine bias, CD Direct input		75
<b>Aiwa AD-F800</b> £249	Good Very Good	Close to first class performance – and superb value. The Aiwa is purposeful and finely engineered. It provides a near irresistible blend of good mechanics and electronics	3 head, dual capstan, Dolby B/C/HX Pro, tape calibration	BB	75
<b>Aiwa AD-R470</b> £150	Average Good	For once, an auto-reverse deck with the performance of a decent uni-directional one at a similar price. The Aiwa is modern in concept, and has good, transparent electronics	Dolby B/C/HX Pro, auto reverse, cue & review, bias adjust	BB	69
<b>Aiwa AD-WX616</b> £150	Poor Poor	Sonically sub-standard twin transport deck which has sensible range of well implemented features, yet which sounds compressed and uneven.	Twin full logic, 1 records, Dolby B/C track search		93
<b>Aiwa AD-WX777</b> £179	Very Good Very Good	Excellent, middle price dual deck with quick side change and a living, breathing sound – though prerecorded tapes sound bright	Twin auto-reverse, one records. Dolby B/C	BB	75
<b>Aiwa AD-WX888</b> £249	Good Good	Inaccurate set-up spoils metal tape operation, but with other tapes the deck works well. This deck offers fine engineering, facilities and sound	Dual auto-reverse twin deck, Dolby B, C and HX Pro	R	75
<b>Aiwa AD-WX909</b> £400	Good Good	Convenience meets sound quality, and both win. An essentially clean, positive recorder which works alongside an auto-reverse player of lower standard – a sensible compromise	Dual deck, auto-reverse, track search, Dolby B/C/HX Pro, bias adjust, 3 Head	R	57
<b>Aiwa XK-007 Excelia</b> £400	Good Good	Downmarket version of XK-009 with simplified bias/equalisation adjustment section and more forgiving but less informative sound. Still good, but less exciting than XK-009	Dolby B, C, dbx, HX Pro, 3 Head, tape alignment		63
<b>Aiwa XK-009 Excelia</b> £550	Very Good Very Good	Excellent detail, stable articulate midband and slightly obvious treble. The most interesting Aiwa for yonks	Dolby B, C, dbx, HX Pro, 3 Head, tape alignment, CD direct	R	63
<b>Akai GX-32</b> £170	Average Poor	Constrained and smeared sum up this deck well. It has poor bass and treble definition alike, though it proved well aligned for prerecorded cassettes	Dolby B/C, variable bias, headphone out, track search		69
<b>Akai GX-52</b> £250	Very Good Very Good	Well finished and a pleasure to use, this well specified deck sounds clean and defined with all tape groups, with or without Dolby	Dolby B, C, HX Pro, track locate features	BB	57
<b>Akai GX-65</b> £300	Average Average	Fine ungimmicky middle ranking deck with simple, purposeful controls, works best with metal tapes. Performance standards fair to good	3-head, dual capstan, Dolby C/HX Pro		87
<b>Akai GX-95</b> £400	Good Very Good	Well designed and finished cassette deck with features well judged to please the audiophile – especially switchable Dolby HX Pro and switchable panel display. The calibration system is simple and effective, and the deck sounds great	Dolby B/C/HX Pro, 3 head, manual tape set-up	R	69
<b>Denon DRM 700A</b> £150	Very Good Very Good	Simple but adequate features, lacks only timer standby. Musically this deck equals the best at this price level despite some clouding of transients with Dolby B.	Dolby B/C/HX Pro, fine bias, 3 heads, record return	BB	93
<b>Denon DRM-400</b> £140	Poor Poor	Messy, confused sound terminally lacking in detail and space under all conditions of use due to high mechanical flutter levels	Dolby B/C, memory stop, track search		81
<b>Denon DRM-500</b> £180	Good Very Good	Powerful, refined and detailed sound, and an excellent transport are keys to the success of this cleanly styled addition to the range – but why no timer standby?	Dolby B/C/HX Pro, variable bias	BB	75
<b>Denon DRM-700</b> £250	Good Very Good	Sloppily executed (though attractive) user interface contrasts with a high standard of music making belying its modest price	3 head, Dolby B/C/HX Pro, record return	R	81
<b>Denon DRM-800</b> £330	Good Very Good	There are some niggling faults and limitations (no timer standby is particularly annoying), but as a means of recording music it sets a very high standard	Dolby B/C/HX Pro, off tape monitoring, dual capstan	R	75
<b>Denon DRW-650</b> £200	Average Average	This simply equipped model is a little fiddly to operate at time, partly because of the way the single set of transport keys is assigned. But sound quality is generally workmanlike - good value	Twin transport, Dolby B/C/HX Pro	R	93
<b>Denon DRW-750</b> £250	Good Good	Polished and articulate, the only significant shortcoming is poor performance with prerecorded material	Dolby B/C/HX Pro, twin unidirectional, one records	R	69
<b>Dual 5850RC</b> £269	Poor Average	Average-to-middling deck which does most things well and skates over the more subtle things. Control system is uninspired but easy to master. Overpriced	Dolby C/HX Pro, bias adjust		87
<b>Goodmans GSW-5200</b> £90	Poor Poor	Musically unimpressive but at least it's cheap!	Dolby B, twin, one records		69
<b>JVC TD-V621</b> £300	Very Good Good +	Sharp, stable sound with rock solid transport. Features count is extensive and useful. Only raw sounding electronics detract from the scoring.	3 head. Dolby B/C/HX Pro, 3 inputs, fine bias	R	93
<b>JVC TD-X321</b> £130	Average Average	Typical modern budget deck with acceptable sound quality, especially when making and playing it's own tapes. The transport is a little rough, but recommended on the basis of good value for money.	Dolby B, C & HX Pro	R	93
<b>Marantz CP230</b> £330	Average Average	This is a competitively priced portable recorder though not suited to replay of musicassettes	Dolby B, bias adjust	R	52
<b>Marantz CP430</b> £400	Average Average	Uniquely flexible and compact package for outside work which at a pinch can double as a domestic cassette deck. dbx is useful for location work; results with Dolby B are acceptable	Portable 3 head, dbx, fine bias, charger/adaptor	R	87
<b>Marantz SD-40</b> £170	Average Very poor	Obstructive aesthetics are offset by apparently good build and sensible features, but sound quality is uneven or worse.	Dolby B/C/HX Pro, fine bias	R	93
<b>Marantz SD-50</b> £220	Good Very Good	Fine, exacting all-rounder offering good stereo, precision and focus. Good with prerecorded tapes too.	Dolby B/C/HX Pro, track & intro search, variable bias etc	R	81



# The Directory

## CASSETTE DECKS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Marantz SD-60</b> £350	Good Very Good	A first rate, highly capable deck offering energetic yet refined sound largely due to good electronic design	3-head, Dolby B/C/HX Pro, variable bias & sensitivity	R	81
<b>Marantz SD315</b> £180	Average Average	Sound quality is promising, but somewhat offset by 'shut in' top end. Pitch integrity suspect Dolby C sound quality and dubbing performance poor	Dolby B/C/HX Pro, twin transports, one rec/play, one play only. Mic input		93
<b>Marantz SD515</b> £350	Poor Poor +	Good electronic design is let down by mediocre alignment and poor transport stability. Disappointing at the price.	Twin auto-reverse, both transports record, Dolby HX Pro, parallel record capable	R	93
<b>Memorex SCT-5</b> £150	Poor Poor	Poor example of a twin cassette deck where everything has been sacrificed on the altar of flexibility	1 rec/play, 1 play only transport, Dolby B/C		87
<b>Memorex SCT-84</b> £200	Average Average	The playback only transport is a little disappointing, but the record one is a quality item and the deck works well. Ergonomics are good, but styling and control feel are decidedly tacky.	Dolby B/C, fine bias, twin deck with auto-reverse record,	R	69
<b>NAD 6300</b> £550	Very Good Very Good	Solid and homogeneous sound quality and very good replay compatibility thanks to 'play trim'. Distinctive, musical – and costly	Dolby B, C, HX Pro, 3 Head, bias adjust	R	63
<b>Nakamichi Cassette Deck Two</b> £300	Very Good Very Good	Not completely neutral, this deck is assured, dynamic and quick, with abundant detail and some coarseness. Stable transport but only rudimentary features accompany fine engineering	Dolby B/C, manual tape type selection, bias adjust	R	93
<b>Nakamichi RX-202E</b> £545	Good Very Good	Fine, clear and articulate sounding player. Excellent with prerecorded material, but idiosyncratic and sometimes obstructive control	Auto reverse, Dolby B, C, 2 head	R	63
<b>Philips FC566</b> £179	Average Average	Mostly well equipped, though some tape search facilities fail to exploit the auto-reverse capability. Sounds clean and stable – with prerecorded tapes too	Auto reverse, track search, Dolby B & C		57
<b>Philips FC567</b> £279	Average Poor	Well equipped but ergonomically substandard; sound quality is messy and lacking in clarity and dynamics	Dual deck, auto reverse, track search, Dolby B & C		57
<b>Philips FC870</b> £250	Average Average	Disappointing at the price, this is a well equipped deck with off-tape monitoring, but a somewhat listless, smeared musical style	Dolby B/C/HX Pro, 3-heads, track/intro search etc		81
<b>Pioneer CT-225</b> £99	Poor Poor +	Budget deck with a strictly budget sound - but surprisingly strong range of features. An opportunity lost.	Dolby B/C, logic controls, track search		93
<b>Pioneer CT-337</b> £130	Average Average +	Simple but well made machine with a slightly soft but consistent standard of reproduction	Dolby C/HX Pro, CD synchro, mic inputs	R	87
<b>Pioneer CT-447</b> £170	Good Good	An excellent and affordable package, decidedly OTT in the display area but capable of genuinely fine musical reproduction	Dolby C/HX Pro, auto tape alignment, track search	BB	87
<b>Pioneer CT-656 Mk II</b> £250	Average + Average +	Reworking of original 656 has led perhaps unintentionally to a somewhat ill-conceived set of compromises. Excellent with prerecorded material, the deck is otherwise unbalanced.	Dolby B/C/HX Pro, 3 heads, track search, fine bias		93
<b>Pioneer CT-757</b> £350	Very Good Poor	Ostensibly fine deck is let down by inability to drive tape hard without loss of focus and consistency. Even prerecorded material, which didn't suffer these shortcomings, lacked detail.	Dolby B/C/HX Pro, 3 head, assisted tape calibration		93
<b>Pioneer CT-91a</b> £500	Very Good Very Good	Superb, near state of the art recorder with an excellent dual capstan transport and very capable electronics. At the price, this one is a mould breaker	3-head, tape calibration, Dolby B/C/HX Pro	R	75
<b>Pioneer CT-959</b> £450	Very Good Very Good	Near state of the art for £450. Engineering is of a high order. An open window sound quality, but playback response is very bright (being corrected by manufacturer)	3-head, var bias & eq, multi-mode meters. Dolby HX Pro	R	87
<b>Revox B215</b> £1727	Very Good Very Good	Fine, consistent and solid sound quality, with excellent under the skin engineering and many useful features — but you're also paying for the same	Dolby C/HX Pro, 3 heads, dual capstans, auto tape align	R	87
<b>Revox B215-S</b> £1826	Very Good Very Good	This is a superbly engineered deck with a classically fine performance that almost transcends the stereotypes. Ergonomics are flawed but the user interface is both powerful and flexible	3-head, dual capstan, Dolby B/C/HX Pro, auto calibration	R	75
<b>Rotel RD-845</b> £130	Average - Average +	Extremely fine transport and clean sounding electronics for the price. Bass lacks weight, but deck works remarkably effectively with chrome tapes.	Dolby B/C, manual tape selector	R	81
<b>Rotel RD-855</b> £180	Average Good	The transport is OK and the various frequency responses are erratic, but good basic electronics help the Rotel deliver. Coherent, enjoyable and informative	Dolby C memory stop & repeat, track search	R	87
<b>Rotel RD-865</b> £200	Good Very Good	Fine, architecturally solid sound quality in a package with a low gimmick count and strong audiophile appeal	Dolby B/C/HX Pro, fine bias	BB	75
<b>SAE C102</b> £549	Average Good	Looking most unlike a cassette deck designed in the States and proving competitive in its price group. Not sonically that outstanding, however	Real-time counter, track search, Dolby B & C		52
<b>Sansui D-X211HX</b> £170	Good Good+	Clean, stable and open sounding recording quality distinguishes this player, - and auto-reverse too. A great improvement on earlier mid price Sansui models, and excellent value.	Auto reverse, Dolby B/C/HX Pro, bias adjust	R	93
<b>Sansui D-X301i</b> £180	Average Good	Lively, informative and well equipped basic deck, if rather obscure operationally	Dolby B/C/HX Pro, variable bias, track search	R	69
<b>Sansui D-X501</b> £230	Poor Poor	Unhappy mixture of good looks, excellent ergonomics and mediocre, sometimes poor sound	Dolby B/C, random track search		81
<b>Sansui D-X701</b> £340	Average Average	A little flat and smeared under some conditions, this design is at its best with metal and prerecorded tapes	Dolby B/C, 3-head, variable bias & output, track search		81
<b>Sherwood DS-1135C</b> £100	Average Average	Excellent value. There is a low level constant background drone, and Dolby C recordings sound flat and coloured. Elsewhere sound quality exceeds expectations	Dolby B/C/HX Pro	R	87
<b>Sherwood DS-7000R</b> £230	Average Poor	Rough and ready cassette deck in which sound engineering has been sacrificed on the altar of extra selling features, namely three heads for real time off-tape monitoring	3-head Dolby B/C/HX Pro		87
<b>Sony (WMD6C) Pro Walkman</b> £249	Good Very Good	One of the finest sounding cassette decks on the market today. A mandatory Best Buy, which also fits in your pocket	Dolby B, & C	BB	60
<b>Sony TC-FX120</b> £90	Poor Poor	Neat and very simply equipped model has decent electronics but poor, unstable transport with predictable consequences.	Dolby B & C, variable bias		93
<b>Sony TC-K520</b> £170	Average Good	Fine, assured and detailed performer with a very well designed and straightforward user interface	Dolby C/HX Pro, variable bias, display on/off	BB	87
<b>Sony TC-K650ES</b> £250	Average Average	Facilities are utilitarian but nicely presented, but sound quality, which is basically good, is slightly marred by some coarseness of tone.	3 head, Dolby B/C/HX Pro, fine bias	R	93
<b>Sony TC-K730ES</b> £500	Very Good Very Good	First rate cassette deck that scarcely betrays it is a cassette deck on audition. Features and control wise, it feels a little dated	Dolby B, C, bias and equalisation adjust	R	81
<b>Sony TC-K850ES</b> £400	Very Good Very Good	Near state of the art recorder with excellent recording quality, and even better playback performance. Sounds — and looks — best with the display turned off	3-head, Dolby HX Pro, bias/level adjust, dual capstans	R	87
<b>Sony TC-RX110B</b> £90	Poor Poor	Woolly bass and scrappy treble combine to make a meal of many music types, despite accurate response shapes with most types of tape. Prerecorded material sounds dull	Dolby B/C		75
<b>Sony TC-TX55</b> £150	Average Average	The sound quality ranking is a good one for an auto reverse machine at this price level. Clean, sharp sound, only slightly let down in the deep bass.	Auto reverse, Dolby B, C & HX Pro	R	75
<b>Teac V-270C</b> £89	Average Average	Not quite cheap enough to compete solely on price, the V-270C is a rather messy and unstable sounding deck	Dolby B & C, bias adjust		63
<b>Technics RS-B905</b> £350	Good Good	Good, well set up cassette deck with a clean, accurate sound but some compression. dbx circuit sounds poor	Dolby B, C, HX Pro, dbx, bias adjust, 3 Head		57

## CASSETTE DECKS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Technics RS-8965</b> £350	Very Good Very Good	Messy control layout, but ultra capable deck with clear electronics and excellent headroom, low noise, an ultra-stable transport - and first rate sound quality.	3 head, dual capstan, Dolby B/C/HX Pro, dbx, assisted tape alignment.	R	93
<b>Technics RS-TR355</b> £200	Average Average	Serviceable middle market dual deck without serious fault but with some annoying inadequacies, notably an inability to play side A and B and then stop	Twin auto-reverse, one records, Dolby B/C/HX Pro		75
<b>Yamaha KX-1200</b> £500	Excellent Average	A veritable rats' nest of buttons and dials, albeit well laid-out. This is nearly a great recorder, but lacks simplicity of sound	Real-time counter, track search, Dolby B, C, dbx, HX Pro, bias adjust, remote control		52
<b>Yamaha KX-250</b> £150	Good Good	Excellent if somewhat fiddly deck with all mod cons. Play trim helps bring recalcitrant tapes back into line. Refined, expressive sound quality and stable transport	Dolby B/C/HX Pro, Intro Scan, Play Trim	BB	93
<b>Yamaha KX-330</b> £170	Average Good	Cramped control panel but a strong, dynamic and comparatively stable performance distinguish this strong middle-price deck	Dolby C/HX Pro, optional remote control	R	87
<b>Yamaha KX-530</b> £230	Good Good	Excellent all-rounder that does most things at least competently and many things well. One of the best middle price decks	Dolby C/HX Pro, 3 motors, optional remote control	BB	87
<b>Yamaha KX-930</b> £400	Good Average	Worthy but ultimately slightly disappointing mixture of fussy ergonomics and tidy but cluttered sonics	3 heads, dual capstans, Dolby C/HX Pro, remote control		87

## DAT RECORDERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Aiwa Excelia XD-001</b> £1300	Very Good Very Good	Clear and very listenable recorder, roughly comparable to, but slightly sweeter sounding than Sony DCT-1000ES - but with an inferior front panel design	Track ID and search, remote	R	63
<b>Denon DTR-2000</b> £800	Good Very Good	Not cheap, but first rate DAT recorder, good to excellent fidelity in all modes, with a slightly cool detached quality when differences are detectable. Only, digital fade, fine cueing, remote control.	Digital LP/digital & analogue SP record/play, LP analogue play	R	93
<b>Grundig Fine Arts DAT-9000</b> N/a	Good Good	Conventional DAT recorder offering standard facilities. The deck is well made and equipped, and is engineered to a satisfactory quality standard. It performs to an acceptable standard, though it is not state of the art.	2/4 hour recording, mic inputs, digital in/out		69
<b>Luxman KD-117</b> £1499	Good Good	Slightly soggy, earth-bound sound quality, this model trails the other DAT decks tested so far	Two analogue inputs, remote twin address		63
<b>Sony DTC-1000ES</b> £1299	Very Good Very Good	Fine, consistent performer with accomplished tape handling and good build quality	Standard track ID and search, remote	R	63
<b>Sony DTC-55ES</b> £550	Very Good Good	Broadly comparable to a middle ranking CD player sonically, the Sony is particularly well equipped and well priced.	DAT with all record modes, inc LP (analogue) record	R	93
<b>Sony DTC-M100</b> £799	Very Good Very Good	Clean clear sounding second generation model with most of the features and sound of the DTC-1000ES	Mid-width, alpha-numeric display, remote, optical interfaces	R	63

## CD PLAYERS

Now entering its second decade, this all digital music source is well established despite high disc prices and the opposition of many hi-fi enthusiasts. Compact Disc's strengths over conventional vinyl are complete freedom from surface noise, ease of use, and more robust software. Remote control is just about standard on all new players.

However, many vinyl enthusiasts find CDs

sound less involving than top quality vinyl.

Prices average out at a little over £200, although entry level models are now available for little more than £100. Even the most basic models can sound very good indeed and employ state of the art decoding chips and the most useful play features. Extra money can buy remote volume control, audio 'tweaks', plus improved build and component quality control.

Digital outputs facilitate an easy upgrade path.

Machines can be split into bitstream and multi-bit with each school having its adherents. Bitstream is the newer technology and will probably win in the end, although the development time spent on multi-bit systems means that excellent results can still be obtained.

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Aiwa XC-007</b> £499	Very Good Good	Creditable sound despite inverted output, high tech engineering with very good lab performance. A worthy contender but not cheap	Remote, keypad, timer, digital output, pseudo 20 bit, dual DAC		64
<b>Aiwa XC-333</b> £149	Average - Average	Looks costly, well featured, well balanced technical performance and sound for money	multi bit, keypad remote, hdph (fixed)	R	88
<b>Akai CD-52</b> £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
<b>Akai CD-55</b> £230	Good Average -	Budget model which fails to compare with the CD52	Remote, hdph, Good programming		83
<b>Akai CD-62</b> £330	Average Very Good	Looks, build quality and the technical specification are right up to date. As it stands it sounds very good but if the indifferent lab performance could be improved, it would probably sound even better	Remote, programme, hdph, comprehensive display etc	BB	70
<b>Akai CD-73</b> £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
<b>Akai CD-93</b> £700	Good Very Good	Undoubtedly a CD player of real class in build, presentation, lab performance and sound quality, but also a shade expensive for formal Recommendation - though that's not to dissuade lovers of black lacquer wood finish	Track entry remote, menu display etc		58
<b>Arcam Alpha</b> £400	Very Good Very Good	Arcam's new star, its best CD player yet and great value	Remote, etc, coax dig. out	BB	83
<b>Arcam Black Box 2</b> £250	Very Good Very Good	An addition to the BB.1, it also offers improved sound and more inputs	Optical and wired input digital decoder	BB	76
<b>Arcam Black Box 3</b> £350	Good + Very Good	Top of a series of three decoders it can offer a high sonic standard with top class transports	Bitsream, auto input switching, optical & coax	R	88
<b>Arcam Delta 170 II transport</b> £600	Very Good Good	An upgraded Delta transport, it sounds different but not really better. More research is required here	Transport only, display off, usual programming		88
<b>Arcam Delta 70 II</b> £600	Very Good Good	Now in Mk II form a further improvement is seen in features, performance and sound quality. Solidly built and British	Now adds simple remote vol + std features; also display off	R	76
<b>Arcam Delta Black Box</b> £200	n/a Very Good	This rich, powerful and articulate sounding DAC transforms the majority of medium price CD players	Needs D-out CD players	R	60



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## CD PLAYERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Ariston CD1</b> £345	Good Good	Easy on the ear compact disc for those who like their music Radio 2 flavoured. And it looks good	digital output, remote control	R	87
<b>Cambridge Audio CD3</b> £649	Poor Good +	Unique internal configuration gives the CD3 a fluid and detailed sound falling off at the frequency extremes. The controls and displays are primitive	Optical/electrical digital out, remote control		87
<b>Carver TL-3100</b> £340	Average Average -	The sound quality did not live up to the excellent fascia. Carver's DTL did not aid the indifferent sound	DTL sound shaping, usual facilities, remote, memory		76
<b>Carver TL-3300</b> £700	Good + Poor	Carver needs to listen critically to CD sounds; in our opinion. DTL does not improve the recipe	DTL, remote, programming, digital output		83
<b>Conrad -johnson DFI</b> £1995	Average - Good +	Setting a decent standard and including an FET line preamplifier, the unusual DFI is worth investigating	Line preamp built-in, simple remote facilities		76
<b>Deltac PDM-One</b> £500	Average Very Good	A no frills audiophile bitstream converter at an affordable price	Coax-in, special cable and mains filter options	R	83
<b>Denon DCD 3520</b> £1000	Very Good Good +	Built like a battleship, this new model takes its place at the top of the Denon range with a smooth and powerful sound, quite free of graininess	Composite 20-bit DACs, full prog. features	R	72
<b>Denon DCD 620</b> £180	Average + Average -	Not competitive on performance though feature pack is good	Hdph + vol, edit, remote		83
<b>Denon DCD 920</b> £320	Good Average +	Highly featured and well presented but unexceptional performance	Everything! inc remote volume		83
<b>Denon DCD 960</b> £300	Good + Average	A fine feature package with good lab results, but unfortunately an unexceptional sound quality	Remote inc vol, hdph, keypad, well featured		88
<b>Denon DCD-1520</b> £550	Very Good Very Good	High tech, high profile, high gadget content, good sounding player at an almost affordable price.	Programme, hdph socket, remote, track entry, optical dig. output	R	70
<b>Denon DCD1420</b> £400	Very Good Average	Superbly equipped with a fine lab performance, this modern player needs a touch more sonic spice to get recommended	20-bit, very comprehensive, remote, power volume etc		76
<b>Denon DCD820</b> £270	Average + Average -	A powerful combination of features and build for the money ensures recommendation. The sound is just good enough	Well equipped, power vol, edit etc, digital out	R	76
<b>Dual CD5150</b> £280	Very Good Good +	In a real sense cloned from the rave Rotel RCD-855, this is also a great value all rounder: multi bit rules OK!	keypad remote, hdph (fixed), Philips based	BB	88
<b>Ferguson CD007</b> £130	Good Average	The cheapest recommendation in the test group; don't expect the earth but the value is good	Manual, digital output, headphone socket	R	64
<b>Ferguson CD008</b> £150	Average Average	Not as strong as its relatives, sample fault perhaps? Though performance is fair enough overall	Remote, midi digital output, 2x O/s, timeshare 16 bit		64
<b>Goodmans GCD-435</b> £140	Poor Average -	Goodmans has the power to source with more care than this, music centre quality!	multibit, remote, basic facilities		88
<b>Grundig CD9000</b> £1000	Good Good	Aimed at a market which puts external styling above sound quality. Although this player is of slightly above average competence, in most departments it is expensive	Remote, programme, hdph socket, calendar display etc		70
<b>Harman Kardon HK7300</b> £199	Average Average -	Budget low bit technology, does not deliver enough for a recommendation	No remote, no digital out; basic control features		83
<b>Harman Kardon HK7500</b> £299	Average + Average	Decided improvement over 7300 in all respects. Still fairly unimpressive sound	Remote, hdph + vol, good programming		83
<b>JVC XL-V231</b> £149	Excellent Average -	Text book lab result but below par sound, nice and boring. Must be some potential here	Remote, hdph (fixed), JVC 1-bit PFM		88
<b>JVC XL-Z1010</b> £499	Good Average -	Despite some high tech design and a good lab result, this model did not deliver good sound quality	32 track prog., disp. off, auto fade, 2 digital op		76
<b>Kenwood DP-8020</b> £500	Excellent Very Good	Fine build and finish, a fine performer in the lab, and in sound quality	Comp. remote, opt & coax dig. output, versatile	R	83
<b>Luxman D105u</b> £699	Average Average	Visible valves are essentially for show in this rather ordinary player - both sound and lab	"valves", remote inc vol, hdph, well equipped		88
<b>Marantz CD-40</b> £200	Very Good Good +	Like the Philips CD620 equivalent, this is the Philips/Marantz performance/value equation at its best	Multi bit, remote, hdph (fixed)	BB	88
<b>Marantz CD-50SE</b> £330	Very Good Very Good	Souped up CD50 delivers reference performance in its class. Worthy successor to the '65SE legend	Full remote, power volume. Hdph, (fixed). FTS. Good programming	BB	83
<b>Marantz CD-60</b> £330	Very Good Very Good	Lacking the SE flair, the 0 remains a fine player by market standards. Second best is more than good enough	Multi bit, remote inc. vol., hdph, FTS etc	BB	88
<b>Marantz CD-60SE</b> £380	Very Good Very Good	Luxury '50SE with superior remote volume and variable headphone socket; a fine performance all round	Optical digital output, full remote, power vol. FTS, hdph	BB	83
<b>Memorex CD1650</b> £200	Poor Poor	An overpriced music entre player. Surely the giant Tandy corp. can get a better standard than this?	remote, keypad, multi bit, midi		88
<b>Meridian 203</b> £495	Very Good Excellent	Exceptionally lucid, transparent and solid sound 'bitstream' converter. Always tidy and easy on the ear, but doesn't bulldoze the craggy bits	Stand alone converter, 32-48kHz, optical/electrical i/p	BB	87
<b>Meridian 206B</b> £950	Excellent Excellent	What a stunner! Audiophile quality from the reference one box CD player, and at a most realistic price	Differential bitstream, keypad remote, prgming	R	88



## COMPACT DISC OWNERS

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# The Directory

## CD PLAYERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Meridian 208</b> £1490	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
<b>Micro Seiki CDM100</b> £3850	Very Good Good Good excellent	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	Balanced output, remote, display blanking		72
<b>Micromega Duo BS</b> £499	Good Excellent	With a good transport it delivers a sweet musical sound at a high quality level	Bitsream D/A convertor, auto input switching	R	88
<b>Micromega Optic BS</b> £695	Average Good +	A bitstream rebuild of a Philips chassis, this player shows promise for the future	Bitstream, remote, hdph (fixed)		88
<b>Mission Cyrus PCM II</b> £400	Very Good Good +	Improvements in price and performance keep this classic remote player in the running	Remote vol, phase inv, dig op. PSX option	R	83
<b>NAD 5320</b> £169	Average - Average -	A low cost player devoid of features but at this low price it should still offer better sound	Budget facilities, 20 track program		76
<b>Nakamichi OMS-5EII</b> £1500	Good + Very Good	"... delivers near state of the art performance and build quality in a deliberately starkly functional package, but at a very high price..."	Skip and scan, simple track programming, I		51
<b>Nakamichi OMS-7EII</b> £2000	Good + Good	The only serious criticism here is of the price. And in our opinion you can get better sound quality for less elsewhere in Nakamichi's range	10 digit track entry programming, hdph		51
<b>Philips CD 850</b> £400	Very Good Very Good	An upgrade of the 840, Philips has got bitstream to work well here. A fine allrounder	Bitstream, keypad remote, FTS etc, etc	BB	88
<b>Philips CD610</b> £160	Average + Average	Built down to the price, the sound is OK while the package performance and features constitute fine value	Remote, hdph, programming etc	BB	76
<b>Philips CD630</b> £250	Very Good Good	Large clear display with an international flavour. Strong Philips style, high value CD player	FTS, digital op, versatile programming, remote,	R	83
<b>Philips CDC875</b> £300	Average + Average -	The changer works well and this machine is very well equipped. The sound quality is below par but may not matter too much in 'muzak' application	6 disc changer/dig op remote, hdph, memory,		76
<b>Philips CDV185</b> £350	Average + Average	Hard to value with the video singles facility but it all works well enough for a recommendation	Video singles + CD scart + digital out etc	R	76
<b>Pioneer PD-7500</b> £280	Very Good Average	Has potential but has not brought it off on sound. Good aspects of earlier models have been lost with the new technology	Low bit dual DAC, full remote, hdph		88
<b>Pioneer PD-91</b> £899	Excellent Excellent	Close to state of the art in nearly all areas - soundstaging, clarity and simple lack of artificiality. A well made and sophisticated player	Track entry remote, calendar display	R	64
<b>Pioneer PD-9300</b> £499	Excellent Average	A mid price flagship of excellent build and lab performance but only average sound - interesting though	Remote, 24 track programming, 2 dig. op		76
<b>Proton AC-120</b> £180	Average Average -	Fine styling, low price but barely average performance	15 track memory, simple design, remote, hdph		76
<b>Radford DAC1</b> £895	Good Good	Fine but slightly dated and costly package in performance terms — but flexible, musical and well built	DAC with 2 electrical + optical i/p, tape out		87
<b>Radford WS2*</b> £1095	Good Good	This player fails only in subtle ways. It is not the most engaging of players, but it is strong, forceful and dynamic, and it remains one of the better Philips 16-bit clones	Programming, intro scan etc	R	87
<b>Revox B126</b> £649	Very Good Good	Made in Switzerland so the build quality and technical performance is high, but then so is the price and the sound quality is only good	Programming, Revox system compatible		70
<b>Revox B226S</b> £840	Good Average	Top quality build and finish for the Revox system enthusiast. For high value sound look elsewhere	Remote vol, hdph, 19 track memory, digital op		76
<b>Rotel RCD-855</b> £250	Good Good +	Stripped for action, this well built Philips technology player delivers fine performance and sound. First rate value	Remote, 20 track prog, 1 audio op, 1 digital op	BB	76
<b>Rotel RCD-865</b> £300	Average Good	Curious mixture of bold musical presentation and foreshortened imagery. Grows on you though. One to audition with care	'bitstream', remote control	R	87
<b>SAE D102</b> £700	Good Good	Considering the high price of this player, most of the innards seem fairly prosaic. Sound quality and lab performance are both respectable enough, but hardly justify the price premium involved, though styling is unusual	Remote (inc volume), skip, scan etc.		58
<b>Sansui CD-X711</b> £550	Excellent Very Good	Luxury features, finish and sound from this class Sansui; no excuses required here	Hdph + vol, remote full programming	R	83
<b>Sharp DX150</b> £129	Average Average	This is one oversampled player which is rather outclassed for technical and sonic merit by the vast majority of the competition. Pretty enough but would you want to put discs in it?	Programmable, skip, search, repeat		70
<b>Sharp DX750</b> £179	Average Average	It has a remote control but it's too like the 150 which is rather outclassed for technical and sonic merit by the vast majority of the competition	Remote, programmable, skip, search, repeat		70
<b>Sherwood 1060C</b> £130	Average Average -	Very cheap but performance is not too bad. No remote unless matched to a Sherwood system	Multi bit, basic facilities, hdph (fixed)		88
<b>Sonographe SD1 (by CJ)</b> £799	Good Very Good	Distinctive with oak end-cheeks, using Philips based 14 bit x 4 oversampling, Conrad Johnson electronics make this a musically rewarding player	Full search programme and timing	R	Coll. '87
<b>Sony CDP-228ESD</b> £400	Very Good Average +	Good value, this is Sony's best mid price design and comes superbly equipped	Hdph, remote, rem vol, custom file	R	76
<b>Sony CDP-338ESD</b> £600	Excellent Good	Only a bit better than the 228, the 338 is a good machine, but not quite good enough for formal recommendation at the price	Custom file, remote, rem vol, hdph, shuffle etc		76
<b>Sony CDP-790</b> £200	Good Average	Great on the test bench but new tech sounds worse than its predecessor. Who does the listening?	Low bit, full remote, comprehensive facilities		88
<b>Sony CDP-X7ESD</b> £1300	Good + Average	A Sony flagship, build and finish is exemplary, styling is unusual but the sound is just average	Custom file, remote, 2 digital op.		76
<b>Stax Quattro</b> £2995	Very Good Very Good	Now in mkII guise this substantial player recreated exceptionally strong and convincing bass lines together with a beguilingly musical midband	18-bit DACs, 20-track memory, full IR remote, variable o/p	R	72
<b>Teac CDP-400</b> £249	Good Average	Fine in the lab, but good build quality is not reflected in the rather average sound	Low bit, keypad remote, hdph, versatile prgm'ing		88
<b>Technics SL-P277A</b> £160	Very Good Average +	High value, budget priced, yet well equipped and finished, a strong example in its group	Remote, programming, hdph + level. No d. op.	BB	83
<b>Technics SL-P550</b> £220	Very Good Average	Superb, slick presentation, well equipped, average sound, fine build	Hdph, rem. prog., edit/fade, dig. optical		83
<b>Wadia WT-2000/Digimaster 2000</b> £5495/£7300	n/a Very Good	Very high grade player which provides state of the art in believable music making from CD, and promises a degree of upgradeability	Transport/multi bit DAC - 32, 44.1, 48kHz o/s		Coll. '90
<b>Yamaha CDX-1030</b> £500	Good + Average	New tech but Yamaha hasn't managed to get this one sounding right. Otherwise its fine	Low bit, remote with vol, very versatile		88
<b>Yamaha CDX-530E</b> £180	Average + Average	A well balanced example using established DAC technology - worthy of consideration if not recommendation	Multi bit, keypad remote, hdph (fixed)		88



# The Directory

## CD MIDI SYSTEMS

So you want a hi-fi, but you don't want to make a fuss about it. A pre-packaged system with everything matching up and no aggravation may not rank with carefully chosen separates on sound quality, but there's no denying the attractiveness or popularity of this approach – the market for pre-packaged component hi-fi systems is considerably bigger than that for separate items, even ignoring the vast numbers of low-cost single unit stacker systems.

The arrival of compact disc led to a new

fashion for shelf-standing compact systems, or 'midis' as they are known in the trade, as a replacement for earlier floor-standing rack systems (themselves the upmarket development from music centres). Only some 330mm wide, midis can more or less match full-size (430mm) rack components for performance, and are certainly cheaper to make, ship, sell and buy.

Whereas specialist hi-fi is moving steadily towards ultra-simple 'no frills' components, midi systems tend to be sold on a feature count at a

price point, usually with little opportunity for demonstration and comparison. Our test programme includes extensive auditioning and lab testing, while making allowance for the different aspirations of designers and expectations of users. Key features valued highly by customers include system remote control, automatic switching, and double 'dubbing' cassette decks. The top end of the market is developing with surround sound audio/video-ready packages.

■ MODEL ■ PRICE	■ LAB ■ SOUND	■ COMMENTS	■ FEATURES	■ VALUE	■ ISSUE
<b>Aiwa NSX-800</b> £550	Average Poor	Undetailed, undynamic and largely unmusical system which throws it all away for an excessive range of tape related features	One box miniature plus remote control & speakers with dual auto reverse cassette mechanisms, mic mixing etc		89
<b>Aiwa X-D100</b> £1000	Average - Average	Very fully equipped with wide ranging in and outputs but poor upgradeability. Sound quality is reasonable on the whole	Digital & optical in/outputs, dual auto reverse, disc file CD		77
<b>Aiwa X-D80K</b> £550	Poor Poor	Congested and harsh sound quality, the cassette deck, amp and loudspeakers being well below par. The built-in timer adds some operational flexibility	Auto-reverse, CD synchro record, remote, timer		77
<b>Akai FX-800CD</b> £700	Very Good Very Good	Well thought through as a functioning system. Lacks the usual surfeit of controls, and sound quality is of an unusually high order. An excellent buy even at this price	Twin record & auto reverse cassette etc with 'intelligent' remote control	BB	89
<b>Ferguson HFD28</b> £300	Poor Poor	Similar to Goodmans 5000 system but with greater power and marginally superior sound	One-piece, semi-remote		77
<b>Grundig Studio Line 1</b> £330	Poor Average +	Intriguing package with warm, woolly but attractive sound let down by poor attention to detail and suspect cassette deck. Amplifier appears to be inadequately protected	CD/cassette tuner plus preset equaliser		77
<b>Hinari DK200 Disc Deck</b> £300	Poor Poor	Confused user interface is matched to inadequate electronics. Poor - and poor value	Single unit, two cassettes, CD, tuner, remote		77
<b>JVC Midi-W53</b> £500	Average Average	A potentially excellent middle price system spoiled by the loudspeakers and - to a lesser extent - the record player	Midi system with SEA equaliser		89
<b>JVC Midi-W900CD</b> £1111	Good Good +	A competent allrounder, with important convenience related features, and powerful linked recording facilities. Less strident speakers would be appreciated	Separates system, equaliser, auto-reverse cassette	R	65
<b>JVC Midi-W91CDM</b> £1111	Good - Average	Very well equipped (viz: multi-disc player, powerful tape related features) with acceptable but rather nondescript sound	Multi-disc player, twin auto-reverse cassette, equaliser		77
<b>Kenwood M-54CD/CDS</b> £600	Average + Average +	The M-54CD is the version without speakers and is the one to buy. The control system is A1 and the range of facilities offered is dazzling, but the amp and CD player are crude	Dual auto-reverse cassette, tuner/timer, CD, turntable with or without speakers	R	89
<b>Memorex System-550</b> £500	Average Average +	Above average electronics let down by very poor loudspeakers. Worth considering if the latter are replaced	Dual CD & cassette deck, tuner/timer, semi-auto turntable		89
<b>Pioneer P500</b> £400	Good Very Good	Costly but high grade compact with excellent consistency between sources and plenty of presence	Compact system, remote control, dual auto-reverse cassette	BB	89
<b>Pioneer S-11</b> £510	Average - Average -	Fine lower middle market system, with one useful extra - the built in timer. Only the record deck is disappointing	Twin auto reverse cassette, built in timers, one piece amplifier and cassette		77
<b>Pioneer S-330D</b> £1080	Very Good Very Good	High standard of reproduction on all sources, though mistracking with Dolby C was a limitation. There are few gimmicks and plenty of fine engineering	Dolby C/hx pro, multi-disc, amp with DAC etc	R	77
<b>Pioneer S-555</b> £800	Good Good	Confusingly well equipped, in some respects rather gimmicky system, weak on record performance (surprise!) but quite or very good elsewhere	Full feature midi system with graphic equaliser, dual disc CD	R	89
<b>Proton AI-3000II</b> £650 w/o spkrs	Average Very Good	Simple facilities and good, no-nonsense engineering combine to produce a system with genuine class. It's as easy to listen to as it is on the eye	Single box amp/tuner/CD/cassette with remote control; loudspeakers not included	R	89
<b>Sanyo 39CD</b> £260	Poor Average -	Acceptably compromised basic low end system, offers broadly respectable if unambitious music making for those on a tight budget	One piece + CD, non-remote, manual tuner		77
<b>Sanyo 49CD</b> £300	Poor Average -	Similar to 39CD, but with Dolby B, preset tuning, remote control and more power. Audio wise, it's more of the same, but there's greater stature when loud and cassettes are helped by Dolby B	One piece + CD, partial remote control, digital tuner	R	77
<b>Sanyo 59CD</b> £380	Average - Average -	Adequate performance overall, though endemic lack of pitch integrity takes edge from tape and records. Some inconsistencies in control system too	As 49CD, + full remote, auto source select, separate turntable		89
<b>Sanyo SYS-801CD</b> £360	Poor Poor	Typical low end midi system: simple controls, adequate CD and tuner, poor turntable and cassette, awful loudspeakers	Remote control midi system		89
<b>Sharp 320E</b> £500	Poor Poor	Poor quality system featuring tacky styling, a lack of sophistication - and overpriced	One box midi & turntable with surround matrix		89
<b>Sharp CD-X17E</b> £500	Average Average +	Highly specified miniature with detachable speakers. AC mains power only. Good sound let down by crude upper midband and treble. Expensive for what it is	CD luggable with dual cassette & tuner, detachable speakers		77
<b>Sony Compact 302D</b> £400	Average Average +	Fine low to middle price system whose only significant weaknesses are the poor tuner behaviour with weak signals and the turntable	Auto-reverse record, unidirectional play cassette, graphic equaliser etc	R	89
<b>Sony LBT-V702D</b> £700	Average + Good	Creditable up-market system with reasonable speakers and excellent cassette deck, amplifier, and a relative absence of superfluous gadgetry circuitry	Twin auto-reverse cassette deck, tuner/timer, video in/out	R	89
<b>Technics CDC30</b> £600	Good Good	A fine record player-less system whose electronics are well made and of moderately good performance, it's rescued from anonymity by excellent loudspeakers cassette, tuner	5 disc multiplay top loading CD player, twin auto-reverse	R	89
<b>Technics CDX50</b> £750	Very Good Very Good	Conventional, well built but button bound sound system with a nearly adequate turntable and excellent loudspeakers etc.	Dual auto-reverse cassette system (tested with optional graphic equaliser)	R	89
<b>Yamaha AST-C10</b> £530	Average + Very Good	Brilliant if flawed luggable with weighty, powerful bass, and a rare combination of expressiveness and clarity unprecedented from such a small package. Good features. detachable speakers, remote	Mains portable twin cassette/CD/radio system	R	77
<b>Yamaha YST-C11</b> £600	Average + Good	The cassette deck is a little wobbly in tone, but CD and FM are excellent, and bass depth is unusually prodigious from such small loudspeakers, though paid by with some loss of subtlety	*Astare, dual auto reverse cassette, luggable, with remote control		89

## TUNERS

The radio medium operates at a much lower profile than TV, but in areas outside pop music the BBC service is the envy of the world. Live Prom concerts can rival all other sources from a hi-fi perspective. Only the FM (VHF) bands give stereo hi-fi sound, though AM (MW & LW) are useful for certain transmissions in the UK.

Something of a hi-fi afterthought, tuners are often selected merely to match a chosen amplifier

cosmetically. However, the task they carry out is far from simple (or cheap), combining the skills of RF (reception) and audio (signal processing) engineering. The importance of the former will depend on local reception conditions, but money invested in a high quality outside aerial system is well spent.

Tuners come in two basic types. Analogue models tune gradually (and usually manually)

across the bands, and can have analogue or digital displays; they are often preferred for sound quality, and are certainly best for AM bands. Digital tuners offer convenient automatic tune facilities and hold many station positions in pre-set memories. (The Lab and Sound results for models tested in issue No. 65 refer to FM only. For AM results see under Comments.)

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Aiwa XT-003</b> £100	Average	Economically designed and built in the UK, but trade-offs have a marked influence on FM and AM sound quality.	FM/AM digital, 30 presets, no signal strength meters.		93 Supp.
<b>Akai AT-52L</b> £150	Very Good	Holds its own on FM against many much more expensive tuners, but AM is very poor	All bands	BB	65
<b>Akai AT-93L</b> £250	Good + Good +	By AM standards presentable (good) while FM delivers the goods	All bands, aerial switch	R	65
<b>Arcam Alpha</b> £120	Good Average +	Attractively classic British analogue tuner with sound quality comfortably better than most	FM/AM analogue	BB	50
<b>Arcam Alpha 2</b> £180	Good Average+	Re-styled to blend in with the Alpha system, Arcam's cheapest tuner makes up for its lack of features with a sensitive front-end and mellow sound.	FM/AM analogue, no presets, manual tuning + AFC	R	93 Supp.
<b>Arcam Delta 80</b> £300	Very Good Very Good	Hi-fi sound on FM, good on AM, a dependable British all-rounder	6AM, 6FM presets. FM/MW/LW display, manual tune	BB	55
<b>Creek T40 Series 3</b> £220	Average+ Average	Creek's FM-only analogue tuner is now in series 3 form, though the aesthetics remain unchanged. Our sample was hampered by an obvious bass 'hump' though production units are said to be cured.	FM-only analogue, no presets, manual tuning + AFC		93 Supp.
<b>Denon TU-260L</b> £100	Very Good Good+	A new cheapie from Denon with the bare minimum of features. Careful designwork promises a surprisingly open and vivacious sound, so don't overlook it!	FM/AM digital, 20 presets, manual and auto tuning.	BB	93 Supp.
<b>Harman Kardon Citation 23</b> £559	Good Very Good	Fine performance, interesting features and ease of use are this tuner's forté, and the sound quality is top notch	FM/AM seek/manual adjustment muting 16 presets plus remote control	R	60
<b>Harman Kardon TU920</b> £299	Good Average	Rather weak sound quality for the price despite good lab test results	16 presets, AM/FM, digital auto scan		55
<b>Harman Kardon TU9400</b> £250	Good Very Good	Striking in appearance and with a sound to match, this new digital tuner comfortably exceeded our expectations. On stereo FM it's HK's best yet.	FM/AM digital, 24 presets, auto-tuning + hi-blend + signal str. meter.	R	93 Supp.
<b>Linx Theta</b> £475	Good Very Good	A Magnum Dynalab on the cheap with the hallmark styling of this small British newcomer. Some of the best midrange from any tuner	Manual analogue tuning, no presets, signal strength meter	R	72
<b>Magnum Dynalab FT101</b> £599	Good Very Good	Although expensive for its fairly minimum set of facilities, its excellent sound makes up for what it lacks elsewhere	Analogue manual tuning, no presets, signal strength meter	R	72
<b>Marantz ST-40L</b> £130	Average + Good	A little slow to tune but once accomplished it provides a meaty and dynamic sound on FM. AM too has a little extra bite to its performance	FM/AM digital, 30 presets, manual/auto tuning	R	93 Supp.
<b>Meridian 204</b> £525	Good + Good	Pleasant sounding with a fine finish but does not make the grade at this price	FM only, auto scan, digital, remote, timer		55
<b>Musical Fidelity T1</b> £300	Good + Very Good	Top class FM stereo sound on good signal strengths from this audiophile model. Watch out for local CB!	FM only, analogue box dial, signal meter	R	55
<b>Naim NAT 01</b> £1294	Very Good Very Good	There may be better sounding tuners in the world, but we have yet to hear one	No presets. Two box, flywheel tuning FM only, Analogue	R	50
<b>Nakamichi ST-7E</b> £750	Good + Good +	Exceptionally good for weak-signal areas, and good all round	16 AM/FM presets, auto time digital		55
<b>Onkyo T9090 II</b> £590	Very Good Very Good	It has most of the facilities you could possibly want and more besides. Lab performance and sound quality are both good enough to ensure recommendation even at this price	FM only, digital, 20 presets, auto scan etc.	R	72
<b>Pioneer F-447L</b> £130	Average+ Average+	Equipped with a various IC-controlled servo and tuning aids, great fun to play with but of little practical benefit. Sounds OK but, on past form, we would expect more from Pioneer.	FM/AM digital, 36 presets, CCTS + R SS + manual/auto seek tuning.		93 Supp.
<b>Pioneer F91</b> £350	Excellent Good +	Easy to use, this model has excellent RF performance and scored very high ratings on the listening tests	FM/AM 24 presets	R	60
<b>Proton AT-300</b> £199	Good Good	The AT-300 is pretty on the outside, orthodox on the inside and rather dear. AM - poor	FM/MW only	R	65
<b>Quad FM4</b> £329	Very Good Good +	Fine sound, excellent ease of use, good build and finish and a more than satisfactory technical performance	7 presets. Digital	R	50
<b>Revox B260</b> £1120	Excellent Very Good	Sophisticated and expensive, the B260 is ideally suited to the rest of the Revox range and should also work well in other systems	FM - virtually everything	R	60
<b>Rotel RT-830AL</b> £110	Good + Good	Fine sounding budget audiophile material, no frills, no fuss	Manual dial analogue, FM, MW, LW	BB	55
<b>Rotel RT-850AL</b> £160	Good + Good +	Scoring well on listening tests and one of the best sounding tuners at its price level, it was a bit let down on AM but RF performance was good	FM/AM, digital	BB	50
<b>Rotel RT-870L</b> £230	Very Good Very Good	Rotel's top tuner is ruggedly built and includes plenty of sophisticated electronics. It's a very slick machine to use with a sound that's equally confident and refined.	FM/AM digital, 16 presets, selectable IF/RF + RF attenuation + signal readout.	R	R
<b>SAE T-102</b> £449	Good + Good +	Expensive for all the radio you get, but sounds interesting. AM - poor	FM/MW only	R	65
<b>Sony ST-S530ES</b> £200	Good+ Good	The cheaper version of Sony's revered '730 certainly looks and feels the part but its sound is, well, less startling. Civilised, yes, but lacks much enthusiasm.	FM/AM digital, 30 presets, hi-blend + Cal tone + manual/auto tuning.		93 Supp.
<b>Technics ST-670L</b> £200	Good+ Good+	Another very polite and refined-sounding tuner but one that does retain just enough sparkle to keep your interest. Plenty of widgets to play with too... facility, decent signal strength-meter.	FM/AM digital, 39 presets, selectable RF/IF + fine tuning	R	93 Supp.



# The Directory

## HEADPHONES

There are a variety of different approaches to headphone design, and examples of each turn up in this group. Amongst the more expensive esoteric models, electrostatic drivers are used in square open-backed phones such as the Jecklin and Stax models.

The majority of these come with some form of transformer which takes the signal initially from the speaker terminals on the amplifier. The actual speaker cables then travel from this unit

bypass switch to the loudspeakers.

The more down to earth models feature dynamic drivers in circular open-backed designs. The advantage of open backs seems to be a correspondingly open sound and a less claustrophobic feel to the music.

One can also of course hear external noises, as well as irritating the hell out of people on public transport.

The third category are closed-back designs,

which are useful in situations where it is necessary to block out background noise. Another means of distinguishing different types is the way they sit on your head.

There are three styles: circumaural models enclose the ear and rest on the side of the head; supra-aural designs press on the outer ear (pinna); and intra-aural types rest inside the ear and are popular amongst users of personal stereos.

MODEL PRICE	LAB SOUND	COMMENTS	TYPE	VALUE	ISSUE
<b>Aiwa HP-V99</b> £50	Good - Average +	Horn loaded in-ear miniatures with plenty of guts but not enough transparency or bass to compete with the headbanded competition	Intra-aural, closed-back, dynamic		75
<b>Aiwa HP-X30</b> £30	Good Good -	A flashy personal stereo phone which alternatively could be used at home. A slight LF tonal preference slightly colours the response, but it ain't a bad can	Supra-aural, closed-back, dynamic		75
<b>Aiwa HP-X80</b> £50	Good Good	A headphone that's highly suited to non acoustic music and portable sources, nicely made and slickly finished. Sound quality doesn't quite match the price	Supra-aural, closed-back, dynamic		75
<b>Aiwa HPEX-200</b> £90	Good Good	Modern looking and well finished, the Excelsias, as they are dubbed, had meaty bass and sounded reasonably open for the type	Circumaural, closed-back, dynamic		63
<b>AKG K135</b> £33	Poor Average	Despite a very appealing design the K135s don't live up to the usual AKG standards, though they do have the ability to reproduce rhythm well	Supra-aural, semi-open, dynamic		63
<b>AKG K145/S</b> £60	Good + Good +	Electrostatic tweeters combine with a dynamic mid/bass unit to create very confident sounds in a comfortable headphone. Balance is on the bright side	Supra-aural, semi-open, electrostatic/ dynamic	R	75
<b>AKG K240 Monitor</b> £60	Very Good Good	Something of a classic, these AKGs are very user friendly in all respects; sonically on the warm side of neutral	Circumaural, semi-open, dynamic	R	63
<b>AKG K280 Parabolic</b> £90	Good Very Good	A very revealing and unusual twin driver design that uses the same principle as a satellite dish to beam sound into the ear	Circumaural, open-backed, dynamic	R	63
<b>AKG K340</b> £140	Good Excellent	Heavyweight cans in most respects, the K340 with its electrostatic tweeter is a very revealing headphone. Gives the total electrostatics a good run for their money	Circumaural, closed-back, electrostatic/dynamic	R	75
<b>Audio Technica ATH 909</b> £55	Average Average	Quite impressive in the treble though a bit bass shy, the 909s worked well at high levels	Circumaural, semi-open, dynamic		55
<b>Audio Technica ATH 910</b> £65	Average Good	The closed-back 910s are an improvement on the 909s with a nice rhythmic quality rarely found with headphones	Circumaural, closed-back, dynamic	R	55
<b>Audio Technica ATH-911</b> £75	Very Good Very Good	Nicely finished dynamic headphones with all the trimmings, plus a very clean and subtle sound	Circumaural, open-backed, dynamic	R	63
<b>Beyer DT 325</b> £30	Very Good Average	Lightweight in more ways than one, the 325s may be a little bright for some systems and tastes but will suit duller sources	Supra-aural, open-back, dynamic	R	63
<b>Beyer DT330 Mk II</b> £45	Good Poor	Not the most revealing 'phones encountered, the 330s were nevertheless enjoyable and rarely offended	Circumaural, semi-open, dynamic		55
<b>Beyer DT550</b> £69	Good Good	On their own the 550s sound articulate with a slightly 'gritty' treble and 'keen' midrange; not suitable for headbangers!	Circumaural, semi-open, dynamic		55
<b>Beyer DT880</b> £90	Good Good	Well made cans with a warmish sound but fairly solid midrange, though they're not that informative for the price	Circumaural, semi-open, dynamic		63
<b>Beyer DT990</b> £100	Very Good Very Good	The 990s are definitely a significant pair of dynamic headphones; they have a smooth and yet revealing neutral sound that is hard to criticise	Circumaural, open-back, dynamic	R	55
<b>Beyer IRS690</b> £200	Good + Very Good	High quality infra-red headphones with soft comfy earpads and mellow but informative sound quality which is hard to dislike	Circumaural, open-back, dynamic	R	75
<b>Jecklin Float Electrostatic</b> £399	Good Excellent	One version of the state-of-the-art, these electrostatics have an openness of sound rarely found in the breed, with good dynamic range to boot	Circumaural-ish, open-back, electrostatic	R	55
<b>Jecklin Float Model One</b> £79	Good Very Good	Whilst very unusual in appearance, the Floats give remarkable sound quality and openness at a reasonable price	Circumaural-ish, open-back, dynamic	BB	55
<b>Jecklin Float Model Two</b> £99	Good Very Good	Helmet shaped and pretty unflattering but open sounding and comfortable in the long term. Note lack of adjustment means you should try before you buy	Circumaural-ish, open-backed, dynamic	R	63
<b>JVC HA-D990</b> £65	Good + Good +	Good looking well made cans that offer good sound quality for the money. Sonic nature is of the easy-going, laid-back variety	Supra-aural, closed-back, dynamic	R	75
<b>Koss K/6X Plus</b> £30	Average Poor	'Sixties-style' phones from the good ole US of A, their sonic style is unique and can make a system sound quite different	Supra-aural, closed-backed, dynamic		63
<b>Koss TD/60</b> £20	Good Average	Although they're devoid of channel identification and have a decidedly Stateside approach to sound, these are very listenable phones for the price	Supra-aural, closed-back, dynamic		75
<b>Pioneer SE-72</b> £30	Good + Average -	Neat, very nicely made personal stereo phones along the lines of Sony V3s. Sound is on the veiled side, good for aggressive sources	Supra-aural, closed-back dynamic		75
<b>Quart Phone 30</b> £40	Good Average	Whilst not as seductive as their PMB25 predecessor, the 30s are reasonably neutral and do improve on some of the competition - though not stunning	Circumaural, semi-open, dynamic		63
<b>Quart Phone 70</b> £70	Good Good	Competent performers that were hard to criticise but lacked the life and sparkle of which some of the competition are capable	Circumaural, closed-back, dynamic		63
<b>Quart PMB 25II</b> £40	Good Good	Despite a somewhat unconventional suspension system, the 25s put in a convincing and enjoyable performance with warm yet lively balance	Circumaural, open-back, dynamic	BB	55
<b>Quart PMB 65</b> £70	Good Good	Quite revealing and neutral albeit with the usual closed back sound, this competes well with more established models	Circumaural, closed-back, dynamic	R	55
<b>Quart PMB 85</b> £90	Average Very Good	These more expensive Quarts bear a striking resemblance to the Jecklin Float models and use two drivers per ear. Sound is a bit bass heavy but not bad overall	Circumaural, open-backed, dynamic		63
<b>Realistic Pro-X</b> £25	Poor Average -	Robust, unanimously uncomfortable and heavily veiled in sonic terms - not a great success	Supra-aural, closed-back, dynamic		75
<b>Ross RE-2760</b> £35	Poor Average	Stylish white cans from the only British firm in the business. Unfortunately sound quality is not up to par in this price range	Supra-aural, closed-back, dynamic		63
<b>Ross RE2530 CD</b> £20	Average Average	Rather an 'average' £20 phone that some found uncomfortable due to high pressure on the ears. Sonic balance is on the bright side	Supra-aural, closed-back, dynamic		75

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## HEADPHONES

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Ross RE2560 CD</b> £25	Good Average +	If you're not too fussy about quality of finish and don't have an elfin head then these British phones warrant attention. Sound could be smoother	Supra-aural, semi-open, dynamic		75
<b>Sennheiser HD40</b> £20	Very Good Good -	Very light and comfortable headphones with an even sonic balance that will suit most sources, but jack is 6.3mm and not suited to personals	Supra-aural, semi-open, dynamic	BB	75
<b>Sennheiser HD450</b> £35	Good Average	Modern, simple and lightweight phones that are remarkably robust and which turned in a relaxed if weighty performance that was at worst pleasant	Supra-aural, semi-open, dynamic	R	63
<b>Sennheiser HD480</b> £45	Good Average	Using the same shell as the 450s, the 480s were a little softened and unrevealing by comparison with their competitors	Supra-aural, semi-open, dynamic		63
<b>Sennheiser HD520</b> £65	Good + Good +	A very comfortable and musically capable headphone. If you've got this sort of bread to blow on cans, give 'em a blast	Circumaural, semi-open, dynamic	R	75
<b>Sennheiser HD530</b> £75	Very Good Good +	One of the better dynamics in its group, the 530s create a sense of space that eludes most sub £100 cans, and they're dead comfy to boot	Circumaural, semi-open, dynamic	R	75
<b>Sennheiser HD540 Ref Gold</b> £160	Good Very Good	The 540 Golds prove that dynamic headphones can be subtle, informative and capable of creating a remarkable sense of space	Circumaural, open-back, dynamic	R	55
<b>Sony A21L</b> £20	Good - Good -	Forward facing in-ear drivers on a folding plastic band provide exceptional clarity for such an inexpensive phone. However, no bass, and fit isn't to everyone's taste	Intra-aural, semi-open, dynamic	BB	75
<b>Sony MDR V3</b> £30	Average Good	Portable stereo oriented phones that are very nicely made and combine clarity with a pleasant lack of distortion	Supra-aural, closed-back, dynamic	BB	63
<b>Sony MDR V7</b> £70	Very Good Very Good	Classy sounding cans that are very slick and work well with all types of music, setting the standard in their price range	Circumaural, closed-back, dynamic	R	63
<b>Sony MDR-CD999</b> £120	Good + Very Good	A very nice headphone in all respects, the 999s are worthy of the best headphone outputs and high quality sources	Supra-aural, semi-open, dynamic	R	75
<b>Sony MDR-R10</b> £2500	Excellent Excellent	Costly state of the art sealed moving coil design built to the highest standards using the finest materials. Sound quality reflects this care, being big, clear, sweet and refined	Circumaural, closed-back, dynamic	R	72
<b>Stax Gamma pro/SRD-X pro</b> £296/£230	Very Good Excellent	The Gamma pros are like a stethoscope for your hi-fi, revealing subtleties that many loudspeakers fail to resolve	Circumaural, open-backed, electrostatic	R	63
<b>Stax Lambda Signature/SRM-T1</b> £470/£895	Very Good Excellent	The Signature when combined with the SRM-T1 valve driver must be the most transparent headphone available	Circumaural, open-backed, electrostatic	R	72
<b>Stax SR Gamma</b> £299 (inc. SRD-6 Adaptor) £100	Very Good Very Good	The next model down the Stax range from the Lambda, the Gamma is an excellent headphone with little to criticise but the price	Circumaural, open back, electrostatic	R	55
<b>Stax SR Lambda Pro/SRD-7SB Mk 2</b> 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
<b>Stax SR Lambda Pro/SRM-1</b> 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
<b>Stax SR34</b> £140	Average Very Good	The least expensive Stax headphones around, the SR34s are lively and rhythmic with good tight bass and a sweet midrange	Supra-aural, open-back, electret		55
<b>Stax SR84</b> £210	Very Good Very Good	The stepping stone between dynamics and full electrostatics, these electret phones are revealing, open and highly enjoyable	Supra-aural, open-backed, electret	R	63
<b>Yamaha YHL-006</b> £30	Average Average	Unusual personal stereo oriented phones that curl up when not in use. Earphones are like golf balls and balance is well suited to Walkmans	Supra-aural, open-back, dynamic		75

## PERSONAL STEREO

Whilst not exactly hi-fi components, personal stereos probably play more music to more ears than all manner of domestic systems and as such demand some attention.

Now that personal CD players have joined the ubiquitous Walkman in the market, the variety and standard of sound quality is huge, with obscurely named cassette players practically falling out of your cornflakes packet and the top Discmen going for £300 or more.

Despite their diminutive size personals attempt to incorporate as many gimmicks and features as possible, cassette players often

incorporating tuners, Dolby noise reduction or even graphic equalisers.

CD players are still relatively expensive, although prices have come down a lot, and don't tend to vary that much on the features front, rather the amount and quality of accessories differs. Rechargeable batteries are extremely useful and increasingly popular, some can now be recharged within the unit.

Most models come with a mains adaptor and some include 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. Cassette players do, on the whole, seem better suited to the outdoor life than their digital counterparts, as does the software.

Bear in mind that the sound and lab ratings given below cannot realistically be compared to those in other categories or between cassette and CD personals

## PERSONAL CASSETTES

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Aiwa HS-PL300</b> £110	n/a Average	Good looking, simply laid out player with a sensible selection of features and reasonable sound quality for a small player of this price	Dolby NR, chrome/metal eq, remote		78
<b>Aiwa HS-PX303</b> £150	n/a Good	Chunky and macho styling combines with comprehensive features and a half decent transport to make a powerful personal	Dolby BC, chrome/metal EQ, remote	R	78
<b>Panasonic RQ-P505</b> £100	n/a Poor	Very attractive and neat little player with nicely designed controls and XBS bass boost, but sonically it's limited by distinct wow and flutter	Dolby, chrome/metal eq, remote		78
<b>Panasonic RQ-P525</b> £120	n/a Average +	Fitted with what is effectively a bass only tone control and harbouring all the necessary features, the 525 also has a knack with tape replay	Dolby B & C, chrome/metal eq, remote	R	78
<b>Philips D6658</b> £30	Poor Poor	The low price limits sound quality, and this is not a spectacular machine, but it does a reasonable job, nonetheless	Graphic EQ, AM/FM		56
<b>Saisho PS90R</b> £40	Poor Poor	A bit of a jumble of features and gadgets, the PS90R has on-board speakers, an extending aerial and even records, but sound quality is dubious	Graphic EQ, types I, II & IV, AM/fm, recorder		56
<b>Sharp JC-270E</b> £130	n/a Average -	Slightly old fashioned design combines with a basic feature count and mediocre sound quality to make an apparently uncompetitive player	Dolby, chrome/metal eq, remote		78
<b>Sony Walkman Pro</b> £249	Good + Very Good	One of the finest sounding cassette decks on the market today. A mandatory Best Buy, it takes other personals to the cleaners (except on weight and power consumption)	Dolby B, C, types I, II & IV, record, line in/out, varispeed	BB	52/56
<b>Sony WM-701C</b> £200	n/a Good -	Beautiful little machine with all the necessary buttons'n'switches and a fundamentally exceptional sound quality, marred unfortunately by wow and flutter	Dolby B & C, chrome/metal eq, remote, folding phones		78



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## PERSONAL CASSETTES

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Sony WM-BF65</b> £90	n/a Average +	Regular size radio/clock/cassette player with a bright even open balance and Sony's forward facing phones. Not as glamorous as slightly more expensive models but sonically not bad	Dolby, chrome/metal eq, radio, alarm clock	R	78
<b>Toshiba KT-4549</b> £80	n/a Poor	Fully equipped with 10 preset radio and alarm clock, the KT-4549 is a bit aggressive on the sonic side and the bass boost system lacks balls	Dolby, chrome/metal eq, radio, alarm clock		78

## PERSONAL CDS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Goodmans GCD-10</b> £120	Average - Poor	Cheap, flashy and not short on accessories, the GCD-10 is a rather noisy player that left a lot to be desired on the sound quality front	13.5 x 3.7 x 18cm, 478g, mains adaptor		66
<b>Kenwood DPC-77</b> £270	Good + Very Good	Very chunky and well made, the DPC-77 is the only player to include a digital output and sounds very good through its analogue output - a suitable domestic alternative adaptors	12.8 x 3.5 x 14.5cm, 750g, digital output, mains & in-car	R	66
<b>Philips D6800</b> £130	Average Average -	A competitively priced and reasonably attractive looking player whose sonic performance is somewhat marred by a rather grainy top end	13 x 4 x 17.5cm, 516g, 3G.008 ready, twin hdph sockets		66
<b>Sanyo CP-12</b> £260	Average Good +	Sonically amongst the more enjoyable personal CD players and capable of revealing the musical aspects of a disc in an interesting and entertaining fashion	12.5 x 2 x 12.7cm, 380g, wired remote, mains adaptor	R	66

## CD PORTABLES

CD Portables or Yuppie Blasters as we classified them are basically portable stereos gone digital, ie a compact disc player is included alongside the usual AM/FM radio and single or double cassette deck. Compact disc is a novelty that seems to add a fairly hefty premium onto the price of the standard ghetto blaster, but the improved sound quality over standard cassettes may justify this for some.

In virtually every case a CD output socket is fitted which means that it's possible to play silver discs through a domestic amplifier and loudspeakers, thus they are some sort of substitute for standalone mains machines (as are the personal CD players). One drawback with having a CD player on board is that batteries are gobbled up even quicker than usual, up to ten batteries being required in some cases. Neither are the units

particularly light, the heaviest weighing eight kilos! However they do all run off the mains too, and come with an appropriate lead for this purpose. Other useful features common to most are spare input sockets to record from an external line source, and microphone sockets for recording live events (although the usual lack of record level adjustment is a nuisance).

MODEL PRICE	SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Aiwa CSD-XL25</b> £150	Poor	It's cheap, cheerful and not too low on features but sound quality from disc is frankly uninspiring	Twin headphone sockets		73
<b>Bose Acoustic Wave</b> £750	Very Good	Not exactly a CD portable as it doesn't play discs, but a highly versatile and stylish radio cassette player that has bass	Input sockets, Dolby NR, PA capable etc	R	73
<b>Grundig RR9000CD</b> £300	Average	Relatively slick machine with full CD function and volume remote control, low on features for price and unspectacular sounding	Remote, motorised volume pot, condenser mic		73
<b>Philips AZ8394</b> £200	Average -	Stylish in a wasp like fashion, unfortunately, the disc playing lets it down somewhat but otherwise it's OK	Twin decks, graphic eq., bass boost, condenser mic		73
<b>Sharp QT-CD43</b> £280	Average	Quite a beefy box that comes complete with remote control for volume and CD functions. It even has a surround sound option which enhances imaging	Clock, speaker outputs, powered volume pot		73
<b>Sony CFD-D73</b> £280	Good	The model we received was intended for the Japanese market and thus may not be entirely representative but it made reasonable sounds and has novel features	UHF bandwidth, input sockets, graphic eq., Megabass	R	73
<b>Sony CFD-DW83</b> £300	Average	A macho looking beast capable of highish levels, but unimpressive sound for the price. Nice styling and good for scratching	Clock, timer, balance, input sockets, graphic eq.		73
<b>Toshiba RT-8089</b> £200	Poor	Square and long but rather drab on the sound quality front, as well equipped as most but rather tinny in many respects	Clock, twin decks		73

## CABLES AND CONNECTIONS

Although cables and connections are sometimes thought to be the least important items in an audio system there has been a growing awareness in recent years that they have a significant effect on sound quality. To this end there is now a vast array of exotic cables and interconnects available to those interested in experimentation. The key observation on cables is that they are much more than mere accessories. Carrying the audio signal, just as any amplifier does, it's really not too surprising that they can influence sound quality.

The characteristics of any cable are determined by the materials and topologies utilised in its construction. The purity of the conductor, nature of the insulator dielectric, mechanical construction, physical geometry, RF characteristics, efficiency of screening and finally the connectors themselves, all play vital roles in the sonic character. These factors tend to vary more with interconnect cables which are used to carry the signal between active components like pre and power amplifiers. The interconnects summarised here were tested in 1m terminated

lengths and therefore the results and prices relate to that length - some cables may well perform differently when used in longer lengths. What's more, most cables are significantly cheaper if you are prepared to fit the plugs yourself. The features column contains information on the material makeup of the different cables with the following abbreviations: OFC - oxygen free copper, OFHC - oxygen free high conductivity (Audionote defines HC as high crystal), PC-OCC - pure copper by ohno continuous casting, LC-OFC - linear crystal oxygen free copper.

## INTERCONNECT CABLES

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Audio Technica AT6115</b> £40	Very Good Average	This cable sounds somewhat 'quieter' than the original LC-OFC interconnect, but is also less transparent and three dimensional	PC-OCC copper coaxial		59
<b>Audionote Copper ANA</b> £44	Average Good	ANC sounded punchy with a faintly lean but tightly-focused bass character. This crystalline precision waned slightly at higher frequencies	OFHC copper twin-axial	R	59
<b>Audionote Flexible Silver ANS</b> £99	Average Very Good	ANS scored a hit with its transparent midband and revealing but quite unforced treble quality. Bass transients were slightly softened	Silver signal & Copper screen	R	59
<b>Audionote Silver ANV</b> £154	Poor Excellent	Far weightier-sounding than the flexible ANS, ANV interconnect also possesses a fair degree of treble clarity and sparkle	21 strand silver Litz		59
<b>Audioquest Livewire Ruby</b> £49	Average Good	Smoother sounding than the Topaz, the extended crystal Ruby is less grainy and coarse, better able to resolve complex passages	FCL copper twin axial	R	59
<b>Audioquest Livewire Topaz</b> £35	Good Average	Sounding 'bigger' and faintly richer than Reference 2, Topaz was also slightly grainy at the top end	Gold-plated plugs, OFHC copper		59

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## INTERCONNECT CABLES

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Budget OFC</b> Circa £7	Average	Subjectively, this cable did lift much of the aural fog experienced with scrawny standard hook-up leads.	OFC		59
<b>Budget Patch Cords</b> (see text)	Average Poor	As thrown in gratis with cassette decks and the like - frequency extremes were restricted and performances were veiled	Thin coaxial		59
<b>Chord Mono-t</b> £27/1.2m	Average + Average +	Offers a slightly rolled-off treble but its rich sound is an upgrade from patch-cords	Unsymmetrical 4-conductor cable		83 Supp.
<b>Deltec Black Slink</b> £152	Excellent Excellent	Inherently neutral, the cable faithfully reproduced broad and deep stereo soundstages with precise focus and a sense of tactility	8 silver plated OFC strands PTFE dielectric	R	59
<b>Deltec Gortex Black Slink</b> £152	Very Good Excellent	A true reference quality cable providing an exceptionally detailed and transparent sound	Symmetrical, 8-conductors, Gore-tex ins.	R	83 Supp.
<b>Deltec Slink</b> £32	Good Very Good	Ideally used in lengths of under 4 metres, it errs on the lean side of neutral but has an uncommon transparency in the midrange	4 silver plated OFC strands PTFE dielectric	BB	59
<b>Denon LC-OFC</b> N/A separately	Very Good Average	Supplied with Denon's dearer CD players, this cable introduced a peculiar 'twangy' coloration at high frequencies, and a slightly soft bass	LC-OFC, non-magnetic gold plated plugs		59
<b>DNM Solid-core</b> £23	Average Good	Transparent in the midband and full of sparkling detail in the treble, low bass was slightly curtailed (unterminated price £2.30 per m.)	Single strand nickel-plated copper. Unshielded	R	59
<b>Isoda Electric HC-05-PSR</b> £54	Good Good	A pleasantly lively and fluid sounding cable though softens some subtle, midband detail	Aluminium + brass multistrand cable	R	83 Supp.
<b>Kimber Kable KC-1</b> £65.55	Very Good Average	Tonally faintly leaner and brighter than the more open-weave PSB, KC-1's treble detail was just too sharp and grainy	Multi-gauge PTFE dielectric		59
<b>Kimber Kable PSB</b> £41.40	Very Good Very Good	An exceedingly transparent midband but slightly 'clanky' treble. It always managed to sound remarkably uncluttered and open	OFC, PTFE dielectric	BB	59
<b>Monster Interlink 300</b> £24	Average + Average	A big, larger-than-life sound but with some emphasis of midband detail and loss of bass	Screened, symmetrical cable		83 Supp.
<b>Monster Interlink 400</b> £34	Good Good	Bass is solid and punchy, counterpointed by a slightly overblown midband which tends to make vocalists sound larger-than-life	Multi-gauge	R	59
<b>Origin Live Soli-Core Super</b> £60	Good Average	Improves over previous Soli-core samples in stereo depth and bass weight, but a 'loud' treble presentation remains	Solid-core gold-plated AT plugs		59
<b>QED Incon Graphite GP1 Gold</b> £18.95	Average Average	A shielded version of Incon P1, it sounded thicker at the frequency extremes, the top end being coarser and more out of focus. Good for long runs though	OFHC Graphite shielding	R	59
<b>QED Incon P1-Gold</b> £15.95	Good Good	A lively open presentation that just borders on the lean side of neutral, the quick and lucid delivery affording considerable musical insight	OFHC, gold plated Deltron plugs	BB	59
<b>Sterling</b> £250	Average Good	Possessing a neutral if faintly rich overall balance, it supplies a pleasantly open and transparent perspective. (Reviewed in pre-production form.)	2 silver strands per conductor		59
<b>Supra EFF-1</b> £60/0.75m	Average Average	A new, costly and mildly disappointing addition to the range. Edgy, smeared sound	Screeded, symmetrical dir. cable		83 Supp.
<b>Thorens SAC 100</b> £50	Good Average	Performance is undermined by a slightly coarse and splashy treble, not necessarily bright, simply rather confused - and fine detail lacks resolution	Silver-plated OFC, coaxial		59
<b>van den Hul MC-D300II</b> £45	Poor Good	It tended to highlight some upper mid detail, but a generally open and spacious acoustic proved its saving grace. Slightly soft at LF	Silver plated single strand VdH plugs	R	59
<b>van den Hul MC-Gold</b> £250	Average Good	It possesses a rich and beguiling treble balance that matches a weighty, slightly warm bass character. Seductive balance may prove worthwhile in some circumstances	Silver & gold plated copper		59
<b>van den Hul MC-Silver</b> £750	Good Good	Although remarkably transparent for an asymmetric design this costly cable was not considered to be of 'state-of-the-art' standard, and is bettered by cheaper models	19 silver plated copper strands		59
<b>van den Hul MCD-1021II</b> £69	Good Good	Possessing the same endearing qualities as the D300, it presented open and transparent soundstages and improved timbral resolution	Twin axial silver plated copper	R	59
<b>van den Hul Thunderline</b> £150	Good Average	Thunderline essentially parallels the sonic performance of the cheaper D102. HF is occasionally tainted by a 'tizzy' coarseness, bass is tight and dry	Silver plated 'matched copper'		59
<b>Vecteur 8045</b> £49	Very Good Good	Sounding solid and forthright it might seem slightly cold in some systems but the treble 'edge' is mercifully clean. Very low frequencies were a little lacking in 'slam'	LC-OFC signal & screen	R	59
<b>Yfere LC-OFC Quad</b> £85	Very Good Very Good	New cable with a very refined sound. Very transparent with good sense of focus and space	Symmetrical, star-quad with screening	R	83 Supp.

## LOUDSPEAKER CABLES

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Absolute Wire Force 4</b> £4.75 per metre	Good Average +	By current standards there was a loss of fine, sharp detail at the frequency extremes, but it has a big, friendly sound	744 OFC strands, PVC dielectric		64
<b>Audio Innovations OR-200</b> £16 per metre	Average + Average +	Open and detailed throughout the midband but a grainy coloration tended to corrupt subtle timbral information at very high frequencies	200 LC strands, polyurethane and cotton dielectric		64
<b>Audio Technica AT6120</b> £10 per metre	Average + Average	Compared to earlier LC-OFC cables, this PC-OCC derivative sounded smoother and less aggressive	PC-OCC, PVC dielectric		64
<b>Audionote AN-SP</b> £100 per metre	Average - Excellent	A clean and open sounding cable that offered a deep and pleasantly detailed perspective. Bass was slightly restricted, but seemed tight and coherent	15 silver strands, polyethylene dielectric		64
<b>Audioquest Livewire Black</b> £15 per metre	Good Good	It proved clear and punchy but with some grain across the treble. Nevertheless Black remains an interesting concept and proved better than Livewire Green	OFHC, surface only - foam core construction	R	64
<b>Audiospec Latitude L4</b> £3 per metre	Average + Average +	Warm, ruddy but also mildly muddy sound with some slight emphasis of bass notes	Fig.-of-eight multi-strand, PVC diel.	R	83 Supp.
<b>Bellwire</b> 12p per metre	Poor Average -	Broadly speaking it delivered a bright and tizzy sounding treble with a fairly open and detailed mid with little or no bass resolution	0.5mm single strand, PVC dielectric		64
<b>Deltec 8S</b> £144 - 5m pair	Good Good +	The unerring transparency and detail resolution of 8S throughout the midband makes it a cleaner and more spacious sounding cable than others at the price	4 silver plated OF copper strands, PTFE	R	64
<b>Deltec Gortex Black 16</b> £528 - 4.5m pair	Very Good Excellent	Improvements in bass resolution, transparency and treble poise maintains status of this cable	Silver-plated OF copper with Gore-tex ins.	R	83 Supp.
<b>DNM Solid core</b> £3 per metre	Average Average	A good general-purpose solid-core, though too bandwidth limited for high-end applications. Sounds great in some systems	0.65mm single strand, webbed PVC dielectric		64
<b>Exposure</b> £2.50 per metre	Good Good	It could sound a trifle matter of fact but this emotive flattening was also somewhat dependent on the music program. It is also highly suited to long runs	56 OFC strands, webbed PVC dielectric	R	64
<b>Furukawa FS-2F09</b> £6 per metre	Good Average +	Some loss of bass weight but otherwise offers a fresh and open sound. Good value	Multi PC-OCC stranding, PVC dielectric	R	83 Supp.
<b>Furukawa FS-2T15S</b> £50 per metre	Good + Very Good	An advanced solid-core cable with a highly fluid, detailed and inherently musical sound	Single 1.5mm Super PC-OCC	R	83 Supp.



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## LOUDSPEAKER CABLES

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
<b>Kimber 4VS</b> £7.15 per metre	Average + Average	Similar construction to 4TC but dissimilar materials infer a slightly tizzy sound	Open-weave, multistrand, PVC ins.		83 Supp.
<b>Kimber Kable 4PR</b> £54 - 5m pair	Average Average +	This directionally marked cable benefited from an open and airy treble quality but seemed notably leaner than 4TC. Bass was well round and satisfyingly taut	4 x 7 copper strands per conductor, PVC diel.		64
<b>Kimber Kable 4TC</b> £17.65 per metre	Good Good +	4TC made a great impression in the listening tests with an open midband, a smooth and unfatiguing treble with slightly rich but suitably weighty bass	OF copper, PTFE dielectric	R	64
<b>Linn K20</b> £2.20 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
<b>Marantz ML-55S</b> £30 - 10m	Average Average	Subjectively, this cable offered a loose and splashy treble which, though not overtly bright, did compromise both tonal and timbral accuracy	30 OFC strands, 3 conductors PVC diel.		64
<b>Mission Cyrus</b> £2.50 per metre	Average + Good	Because of its impedance characteristic this cable will deliver a smooth and unfatiguing treble balance with loudspeakers offering an easy load	0.8mm single strand, PVC dielectric	BB	64
<b>Monitor PC Silverline PC4</b> £5.75 per metre	Good Average	Sonically, it laboured under a heavy and claustrophobic balance, lacking the see through transparency and lucidity of the better solid core cables	2072 x 0.07mm silver plated copper strands		64
<b>Monster Original</b> £4.50 per metre	Good Average +	Original sounded relatively congested and murky at higher frequencies but possessed weight and conviction in the bass	Multistrand		64
<b>Monster SCI 16-4</b> £3 per metre	Average Average	Not as thick-sounding as early Monster cables but still slightly unbalanced. Versatile construction	4 x 16-gauge conductors, OFC strands		83 Supp.
<b>NVA LS1</b> £6 per metre	Average + Good	A light and breezy sounding cable best suited to short lengths, NVA benefited from a clear and transparent outlook	7 x 0.25mm silver alloy strands, PTFE	R	64
<b>Origin Live Soli-Core Ordinary</b> £1.80 per metre	Good Average +	Subjectively it bettered the performance of the costlier Super version, affording a pleasantly detailed and spacious soundstage with firm bass but slightly coarse treble	1.8mm and 0.5mm single strands	R	64
<b>QED 79-Strand</b> £1 per metre	Good Average	For much of the last decade QED 79-Strand has been the first port of call for enthusiasts on the upgrading ladder, a tradition that should still hold true today	79 strand, PVC dielectric	R	64
<b>QED Flat 200</b> £2.20 per metre	Good Good	I detected a degree of confusion at low frequencies but this did not stifle the acoustic atmosphere which remained open and positive	200 strands, flat webbed PVC dielectric	R	64
<b>QED Incon Graphite</b> £2 per metre	Average + Average +	This graphite version of Incon sounded cruder and generally more heavy handed than the cheaper unshielded type. Overall presentation was mildly restricted and cloaked in a faint aural fog	OFHC, polymeric screen		64
<b>Rotel Supra 10</b> £6.91 per metre	Good + Good	Supra 10 provided a very free and open sound that was unhindered by any excess at low frequencies. Worth its weight in scrap copper!	2,562 OFC strands, webbed PVC dielectric	R	64
<b>Rotel Supra 4</b> £2.57 per metre	Good + Good	Ideal for both long and short runs, it furnishes a big sound that benefits further from a smooth, unfatiguing treble	1,036 OFC strands, webbed PVC dielectric	R	64
<b>Solid core mains cable</b> 36p per metre	Average + Good	It enjoys much of the smooth treble and articulate midrange usually associated with the better solid core derivatives. Lean but taut and rhythmically coherent	1.5mm square, 3 cores, PVC dielectric	BB	64
<b>Sterling</b> £99 per metre	Average Average	This pre-production sample possessed a strangely muddled and reserved sound quality. It suffered from a progressive instrument modulation	Pure Silver, PTFE dielectric		64
<b>Townshend Isolda</b> £400 - 5m pair	Average + Good	Isolda possessed a truly dark background out of which rose a very solid and extended bass together with an excellent sense of transparency through the upper octaves	8 coax cables per conductor - very thick	R	64
<b>van den Hul CS-122</b> £5.95 per metre	Average + Good -	Characterised by a driving and powerful bass, CS-122 is a heavy sounding cable. Mid treble detail was refreshingly clear but there was a slightly muted air about the extreme treble	19 x 0.45mm silver plated strands, webbed rubberised dielectric	R	64
<b>van den Hul CS-352</b> £12.95 per metre	Good Average +	Subjectively it sounded like CS-122 only more so, the deep rumbling bass tending to overwhelm subtle musical details. It also appeared a trifle peaky in the treble	7 x 0.76mm + 168 x 0.125mm silver plated strands, rubberised diel.		64
<b>van den Hul SCS-12</b> £29.95 per linear metre	Good + Good +	SCS-12 set a high standard with a tight and well focused soundstage populated with tactile stereo images. Bass wasn't as extended or resolved as some other cables	19 silver plated strands of 12 different gauges, PTFE dielectric	R	64
<b>van den Hul SCS-2</b> £99.95 per linear metre	Good + Good +	Overall it was commendably neutral and transparent but nothing less would be acceptable bearing in mind the tremendous cost of a stereo pair	665 silver plated matched crystal copper strands, PTFE dielectric	R	64
<b>Vecteur R-CV30</b> £4.99 per metre	Average Good	Subjectively the better of Vecteur's cable line-up offering a neutral overall perspective but slight loss of detail resolution at both frequency extremes	4 x 0.8mm LC-OFc PTFE insulated strands	BB	64
<b>Vecteur S-CV90</b> £69 per metre	Average + Average +	It seemed both less transparent and integrated throughout the midband than R-CV30, though both frequency extremes were spruced up with a tighter sharper delivery	6 x 0.7mm LC-OFc strands		64

## STANDS AND SUPPORTS

It's becoming more and more apparent that all the components in a hi-fi system benefit from being placed on the right kind of support. It is already acknowledged that performance of electro-mechanical transducers, such as turntables and loudspeakers, can be greatly improved by using highly rigid supports. This notion has been expanded to include electronics such as amplifiers and compact disc players, and inevitably a broad range of stands and supports have been produced to cater for this requirement.

With loudspeaker stands there seems to be two broad schools of design. The most common

is the open frame type which uses square section steel tubing (usually less than an inch square) made up to form a tripod or quadropod stand usually fitted with spikes top and bottom to ensure good coupling to both floor and cabinet. However, for reasons of domestic harmony this latter option is often not pursued as eagerly as perhaps it should be.

The alternative approach is to use mass. Larger section (approximately 3 inch x 2 inch) tubing is welded between square top and bottom plates and filled with sand and/or lead shot. Again, this type uses spikes at the base but Blu-

tack or the like for coupling with the cabinet.

Equipment supports generally place isolation quite high on the list of priorities and usually use a lightweight steel frame to support an MDF platform. Once again spikes are used to minimise contact with the platform and ensure good coupling to the floor. Minimising weight without compromising rigidity seems to be the aim with turntable supports but those designed for electronics often employ some form of damping to kill vibration, sometimes in the form of mass.

## LOUDSPEAKER STANDS

MODEL PRICE	LAB SOUND	COMMENTS	TOP PLATE SIZE, HEIGHT	VALUE	ISSUE
<b>Appolo A10</b> £52.50	4 leg Average	A robust and lightweight model, it would make an ideal upgrade for those still happy with the big boxes of old.	19 x 19cm 44cm	R	58
<b>Appolo A820</b> £44	4 leg Average	A light open-framed budget design slightly lacking in rigidity and subjectively superceded by other stands costing £10 more.	19 x 19cm 53cm		58
<b>Audio Dimensions Classic 2</b> £110	4 leg Average	Built in the heavyweight tradition and damped with chalk. Solid, stable, tactile sound	20.3 x 20.3 x52cm	R	83 Supp.
<b>Foundation Fred</b> £70	2 leg Average	With sand filling the Freds made speakers sound tight and coherent with a more even balance.	19 x 19cm 36/43/59cm		58
<b>Foundation Maggi</b> £159 to order	Plinth Very Good	Made for Magneplanar and other similar panel speakers they seem to have a healthy effect on the sound quality thereof.	50 x 2cm 2cm	R	58

# The Directory

## LOUDSPEAKER STANDS

MODEL PRICE	LAB SOUND	COMMENTS	TOP PLATE SIZE, HEIGHT	VALUE	ISSUE
<b>Foundation Pi</b> £269 to order	2 leg Very Good	Overpriced in material terms the Pi nevertheless has a very positive effect on the low frequency performance of conventional speakers.	20 x 20cm 25/38/46/5	R	58
<b>Foundation Sir Fred</b> £80	2 leg Good	Upgraded 'Fred' with special in-fills. Sweet sound but one that also lacks bite and edge	19 x 19 x46.5cm		83 Supp.
<b>Golding Black Satin</b> £65	1 leg Very Good	Screw together stand tastefully hewn from medite. Some loss of bass but still pleasantly rhythmic	18 x 20 46cm	R	83 Supp.
<b>Heybrook HBS1</b> £99	4 leg Very Good	With its new aluminium base frame the HBS1 fared very well in the listening tests. It allowed much of the speakers own 'sound' to remain intact.	23 x 21cm 47cm	R	58
<b>Heybrook Point 5</b> £55	3 leg Very Good	An unusual triangulated open frame stand that can help certain speakers sound more transparent and fluent - a good value stand	23 x 21.5cm 47cm	BB	58
<b>Linn Kan II</b> £79	4 leg Very Good	Built to support Linn's Kan speaker this stand is well suited to the task, but is less successful with other loudspeakers.	19 x 16cm 59cm		58
<b>Linn Sara</b> £85	4 leg Very Good	The Sara exhibits some odd properties so its use other than with the Sara loudspeaker should be viewed with caution.	25 x 21cm 53cm		58
<b>Monotrak Engineering M1</b> £58	1 leg Good	The M1 gave the mid and treble a commendably smooth and detailed presentation but bass sounded rather lacklustre and muddy.	19 x 18.5cm 48cm		58
<b>Monotrak Engineering M4</b> £58	4 leg Very Good	Begging comparison with Heybrook's HBS1 the M4 maintained much of the openness and forthright detail of that model.	23 x 21.5cm 53cm	R	58
<b>Monotrak Engineering M4S</b> £58	4 leg Very Good	Its stature and stability would seem to mark it out as most suitable for smaller, lighter cabinets. The M4S possessed an open midband and clear treble.	20 x 17.5cm 53cm		58
<b>Origin Live Advanced</b> £145	3 leg Good	One of three related tripod-like stands. Stable sound with good sense of depth and power	22 x 20.6 44cm		58
<b>Origin Live Three Leg</b> £89	3 leg Good	An unusual tripod stand devoid of top plate and taking up more floor space than normal, subjective and technical performance was exemplary.	(support area) 22 x 17.5cm 52cm	R	58
<b>Partington PP4</b> £60	1 leg Good	The PP4 offers a rather mixed performance, though when damped with sand infill it was less ready to embellish the overall sound and low frequencies became tauter and quicker.	18 x 16.5cm 48cm		83 Supp.
<b>QED TS22 Tristand</b> £60	3 leg Very Good	Most tracks sounded uplifted or buoyant, never thick nor coloured. It worked well with most of the speakers tried and encouraged a fluid and revealing midband.	19 x 17cm 45/50/58cm	BB	58
<b>Stand Design Z20</b> £70	1 leg Excellent	Well built and finished with optional sand in-fill. Ideally suited to Wharfedale 505.2's	16.5 x 19 50cm	R	83 Supp.
<b>Target HJ15/3</b> £100	3 leg Very Good	Sound quality was basically very good though without the sand infill some loudspeakers may sound a little unbalanced as both bass and treble regions are subjectively exaggerated.	28 x 28cm 40cm	R	58
<b>Target HS20</b> £60	1 leg Excellent	This monopod stand can be used either filled or unfilled and encourages different characteristics in the sound accordingly.	19 x 16.5cm 53cm		58
<b>Target T-40</b> £48	2 leg Very Good	Not very stable, tends to infer a slightly forward, ragged sound with diluted pitch	19 x 19 40cm		83 Supp.

## EQUIPMENT SUPPORTS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE (H x W x D)	VALUE	ISSUE
<b>Alphason R444</b> £120	Rack Good	A heavyweight structure with stressed MDF shelves, ideally suited to the Sonata turntable	82 x 60 x 39.5cm	R	83
<b>Audioquest Sorbothane Feet</b> £40 for four	Feet Good	These large gumdrops are very useful for damping vibrations in amplifiers and especially CD players.	6.5 x 2.5cm (circular)	R	57
<b>Cornflake TCS6</b> £60	Shelf Good	A squat and rigid frame supports a Medite top board with four adjustable spikes, better suited to suspended sub-chassis turntables.	43 x 23 x 33cm		83 Supp.
<b>Foundation Stable Table</b> £100 (with Supe)	Table Good	Similar to Stand Design's table though less well finished and certainly less stable	64 x 46.5 x 36cm		58
<b>Origin Live Skyline Super</b> £100	Table Good	An asymmetric table that helps provide a quick, lucid and solid sound with most decks	41 x 50 x 40cm	R	83
<b>Roksan Equipment Table</b> £169	Rack Good	An upgradable/expandable system suited to Roksan's Xerxes if not other competing turntables	65 x 52 x 38cm		58
<b>Sound Organisation Table</b> £55	Table Very Good	A deceptively simple structure that just happens to be engineered in a thoughtful, and ultimately successful manner.	37 x 45 x 35cm	BB	57
<b>Sound Organisation Wall Stand</b> £40	Shelf Very Good	The first of its ilk and still amongst the best, this simple framework represents a vast improvement over standard furniture shelves.	27.5 x 43 x 35cm	BB	57
<b>Sound Organisation Z022</b> £97	Table Excellent	A small but costly table made from thin steel tubing. Suited to the LP12 but not other decks	49 x 45.5 x 36cm		58
<b>Stand Design Duplex</b> £75	Table Very Good	Well made and nicely finished, this table is broadly compatible with most heavy turntables	63.5 x 46.5 x 36cm	R	83
<b>Target TT1</b> £46	Shelf Excellent	This rigidly braced shelf offers both good sound quality and material value for money.	26 x 46.5 x 35.5cm	BB	57
<b>Target TT2</b> £55	Table Very Good	Standing up to the best in most areas, the TT2's only real foible concerns a slight loss of bass 'slam'.	52 x 46.5 x 35.5cm	BB	57

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## TELEVISIONS

The standalone television set is rapidly evolving into a key component in integrated home entertainment systems

NICAM digital stereo sound is now being broadcast for many hours every week, although you will have to check to see what is available in your area. The IBA are quite open about it, but the BBC tend to be more secretive.

Most up-market stereo CTVs are now equipped with NICAM decoding and rather more attention is being paid to the built-in amplifier

and speakers.

NICAM is also available on Hi-fi stereo videorecorders (see above), and this is usually the more practical route for hi-fi system integration, as well as allowing favourite musical events to be saved on tape. To both watch and record with stereo sound will require NICAM on each of course, but the decision to update one or the other first will probably have as much to do with the age of the respective components than the convenience of the interconnections.

The ten CTVs tested so far are all luxury stereo models with 'flatter squarer' 59cms tubes of various kinds. Best suited to a viewing distance of about 7ft, these are one size up from the most popular 51cms size sets and take about 23 per cent of the top 30 per cent of the market.

All have remote control as well as Fasttext (enhanced teletext), and many have on-screen graphics and flexible in/out socketry.

MODEL PRICE	LAB SOUND	COMMENTS	SCREEN SIZE, FEATURES	VALUE	ISSUE
<b>Ferguson 51L5</b> £499	Average Good	This nicely (monitor) styled set delivers a fine all round performance at a very competitive price. Ergonomics are better than most thanks to good on-screen graphics	51cm MP FST, NICAM, Fastext, OSG	R	86 Supp
<b>Grundig ST-63-460TT</b> £649	Average - Average +	Bulky set's shape resembles a square-rigged sail; screen tilts back slightly, so might suit floor mounting, though beware room reflections. Picture quality is good, if a touch bland, but ergonomics are fairly impenetrable - no on-screen graphics either. Halfway respectable sound quality is over-enriched by cabinet drone.	59cm FST, NICAM, Fastext		76
<b>ITT Nokia</b> £629	Average + Average -	Bulky square-rigged shape helps deliver a respectable standalone sound quality at a modest enough price. A versatile set with good handset but no on-screen graphics, the picture quality of our sample lacked fine detail resolution, lending a 'soft focus' effect	59cm FST, NICAM, Fastext		76
<b>JVC AVS250</b> £500	Average + Average -	This compact and delightfully versatile non-NICAM set has respectable on-board stereo sound and lovely screen graphics, along with an internal handset. Our sample suffered a tuner problem which marred a picture quality which was pretty good when monitoring baseband signals off tape.	59cm FST, Fastext, o/s graphics		76
<b>Panasonic Prism TK-24 W1</b> £699	Average + Average -	Handsome but bulky set delivers serious standalone sound quality. Lovely ergonomics but off-air picture quality marred by tuner section noise on our sample (works fine as a monitor.) Good NICAM (SCART) output.	59cm FST, NICAM, Fastext, o/s graphics		76
<b>Philips 21GR 2752</b> £530	Average Average +	Detachable speakers ought to be an asset, but those supplied are too cheap'n'cheerful. Picture quality is nicely balanced, if a shade 'soft', the handset is nice, but the on-screen graphics are a bad joke	51cm FST, NICAM, Fastext, OSG*		86 Supp
<b>Pioneer SD-21AV1</b> £599	Average + Good +	The set that can do anything if you've the patience to find out how to drive it: fine picture, decent sound and good flexibility in a neat compact monitor package, plus a handset that deserves its own instruction manual	51cm FST, NICAM, Fastext, OSG/LED	R	86 Supp
<b>Sony KVXU 2132</b> £530	Average - Average +	This is an attractive, ergonomic and competitive package, trading picture resolution in favour of stability. The on-set sound is naff, so Trinitron fanciers should use it as a monitor alongside a hi-fi system	51cm Trinitron FST, NICAM, Fastext, OSG	R	86 Supp
<b>Toshiba 217D9B</b> £480	Average Average -	A superficially impressive looking package for the price, picture quality was disappointing on our sample	51cm FST, NICAM, text, OSG		86 Supp

## VIDEO RECORDERS

For some time there's been a move to improve both the video and the audio quality of video recorders and TV sets alike as a necessary prelude to a proper integration between the two. Hi-fi video is obviously an important element in the story, and so is Dolby Stereo, the ambient 'surround sound' system.

The weak link of course is on the broadcast side. Although TV sound is well up to normal hi-fi standards, it has always been in mono and unjustly or otherwise has rarely attracted much audiophile interest. But TV sound is - or shortly will be - freed of the shackles of mono by the introduction of NICAM stereo. NICAM - an

acronym for Near Instantaneous Companding and Modulating - is the missing link that will help facilitate the much feted integration of video with audio. And then we have S-VHS, a system which does for picture quality what the other developments promise to do for the sound

MODEL PRICE	LAB SOUND	COMMENTS	SCREEN SIZE, FEATURES	VALUE	ISSUE
<b>Akai VS-75EK</b> £550	Average Good	Excellent performance and a slick set of controls make this recorder a pleasure to use. Good price is a bonus	Hi-fi, NICAM, programmable remote	BB	71
<b>Akai VS-967EK</b> £500	Average	Many well implemented facilities, but unsuitable for dedicated audio use due to lack of LP mode, manual record levels or audio input	Hi-fi, NICAM, on-screen programming	R	86 Supp
<b>Grundig VS680</b> £1250	Very Good Average	State of the art technology gives top notch sound with tremendous flexibility but somewhat disappointing picture quality. It's also very hard to drive graphics	Hi-fi, NICAM, LP/SP, teletext programming, on-screen titling &		86 Supp
<b>Nordmende V4405K</b> £549	Good Good	Fine basic sound and picture quality, but the RF converter introduced significant losses. An excellent model, but configured for German home market. The recorder lacks NICAM	Hi-fi, transmitter handset, digital FX	BB	71
<b>Panasonic NV-F65</b> £500	Good Average	Uninspired but competent and well made deck. Plenty of features, decent sound and reasonable video ensure recommendation	Hi-fi, NICAM, LP audio only, bar code programming	R	86 Supp
<b>Panasonic NV-FS1</b> £1000	Poor Good	The control system is poorly organised, with cramped legends and some strange machine logic. Bar code programming is hardly a great achievement either. Picture and sound quality are good, but not state of the art	S-VHS, Hi-fi, NICAM, bar code programming	R	71
<b>Philips VR-6585</b> £530	Average	Fine middle-ranking deck with full LP operation and easy controls and displays	Hi-fi, NICAM, transmitter LCD remote, LP/SP		86 Supp
<b>Sanyo VHR-D4890E</b> £1000	Poor Excellent	High grade S-VHS recorder with digital effects which gives first rate screen-based results but relatively poor sound recording	Hi-fi, NICAM, S-VHS, PIP etc		86 Supp
<b>Sharp VC-S1000H</b> £1000	Good Poor	Clean, accurate and stable off air and from tape, and LP modes are satisfactory - but on-screen S-VHS results are well below par	Hi-fi, NICAM, LP, S-VHS, titling		86 Supp

# Personal Messages

*This month has been rather loud chez Paul. He's been pumping up the volume with the new Naim Audio speakers.*

Since I propose to discuss a new £5-7,000 per pair British loudspeaker in this column, I'd better start out by covering my back, on both prices and priorities. To suggest any pair of speakers can be worth such a lot of money flouts both the law of diminishing returns, and the code of the priority of the source.

To take those old saws in reverse order, I'm not suggesting driving these monsters with budget equipment. The 'pilot production' samples I heard were on the end of a record player worth around £3,000, plus about £13,000 worth of amplification. We're talking about a twenty grand plus single-source system here, which brings me neatly onto those diminishing returns.

Can any hi-fi system be worth that sort of money? There's no simple linear relationship between price and performance, but if a component redefines the state of the art - or to be more precise, a state-of-the-art, since there's more than one - then surely that alone is justification.

The speaker that's going to cost between £5,000 and £7,000 (unfinalised as I write) and which is scheduled to make its public debut at the Hi-Fi '91 show in Bristol (I write this piece a week before the promised appearance) is Naim Audio's new *DBL* loudspeaker. The initials stand for decoupled box loudspeaker, though for my money the company's in-house development acronym *FBS* is more expressive of the size, weight and (both) installation engineers' comments afterwards.

## Awesome

My personal finances are still recovering from the recent acquisition of a Naim *NAC52* preamp, but I didn't even need to go into the listening room to realise that I was going to have to start saving

up again. The *DBL* simply, comprehensively, indeed awesomely, redefines the performance envelope achievable within what's still best described as the Linn/Naim philosophy of high end hi-fi.

Which means it doesn't deliver the layered transparency of the best panel speakers, nor the seductive liquidity of the state-of-the-valve-art. What it does convey, in a devastating way, is an awesome authority - a 'this is it, and you'd better believe it' statement that is too powerful to ignore. The samples I heard were still being 'tidied up' sonically, and there was clearly some scope for tinkering with the cosmetics and presentation of the sound. But such considerations were entirely irrelevant against the extraordinary performance in dynamics, leading edge resolution, dynamic range and bandwidth.

One of the toughest tests for any system is how 'real' it sounds from *outside* the listening room itself. This takes the presentation distractions out of the equation, helping focus attention on the vital timing information that is responsible for much of the humanity and emotion of the music. Here the *DBL* excels.

Inside the room, even floppy foam-filled furniture started vibrating sympathetically with the sheer amount of energy generated. The loudness capability is prodigious - certainly getting into the PA arena - yet it was accompanied by genuinely subsonic bass extension with uncanny stop/start dynamic grip and control.

No sooner had the mind learnt to accommodate the new dimensions of scale and weight than one noticed it wasn't all wham-bang-and-thank-you-very-much. There's considerable refinement too; delicate fine low level detail is well

maintained even after the ribcage has gone into resonance.

## A good size

To get down to the mundanities of this beast, it looks - and is - very big, roughly four times the volume of Naim's *SBL*, or twice the size of an *Isobarik*. It's obtrusively wide, though quite shallow, so it doesn't stick out far into the room space, and sits low and snug on its integral stand. The overall shape and size shows a close similarity to the Snell *Type A* - a redoubtable design of many years standing but a regrettable rarity in the UK. The *DBL* apparently registers more than 80kg on the scales, compared to, say, the *Isobarik's* 40-something and the 60-odd of the *Mission 767*.

Designer Roy George has effectively expanded on the decoupled box principle already used to excellent effect in the *SBL*, combining several separate cabinets in such a way that each is individually spike-coupled/decoupled to an integral stand or frame, so minimising mechanical interactions between the drivers. Things are made a little more complicated here by the further separation of bass and midrange, and the need to enclose a large volume of air.

The resultant cabinetwork is very elaborate. A massive 15inch ATC-sourced paper cone bass driver works into a smallish enclosure, coupled via an acoustic resistance panel into the much larger main chamber that extends up the sides, a clever technique which combines good diaphragm damping while making the enclosed volume seem acoustically larger than it really is. The midrange box, which also baffles the leaf-spring-decoupled tweeter, nestles between these bass flanks.

As far as expanding the performance envelope is concerned, bass extension

and power are both clearly better than I normally get from my *Isobariks* (though recent stand experiments suggest there may be quite a bit extra to be had with the latter, if I can get all the mechanical interfaces right), while the integral stand should make the *DBL* all the more predictable in practice.

Much more important is a massive gain in efficiency over the *Isobarik*, with reportedly some 6dB extra sensitivity alongside a much less demanding amplifier load, which represents a substantial increase in system loudness capability and headroom.

At the end of the day, I'm not sure how people are going to react to this speaker. The whole experience can be a little intimidating, which some people may find uncomfortable, but it is very impressive, nonetheless.

## Temptation

I occasionally hear other speakers of comparable price and size, and the sound is usually pretty awesome. However, nothing (bar perhaps the Apogee panels, which are an entirely different type of experience) has hitherto shown any signs of achieving serious commercial acceptance. Most stay confined to a handful of 'high-end' specialists and the odd exhibition outing.

In contrast, the *DBL* is going to get nationwide distribution, simply because of the credibility Naim has already built through very healthy sales of the no less extravagant *NAC52* preamplifier. Every '52 owner is going to be sorely tempted, and the whole idea of spending five (or seven) grand on a pair of speakers is going to start becoming much more credible. Furthermore, you won't have to travel halfway across the country to have your mind set permanently readjusted.



SOUND AND STYLE



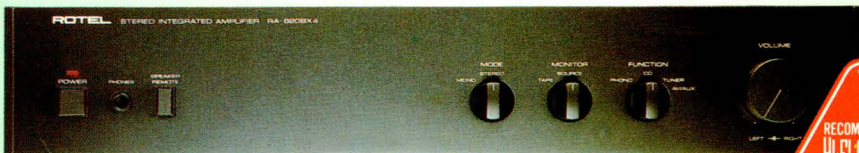
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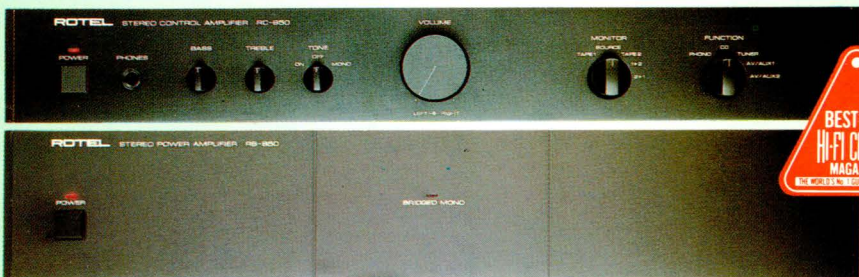
**RA810A** 20W STEREO INTEGRATED AMPLIFIER



**RA820AX** 30W STEREO INTEGRATED AMPLIFIER



**RA820BX4** 30W AUDIOPHILE STEREO INTEGRATED AMPLIFIER



**RC/RB850** STEREO CONTROL AMPLIFIER AND 50W STEREO POWER AMPLIFIER



Three new integrated amplifiers join the product line for 1990. The famous RA820 (AX) features a larger power supply giving even greater control and refinement. The equally famous RA820BX and RA840BX series of audiophile amplifiers have undergone substantial revision. The BX4's incorporate the very latest understanding of both circuit layout techniques and component selection making them definitive amplifiers in their class. Phone or fax Rotel UK for further information and nationwide dealer list.

UK DESIGN AND DEVELOPMENT

ROTEL UK, Gamepath Ltd,  
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