

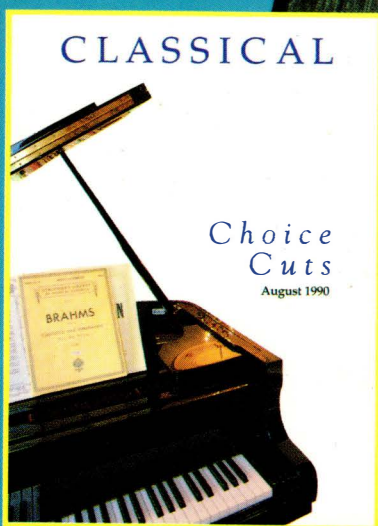
# HI-FI CHOICE

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

AUGUST 1990 £2.95

## Amplifiers

FULL TESTS ON 16 INTEGRATED  
AND 4 PRE/POWER AMPLIFIERS



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RECOMMENDED PRODUCTS

OVER  
950 Test  
Summaries

IN THE CHOICE  
BUYER'S GUIDE

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A CHOICE GUIDE TO THE BEST  
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ISSN 0955-1115



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PUBLISHED by Dennis Publishing Ltd, 14 Rathbone Place, London W1P 1DE.  
 Tel: 071-631 1433. Fax: 071-323 3547 (Editorial); 071-636 1640 (Advertising)  
 Company registered in England.  
 REPRO: Graphic Ideas.  
 TYPESET by: Time Graphics Ltd. PRINTED by: Riverside Press.  
 DISTRIBUTED by: SM Distribution,  
 6 Leigham Court Road, Streatham, London SW16 2PG.  
 Tel: 081-677 8111.



Enquiries regarding the content of this journal should be made in writing to *Hi-Fi Choice* Editorial, 14 Rathbone Place, London W1P 1DE. We regret enquiries cannot be dealt with by telephone. While every care has been taken in the preparation of this journal, the publishers cannot be held responsible for the accuracy of the information herein, or any consequence arising from it. Readers should note that all judgements have been made in the context of equipment available to *Hi-Fi Choice* at the time of review, and that 'value for money' comments are based on UK prices at the time of review, which are subject to fluctuation and are only applicable to the UK market. This edition © 1990, Felden productions. ISSN No. 0955 111 5.

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**ABC** (July-Dec 1989 - 23,847)



# Menu



While there will always be listeners who maintain that all competently-designed amplifiers sound the same, audiophiles like ourselves continue to be surprised at the differences in perceived sound between various models. Listening to amplifiers under 'blind' conditions – no-one on a *Choice* listening panel ever knows which product he or she is auditioning at the time – is a fascinating exercise, one which reveals time and time again that changing the amplifier can have a very marked effect on the quality of sound you experience from the hi-fi system in your home.

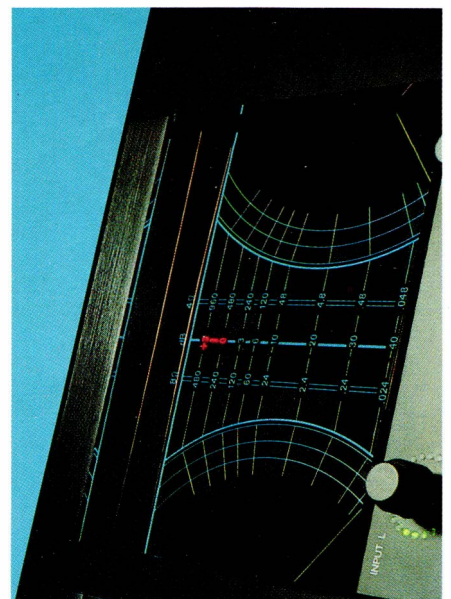
Fearful of repeating ourselves month after month, we should nevertheless point out that the results of our tests are of course based on how well (or not) individual components perform in a 'reference' system. By all means use reviews as a guide to building a shortlist, but bear in mind that an amplifier which fails to impress our listening panels and/or reviewer might sound fabulous in your own system. Consequently you should endeavour to find a conscientious dealer who will let you carefully audition a few models before you make a purchasing decision.

When it comes to high-end audio performance, amplifier components don't come cheap. This month's free-to-enter competition on page 12 is therefore a fabulous opportunity for a lucky *Choice* reader to win a hi-tech *Finestra* preamplifier – worth a cool £1,299. That lucky reader could be you! EC Audio, the *Finestra's* manufacturer, has also given us a few of its *Pandora* mains purifiers as runner-up prizes. The quality of the mains supply is most important to a hi-fi system, as you will read in *Statements*.

Don't miss next month's action-packed issue which concentrates on loudspeaker reviews. Busy as always, we've just finished listening to a large batch of exciting new models, and Paul Messenger's word processor is currently in overdrive. Also next month we have a FREE supplement containing reviews on NICAM equipped televisions and Hi-fi video recorders.

The September issue goes on sale August 10th.

*John Bamford*

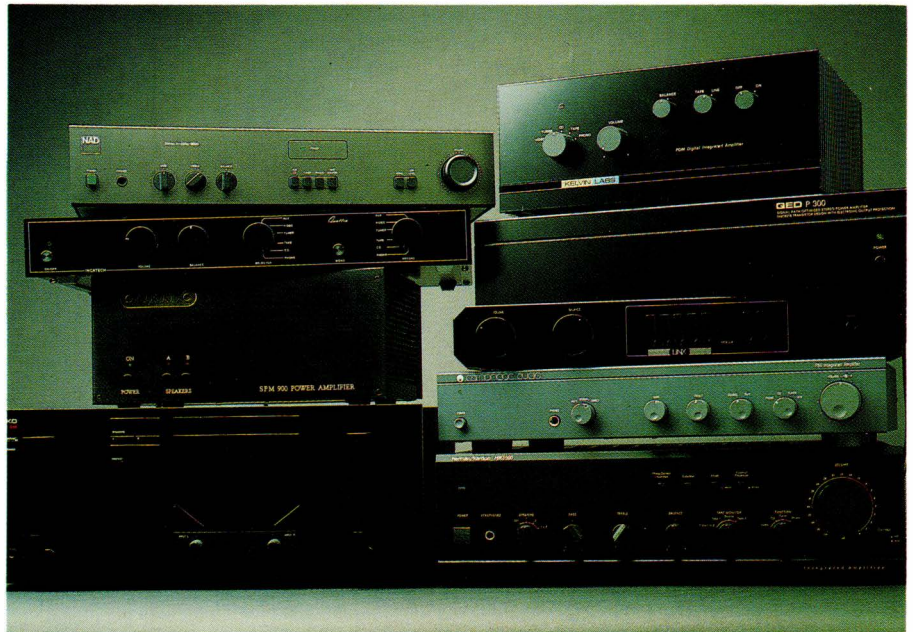


Cover photograph  
by Chris  
Richardson

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We find the first Denon *DCD 3560* flagship CD player to hit these shores – just outside a Tunbridge Wells listening room!

Turn to page 12 – you could win a *Finestra* preamplifier!



Make more of the magic in the grooves  
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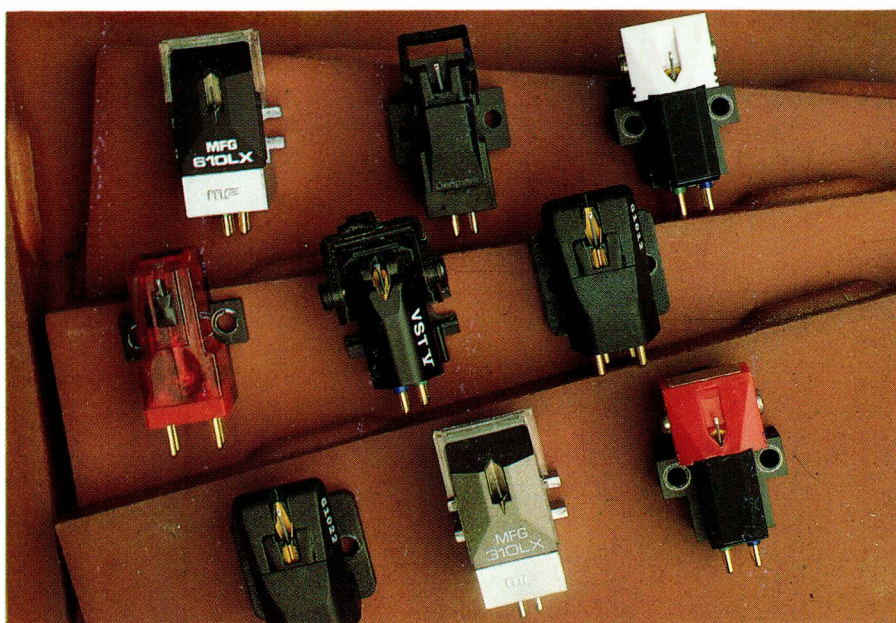
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### THE CHOICE DIRECTORY

Our buyer's guide gives comprehensive 'at a glance' information on all the available equipment we have reviewed.

*Aspirational system being cornered by hi-fi eating plants!*

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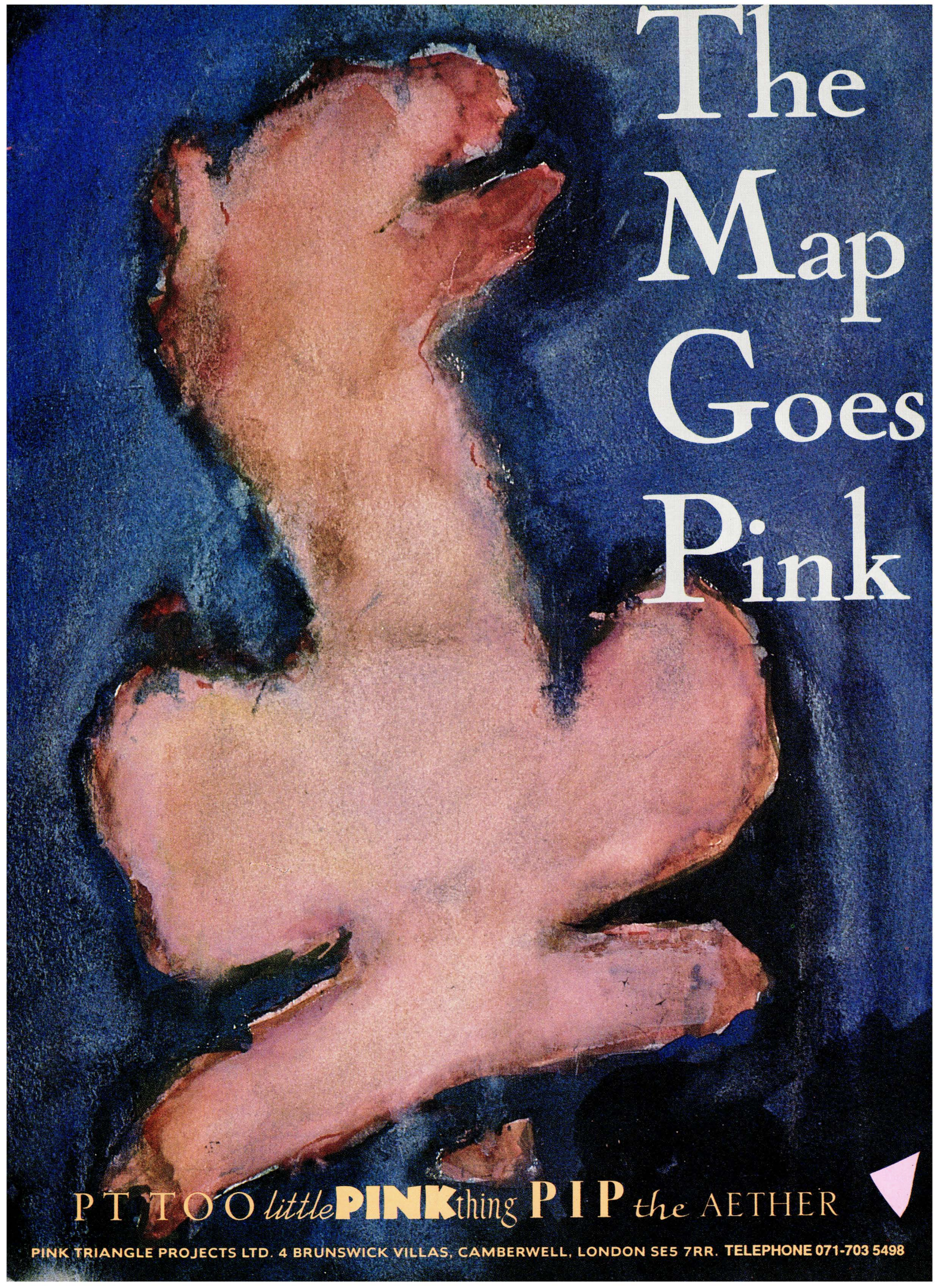
### BACK ISSUES

Missed an issue? Catch up on past topics using this page.

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Paul Messenger continues to tweak his system, this time discussing the effects of some new Naim cable.



The  
Map  
Goes  
Pink

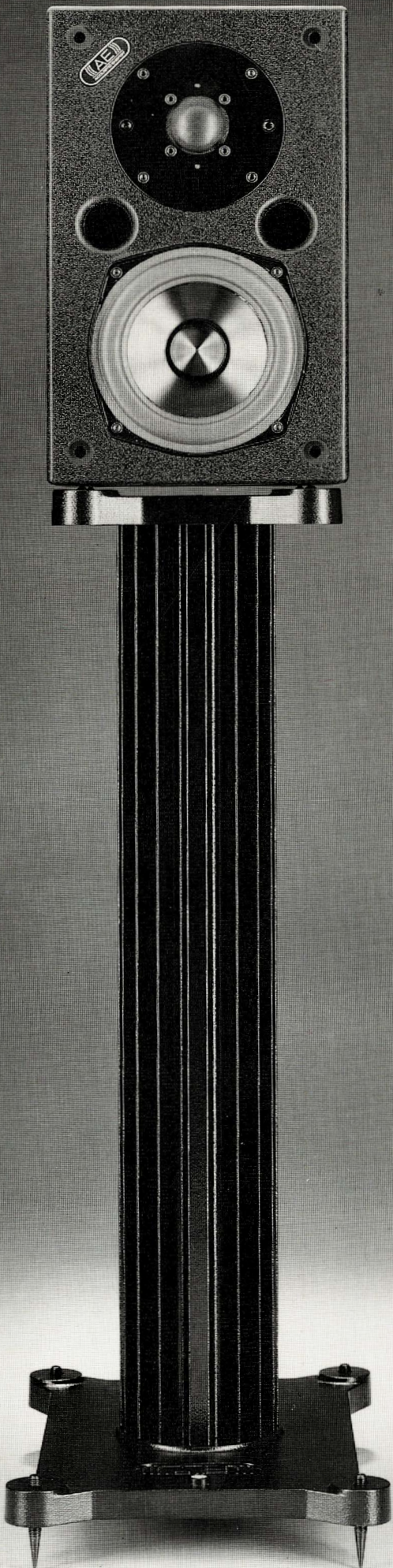
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**John Atkinson,**  
Stereophile, Sep. 1988

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**Alvin Gold, Hi-Fi Choice, June 1988**

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**Jonathan Kettle,**  
New Hi-Fi Sound, July 1989

"The AE1 leapfrogs existing references and sets new standards of technical and musical excellence..."

**David Praker,**  
Hi-Fi Answers, March 1988

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**Grahams Hi-Fi**  
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**KJ Leisure Sound**  
London W1  
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**Le Set**  
London SW3  
Tel: 071-581 3676

**Peter Jones**  
London SW1  
Tel: 071-730 3434

**The Cornflake Shop**  
London W1  
Tel: 071-631 0472

**The Hi-Fi Centre**  
Barrow-in-Furness, Cumbria  
Tel: 0229 38757

**The Listening Rooms**  
London SW5  
Tel: 071-244 7759

**The Audio File**  
Bishops Stortford, Herts  
Tel: 0279 506576

**Clearance**  
Bolton, Lancs  
Tel: 0204 31423  
(also at Manchester)

**Steve Boxshall Audio**  
Cambridge, Cambridgeshire  
Tel: 0223 68305

**Audio Excellence**  
Cardiff, Wales  
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(also at Gloucester & Swansea)

**Chelston Hi-Fi**  
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**Data Sound**  
Dorking, Surrey  
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**Wentworth Audio**  
Dunstable, Beds  
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**Jeffries Hi-Fi**  
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(also at Brighton)

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Edinburgh, Scotland  
Tel: 031 220 1535  
(also at Falkirk & Glasgow)

**In Hi-Fi**  
Edinburgh, Scotland  
Tel: 031 225 8854

**Lintone Audio**  
Gateshead, Tyne & Wear  
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(Also at Whitley Bay & Durham)

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**PJ Hi-Fi**  
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Havant, Hants  
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**The Sound Gallery**  
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**Audio Projects**  
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**The Leicester Hi-Fi Co.**  
Leicester, Leic.  
Tel: 0533 539753

**Pure Sound**  
Liverpool, Merseyside  
Tel: 051 645 6690

**Unilet Products**  
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**Audio Insight**  
Milton Keynes  
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**Basically Sound of Norfolk**  
Nr. Norwich, Norfolk  
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**Sound Approach**  
Norwich, Norfolk  
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**Audio Counsel**  
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**Stilton Audio Systems**  
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**Rayleigh Hi-Fi**  
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**Audio Centre**  
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# Update

## PRODUCTS

### Technics technology

Such is the engineering strength of Matsushita, it takes a day long seminar to convey the full annual message to the assembled European hi-fi press.

This year, much time was spent on the subtleties of MASH low-bit digital-to-analogue decoding, and its supposed superiority over its various rivals. Since nobody but the engineers themselves understand fully the ins and outs, and they all find reasons why their own approach is superior, the poor baffled consumer merely gives up, checking the feature count against the price tag – and even using the evidence of the ears, as our reviewers do.

A new generation of amplifiers, typified by the *SU-MA10*, uses a new approach to the volume control that ensures the amplifier signal-to-noise ratio remains at the 110dB necessary to maximise CD sound quality irrespective of the setting. The *MA10* also represents Technics' acknowledgement of the importance of passive components in determining the sound quality of a product. The design incorporates proprietary, specially developed X-Pro power supply capacitors, and uses OFC (oxygen free copper) transformer windings. A demonstration comparing the amplifier

when used with the new power supply components against standard commercial grades was rather convincing, the copper shielded, mechanically damped X-Pro providing the greater effect.

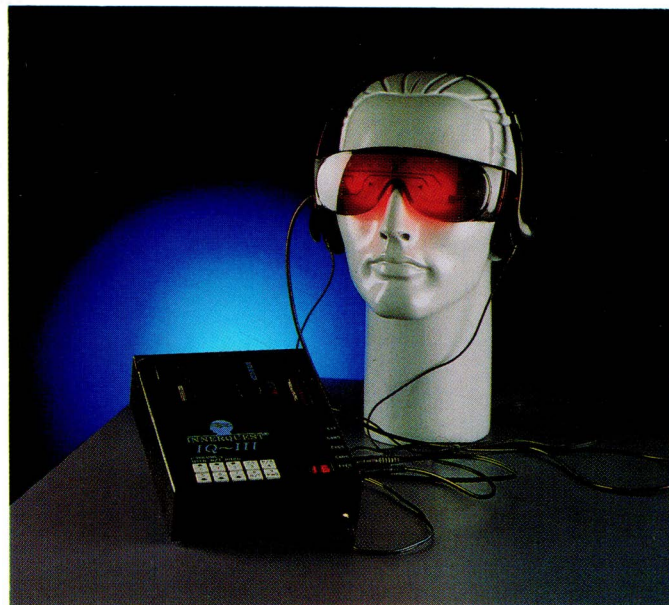
Elsewhere, a new cassette transport is fitted to four models, using a new high torque direct drive motor to supply smooth capstan drive characteristics and minimise mechanical perturbations. The top-of-line *RS-B965* goes one stage further with a closed-loop, dual capstan drive mechanism.

Rather less convincing was the paper devoted to the highly contentious claim that velocity of sound transmission is the most fundamentally important characteristic of the cone or dome used in loudspeaker drive units. Technics is currently using something it calls 'super graphite', which looks even more difficult to manufacture than the expanded honeycombs that were the flavour of the Eighties.

Debatable or not, this regular annual seminar event still proves to be the most effective technique of all in attempting to bridge the East/West cultural and technological divides.

### Brain machines

A range of electronic gadgets known as brain frequency stimulators have been launched in the UK promising the ultimate in audio-visual relaxation. Colloquially called 'Brain Machines', three models are



*All things whacky and wonderful: a brain machine.*

available priced £265, £495 and £545.

The machines consist of a small computer unit, light producing glasses and a pair of headphones. They produce patterns of light and sound which can be programmed to any of the human brain's four states. Very simply, the brain emits four distinct wave patterns of electric frequencies according to its state of alertness or receptivity. These are: Beta, the everyday working state (from 13-30Hz); Alpha, a relaxed state (8-12Hz); Theta, the most creative (4-7Hz); and Delta – being asleep (1-4Hz).

Scientists, mostly working in America have noticed that the brain state can be altered if it receives harmonics and/or light patterns which match any of the four basic frequency ranges. In such circles the alteration is known as 'frequency following response' or 'entrainment', but music lovers have known for millennia that they can relax, or become excited according to different types of music. The Brain Machines offer a more refined application of that philosophy by delivering exactly the right frequencies to the brain in varying preset patterns.

Des Taylor, of Cerebral

Dynamics UK which is importing the machines, told us: "The machines can help you relax or sleep and that may be their main purpose but they can also improve learning and IQ. We think of them as being like a digital tranquiliser – but there are no chemicals involved so you won't become dependent except in the sense of just wanting to use the machine to help you relax. Before this you would have had to do yoga for ten years to be able to affect your brain state this quickly."

Users don glasses which contain four red LEDs on the inside lenses. These then emit patterns of light which are astoundingly colourful to the closed eyes. Headphones from the machine provide a barely audible pulse over some suitably outlandish 'new age' music, or better classical, and you end up asleep or awake-yet-relaxed depending on which out of the 14 or so programmes you choose. The more expensive models also feature manual programming, while the most expensive comes with its own cassette transport. For hi-fi users the latter doesn't represent a best buy in terms of sound quality – but the machines can be hooked into a system (using an adaptor to the mini jack sockets) so that



*For MASH get Technics.*

you don't even need cans.

Demonstrations are available at Crystal Connections which has branches in Camden Lock, Margate and Brighton. Tel: (071) 267 4325. The machines would not be suitable for some people such as epileptics.

## 'Alloy alloy

"It's far too cheap, but I want to give all my competitors a shake up," says designer and MD Mo Iqbal of his new loudspeaker – the Monitor Audio Monitor 11. At £299 he could well be right. The '11 is an elegant three-way bi-wireable design which uses a newly designed alloy dome tweeter and two six-and-a-half inch doped paper mid and bass drivers.

"It's a true three-way system; by using a low pass filter in the bass unit the bass-mid unit singularly integrates with the tweeter," Mo said. The '11's medium density fibreboard cabinet is finished in black lacquer and internally uses a figure-of-eight brace for maximum strength and rigidity. It joins the Monitor 7 and 9 in the series which will shortly be

completed with the introduction of the Monitor 14.

MA can supply a dedicated stand – the Mon 11 – which is spiked and sand-filled and costs £79.

## TECHNOLOGY

### A new bias

A recently announced Scottish invention could result in dramatic improvements in quality from all analogue tape formats, by means quite unlike those of conventional noise reduction systems.

In a paper to the Institution of Electrical Engineers in April, Archibald M Pettigrew of Paisley College of Technology presented the theory – and a demonstration – of his new 'Contour Biasing' system for tape recording. This process does away with the AC bias previously regarded as essential in magnetic recording to linearise the tape's characteristics. Instead, the signal is 'contoured' so that it may be recorded direct to tape without bias.

Pettigrew discovered that tape is much more sensitive



Pining for stylish storage? Enter Napa Valley.

at low signal levels than was previously thought and Contour Biasing, by using the tape more efficiently, can achieve much better noise and high frequency performance than conventional recording. Improvements in signal-to-noise ratio of up to 43dB are claimed.

Only the recording part of the operation is different from current practice, and tapes recorded with Contour Biasing can be replayed on any tape deck. Because Contour Biasing addresses the problems of magnetic recording at the most fundamental level, it is not like Dolby and similar schemes which filter and compress/expand signals to reduce noise but record them conventionally on the tape using AC (or DC) bias. It therefore seems to be a major breakthrough in recording technology, applicable not only to audio but also to video, digital and instrumentation recording.

## PRODUCTS

### Store in style

Solid wooden compact disc and cassette racks from the American Napa Valley Box Company are now available in the UK. Initially four types of storage rack are being imported by Bib products, of Hemel Hempstead, Hertfordshire. The stained pine 100-cassette rack will cost £29 while a version carrying 64 cassettes is £19.96. At £15 there is also a 24 CD 'flip file' in stained pine and a £17.25 hardwood rack (Woodwak II) which will hold 40 CDs, 24 compact cassettes

or 15 video tapes. Other storage racks, for LPs for instance, are not being imported, yet.

### Serious series

Wharfedale has launched three-fifths of its new Performance Series range of loudspeakers which kicks off with the totally revamped Diamond IV. Gunning for Best Buy status the £110 IV uses a tweeter derived from Wharfedale's Five series. It also has a new bass unit which aims for a perfect marriage with the tweeter and which uses polypropylene damped with carbon for optimum stiffness and minimum coloration. The cabinet is slightly larger than the previous Diamond.

Visually the new model – and the rest of the series – is streamlined for both performance and style. There are no screws visible and the drive units are mounted using a bayonet-type fixing similar to that used in camera lenses. The tweeters promise excellent dispersion characteristics and the baffles are bevelled for softer style and better performance. The simple, wrap around grey plastic grille, if wanted, also aims to appeal to the eye with a breaking 'bar' between the drive units.

Diamond IV is joined by the 410 and 420 – two completely new models priced £130 and £160 respectively. Both are designed to offer value for money improvements in terms of sound quality on the Diamond IV. The other two models, 430 and 440 will complete the series in September. All will be



Monitor 11 speaker and proprietary stand.

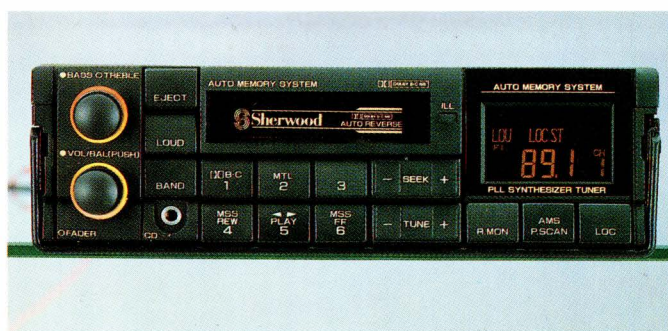
available in black or walnut veneer; *Diamond IV* is also available in white.

## Denon's digital flagship

A shilling under a £1,000 buys the new Denon top of the range CD player. The *DCD 3560* uses the new LAMBDA converter, an acronym for 'ladder-form multiple-bias digital to analogue' (converter). Devised by Denon, LAMBDA is described as a 20-bit self tracking circuit which reduces distortion and noise and enhances the resolution and phase characteristics of Denon's existing 20-bit 'Super Linear' DACs. Another touted advantage of the new chip is that it is self regulating in terms of time and temperature; Denon claims that linearity at -90dB is maintained to within 0.25dB over a range of 50 degrees centigrade.

Other features include attention to the power supply and earthing paths – minimising digital interference, radio frequency and magnetic distortion. Outputs include a balanced audio type, two co-axial digital and an optical digital, as well as a variable to cater for all tastes and requirements.

Denon also launched two integrated amplifiers last month. Both the *PMA 1060* (£300) and its less powerful brother, the *PMA860* (£230), incorporate circuitry derived from the Recommended £140 *PMA 250* – developed specifically for British tastes.



*Affordable in-car entertainment from Sherwood.*

## Sherwood in-car

Recently we saw the launch of Sherwood in the UK, a Far Eastern brand of competitively priced hi-fi electronics. Now the company's range of in-car equipment has been revealed. As with the domestic equipment, the sales pitch is 'quality and features at attractive prices' with cassette receivers and power amps starting at £99.95.

Hayden Labs, the UK distributor, is marketing four cassette receivers ranging from the above price to nigh-on £250 for the *XR-2701P*, an extractable 2 x 22W full feature player with inputs for onboard and portable CDs.

There are two types of power amp, Tri-mode and standard with power outputs varying from the 2 x 50W *XA-2104* to the beefy *SCP-1002* (£149.95) with its 2 x 120W or, in Tri-mode, 2 x 60W plus 1 x 120W for a mono subwoofer. Future Sherwood components are likely to include a single disc CD player for digital sounds on the road, on the cheap.

## Times a' changin'

What's happened to the good old midi system market – the sort of 'hi-fi' you could buy either before or after your net curtains in one of those amorphous complete-home

stores? Grasping the nettle of market research, which shows a drift away from such purchases, Goodmans has launched a range of very affordable separates which can be used together or as part of a mixed system. Two CD players, (one a six disc multiplay type), a record player, amplifier, tuner and double cassette deck offer potential midi system buyers a sensible alternative; probably in terms of sound for price, and certainly in terms of flexibility.

## BUSINESS

## Not fade away . . . just yet

Recent stories suggesting that EMI was pulling out of its vinyl manufacturing operation were described as 'exaggeration' by the musical multinational. At a time when audiophiles around the world are still resolutely in favour of their long-playing records, any news that a company is to shelve production in favour of the compact disc is seen as heresy. But Terri Anderson, head of corporate press at EMI in London told *Choice*: "The situation is that EMI has closed a few (vinyl pressing)



*EMI's Kate Bush: still on vinyl.*



*A shilling under £1,000 – Denon's new flagship CD player.*

factories but this is more for rationalisation purposes. There are still eight plants producing vinyl records around the world including the biggest at Hayes in Middlesex. There are no plans to close that and it will continue to make records as long as there is a market. In fact Hayes would be the very last plant to close. However there has to be a realistic recognition that vinyl will

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finally fade away."

Anderson envisaged that when market forces made it uneconomic for EMI to continue making records it would sell licences to smaller firms which would be better able to meet specialist demands. Looking ahead she continued: "I've heard predictions that vinyl will be a viable market in the year 2000 and beyond – that's entirely reasonable. Of course, there are still many areas of the world where they don't have CD players yet."

The bad news for record lovers is that records may well go up in price in the near future (to offset falling demands). Anderson claimed that if the price of vinyl records had kept pace with inflation they would be twice the present price.

## SD Acoustics prize winners

The lucky winners of our SD Acoustics loudspeakers competition, run in May, have been chosen. First prize of a pair of SD1s goes to Patrick Butler, of Chertsey. Daisy Hobson, from West London wins the OBS second prize and Johan Madsen, of Beith in Ayrshire receives a pair of SD3s. Response to the competition was formidable and our thanks, and commiserations go to all who took part. Better luck next time . . .

## Chicago snippets

Chicago CES in June 1990 was not a classic show, with low attendances reflecting the currently flat state of consumer electronics in the US. However, it's still the most important hi-fi show of the year, amongst British as well as US and Japanese manufacturers.

The roster of new products from UK hi-fi specialists was as impressive as ever, starting from the exciting and affordable new Mission 760 and Cyrus 780 baby loudspeakers up to SME's £9,000 turntable and Meridian's £12,000/pair digital loudspeakers.

In between was seen a battalion of new B&Ws, a



SD Acoustics loudspeaker prizes.

couple of KEFs, and Celestion's expected 5 (extending the successful 3 concept). Monitor Audio is updating its midprice models with the *Monitor 11* and *14*, Linn goes *MkII* with *Index* and *Helix*, while Creek could finally get its *LS50* "loudcreeker" into production.

These and a number of other goodies will be covered in greater detail in next month's show report.

## Style and sound?

Philips has bought into Bang & Olufsen in a move described as bringing the two companies into closer co-operation. The present B&O will become a holding company while a new B&O is floated using 25 per cent of Philips' money. Closer co-operation will result in B&O getting more access to Philips' technical knowhow and components, while the

electronics giant gains input on design and B&O's marketing approach for advanced audio and video products.

Philips spokesman Nick Thomas pointed out that the move would mean further integration between European manufacturers (Philips owns Grundig and Marantz for instance) which would help with the adoption of unilateral new standards. "The Japanese are very good at working as an integrated entity and this is part of a European effort, a kind of together we stand, divided we fall initiative," he said. Thomas was saying nothing about the money involved but added that Philips and B&O had long-established links since B&O was founded in 1925; the move was a formalisation of those links and Philips won't be involved in the day to day running of B&O.



Ivor Tiefenbrun with Sir Patrick Meaney (left) and Bob Wyatt.

## IN BRIEF

Following last month's report Linn Products, the Glaswegian turntable and hi-fi manufacturer, has won the small companies category of The Management of New Ideas Award, from the Royal Society of the Encouragement of Arts, Manufacturers and Commerce.

The Absolute Sound and Video group of shops is due to merge with AT Labs branches to form a ten strong specialist chain across the south of England. The new chain promises a wide range of choice from budget to state-of-the-art systems.

The Harman/Kardon and JBL roadshow will visit Laser Sound and Vision Ltd, 72 Terminus Road, Eastbourne, East Sussex on July 14. Details: 0323 640911.

Arcam hi-fi equipment – including the new digital pre- and power amplifier combination – will be shown at an Aston Audio musical evening in the Stanneylands Hotel, Wilmslow, Cheshire, on September 5 at 8.30 pm. Free tickets from Aston Audio: (0625) 582704.

Oxford Acoustics, which makes the gorgeous *Crystal* turntables (see *Statements* this month), has moved to a new factory. The new address is Unit 4 Cranbrook Court, Station Lane, Avenue 2, Witney, Oxon OX8 6YD. Tel: (0993) 771174.

Soundtec Marketing, the company which distributes ADC and MB Quart products has been liquidated.

Swisstone Electronics, distributor of Rogers loudspeakers, is to take on the Luxman brand of electronics in the UK. Luxman was previously available in the UK through HW International.



# Win a Finestra!

No doubt about it, the best competitions are always in Hi-Fi Choice! This month's fabulous prize is a £1,299 audiophile preamplifier — the Finestra, manufactured by EC Audio. Our lucky prizewinner will also receive a Pandora 'mains purifier' to get the best possible performance from the preamp, while we've a further three Pandoras (worth £120 each) to give away as runner-up prizes.

## How To Enter

Our simple hi-fi quiz requires six answers which must be written on the entry form provided. Fill in the form, remembering to include your name and address and send it to the address shown in bold type at the bottom of the form. Mark your envelope **Finestra competition**.

## The Prizes

The first correct entry drawn from our mailbag after the closing date will win a *Finestra* preamplifier (worth £1,299) plus a *Pandora* mains purifier (worth an additional £120). The second, third and fourth correct entries will each win a *Pandora* as runner-up prizes.

The *Finestra* and *Pandora* are manufactured by EC Audio, 1 Loverock Road, Reading, Berks RG3 1DQ. Tel: (0734) 589186.

## The Questions

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

1. Name the designer of the *Finestra* preamplifier.
2. Which British company manufactures an amplifier called the *Nebula*?
3. Name the Peterborough-based company famous for adding solid bodies to the likes of Audio Technica and Nagaoka pickup cartridges.
4. One cartridge manufactured by the Japanese Audionote company is a very rare electromagnetic design. What is it called?
5. Which British loudspeaker manufacturer produces a metal driver-equipped model called the *Studio 10*?
6. The proprietor of the Nottingham Analogue Studio is the man responsible for the design of Omega Point turntables. What is his name?

## Entry Form

NAME: .....

ADDRESS: .....

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HFC/AUGUST/90

Closing date: Monday, 10th September, 1990

**Your answers:**

1 .....

2 .....

3 .....

4 .....

5 .....

6 .....

### COMPETITION RULES

1) All entries must be on the entry forms provided. Photocopies will not be accepted. Incomplete forms will not be considered.

2) There is no cash or other alternative to the prize.

3) Employees of Dennis Publishing Ltd and associated companies, the manufacturers and suppliers of the prizes, their agents and relatives, are not eligible to enter the competition.

4) The competition is not open to readers living outside the United Kingdom.

5) The prizes will be awarded to the first sets of correct answers opened after the closing date. The Editor's decision shall be final and binding. No correspondence whatsoever will be entered into regarding the competition.

6) The winners will be notified by post and the results will be published in *Hi-Fi Choice*.

Send your completed forms to:  
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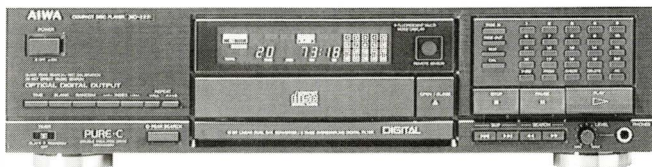
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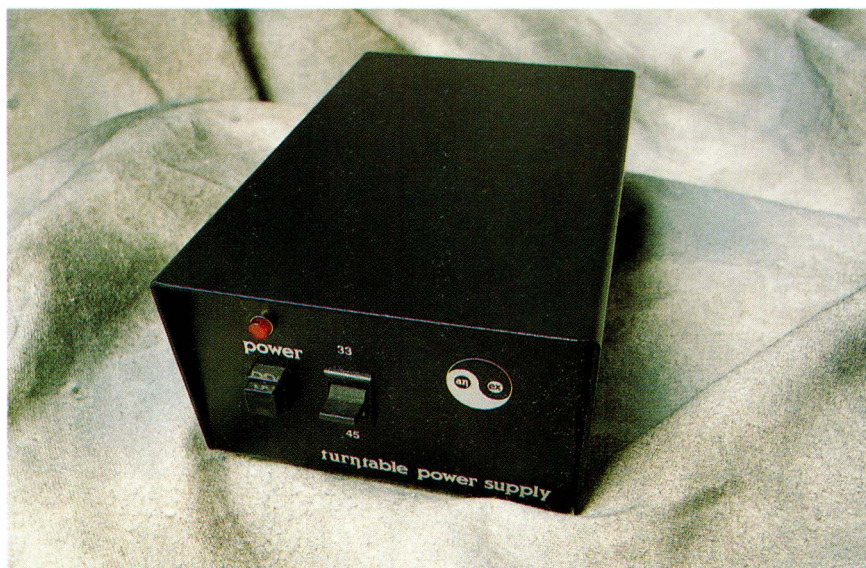
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# Choice Sessions

*Things we hear . . . This month, Analogue Experience's turntable power supply; the much talked about Studio 10 loudspeaker from Monitor Audio; a hi-fi show with a difference in downtown Chesterfield.*



## Turn, turn, turn

*Jason Kennedy finds a power supply to torque up his vintage Rock turntable.*

Wandering around the Bristol hi-fi show way back in February we kept coming across leaflets emblazoned with the Yin/Yang motif. They were, it transpired, put about by a new company from Blackburn called Analogue Experience – or Anex for short.

The Anex company produces a slowly expanding range of power supplies for turntables, including a single (33rpm) and two-speed version for any turntable that uses a Philips-type motor. These include many middle-market models such as those made by Rega, Manticore, Revolver, Systemdek, and so on.

The company also produces a supply specifically for the late, great, Townshend *Rock*, an excellent if somewhat hairshirt record player that for lack of a little styling and a lot of marketing never really received the acclaim it deserved. Yours truly recently found one in Paul Messenger's attic (yes, really!) and I've been looking for a power supply to give it a better sense of timing ever since. Like the Townshend *Merlin* power supply (when it was in production), the Anex supply for the *Rock* delivers the 80 volts the motor is designed to run off. However, when we first spoke to Anex about borrowing a sample for review the company was only building the one and two speed

*Giving your turntable a clean feed can make all the difference in performance.*

versions for general use, and an example of the latter was what first arrived in the *Choice* offices. It looked pretty basic, with switches for power and speed on the front and an IEC power socket, fuse and mains lead on the back, while it felt quite solid in construction. Unfortunately, attaching an IEC plug to the lead on my *Rock* and connecting it up to the Anex didn't produce very inspiring results. In fact it didn't produce any results at all, a problem which probably can be accredited to the Post Office parcel handling division.

A second sample was duly despatched and arrived in a relatively healthy and operative state. What's more it came with a male IEC plug which is apparently standard procedure now, and as this is not a particularly prolific connector it's a good thing.

A-b'ing the standard Anex with straight mains revealed significant if not awe-inspiring improvements in the black box's favour. Specifically, music sounded more purposeful and definite, and instruments sounded more like they were there in front of you. Going back to straight mains resulted in a sluggish, almost slow and lazy feel to the sound. Possibly the deck does run a little slow. Those differences were noticeable playing some Steely Dan (pretty timing-oriented stuff), and other records including *Paganiniana*, Sonny

Rollins and REM improved in a similar manner. Rucci's violin sounded more dynamic and articulate, Rollins' horn sounded more natural and rhythmically correct.

Replacing the standard Anex with the model specifically made for the *Rock* was a slightly more tricky operation than the mere attachment of an IEC plug. With turntables of this one's vintage, a resistor has to be removed from the simple circuit board inside the player. Apparently later *Rocks* incorporated a switch so that users could upgrade to the *Merlin* without too much hassle.

Sonically, this 80volt supply reinforced the effects of the standard Anex, but in a slightly more subtle fashion. Resolution improved in such a way that attack and decay times seemed extended and instrumental separation greater. Fundamentally the deck was managing to retrieve more information from the groove. More particularly it seemed to find more high frequency detail which contributed to a greater sense of space and life in recordings.

At £99.50 for the single speed model or £135 for the fully fledged supply, the Anex would seem to represent good value for money to owners of decks like the Systemdek, Rega, *Rock* and most other audiophile-on-a-budget decks that don't incorporate their own supplies. The improvements are likely to be greater than those noted above with decks that use lighter platters as most

do, and of course the better engineered models will doubly benefit. A further tweak which can be carried out on many decks is the removal of the resistor which steps down the mains to the 110/120V that the Philips motors actually run on as the Anex can be switched to suit this lower voltage.

Analogue Experience Ltd., 114 Manxman Road, Blackburn, Lancashire BB2 3EP. Tel: (0254) 676538

## Vital Metal

*Alvin Gold reports on Monitor Audio's £1,000-a-pair Studio 10 loudspeaker which features the company's new aluminium cone bass driver.*

The phrase 'handsome is as handsome does' is redolent of an age past, along with other well known sayings such as Protestant work ethic and free eye tests. Nobody I trust would deny that the *Studio 10* is handsome – if not with its cover off and its bright metal drivers glinting with hi-tech perfection, then toned down for domestic consumption with the front baffle cover in place. Appearance is enhanced immeasurably by the use of real wood veneers, a Monitor Audio trademark even with the company's cheapest models, and by the small size and proportions of the system which are, somehow, just right – almost as though they had been decided on by eye rather than by calculation.

The *Studio 10* is a showcase for metal drive unit technology in which a gold anodised alloy dome tweeter is matched to a drawn aluminium cone bass unit. For Monitor Audio, the choice of aluminium as a bass cone material helps close the circle by providing a drive unit which is in keeping acoustically with the metal dome tweeters they've been using for years. Metal domes are no panaceas, as MA itself has had cause to discover. Although they can be manufactured to be compatible with soft domes in terms of impedance and sensitivity, in a speaker system a metal dome's speed and lack of compression can leave the bass driver standing – almost literally. This is one reason why some of the best metal dome equipped loudspeakers have used paper cone bass drivers, which at first sight seems a bit like hitching a pony trap to a Ferrari. At the same time, there are metal domes and there are metal domes. They may all be pretty quick, but they can lack consistency, they can distort, they can even sound 'metallic' (would you believe!). And quite a large proportion of them do all three.



**MA Studio 10: a showcase example of metal driver technology.**

The *Studio 10* uses the latest version of Monitor Audio's 25mm dome, in this case with a vented voice coil and ferrofluid injected in the gap to improve heat dissipation from the coil (which is also cooled by the dome, with which it is in thermal contact) and reduce compression. The dome is anodised and covered with mesh to restrain prying fingers, but there is an audible advantage to be had by removing the mesh. The bass driver is a state of the art solution to the problems and possibilities opened up by the use of metal dome tweeters. The cone is drawn to a precisely specified thickness (other metal cones, eg from Acoustic Energy, are spun, which makes it harder to control thickness) and anodised on both surfaces, the composite acting as a self-damping sandwich. Again the voice coil is in thermal contact with the cone, which acts as a heatsink reducing compression under hard power conditions.

The marriage is consummated in a split, bi-wirable crossover, and the system is reflex loaded, the hole being on the back panel to reduce unwanted audible side effects of bass reflex loading. There's a lot more to this speaker than there is room to explore here, but these are the basics.

In principle – and it turns out in practice too – the drive system offers the promise of consistency and homogeneity missing from many otherwise ambitious loudspeakers. The enclosure is fairly small (though the enclosure system has considerable depth) and is

extremely solid and well damped. To complete the package, Monitor Audio has developed a tall lead-filled pillar stand with a triangular base and three vertical pillars. In contrast to many stands which are designed purely for function, appearance is clean and even elegant with the loudspeakers in place – and with no apparent performance compromise.

I've now used three pairs of *Studio 10s* starting from just before they were first announced. It has been hard to hold onto any pair for long because they are unaccountably popular with other reviewers and magazines who keep claiming to need a pair, either for review or to help when reviewing something else. More than once I've been reduced to borrowing a pair from a dealer. The upside of this is that I can speak with greater authority than usual about the consistency of the product from sample to sample, which is of the highest order. This is in marked contrast to the *Studio 10's* closest rival, the Acoustic Energy *AE-1*. The comparison is an illuminating one.

In the final analysis, the (slightly smaller) Acoustic Energy model has certain architectural qualities that the MA can't quite equal. With eyes closed, the *AE-1* can disappear almost completely, leaving only a spacious, vibrant soundfield at the far end of the room of such palpable tangibility it's hard to believe it isn't really happening live as you listen. Bass performance too can be extraordinarily believable. But it doesn't always

happen this way. I recently attended a press conference which included a demonstration system with *AE-1s* of such nasality that I gave them just five disbelieving seconds of my time before moving on. Other pairs I have used have varied from wonderful to tantalising.

It would be wrong to suggest that the *Studio 10* has quite the transparency or dynamics of the extraordinary *AE-1*, but it gets pretty close, and there's never the slightest hint of temperament, or of lack of consistency between different installations. It can sound a little bright if auditioned from close quarters, but it has a wonderfully translucent quality, for example with female vocals, that can make the hair stand on end.

All this makes the *Studio 10* the safer choice, if not always the better one. I value its unflinching honesty, clarity and (by any normal standards) lack of compression, even when it's being caned to within an inch of its life. I like also the fact that it is really moving air when this happens – the *Studio 10* can take plenty of stick. It is, in short, a showcase example of how to combine vitality, clarity and refinement in a small and attractive, if expensive, package.

## Chesterfield calling

*Ian Ward reports on a hi-fi show with a difference – the British Audio Designer's Open Day.*

Most hi-fi shows present a bewildering pot-pourri of products and services, nevertheless they offer the only opportunity for the public to view and audition hi-fi equipment on a grand scale. While manufacturers of specialist products struggle to put on good demonstrations in inhospitable hotel bedrooms, mass market companies with their racks

and midi systems are usually to be found battling for prominence in a large hall or marquee. These large peripheral venues are often the bane of the enthusiast, where the cacophony of umpteen stack systems can be heard playing different music simultaneously!

Such audiophile nightmares were not in evidence at a most enjoyable show which I attended on 25th March at the Chesterfield Hotel, Chesterfield, organised under the banner British Audio Designers' Open Day. Some of the exhibitors could perhaps be described as working on the periphery of the hi-fi industry, while others were relatively small companies trying to gain a wider reputation.

According to estimates approximately two thousand hi-fi enthusiasts attended during the day, sufficient to make for a lively atmosphere without the age old problem of overcrowding. Nevertheless once this show's reputation spreads I can see it becoming a very popular annual event.

Two exhibitor's rooms were of considerable interest to valve freaks – as well as the mildly curious. Grant Amplifiers had a most impressive array of equipment on demonstration including the Michell *Gyrodec*, and a rare opportunity to hear the Martin-Logan *CLSII* electrostatic loudspeakers. The Grant company markets two preamps and a range of four power amps covering power requirements from 45wpc to 200wpc. Whenever I speak to (or read about) anyone connected with UK valve manufacturers there always seems to be an air of frustration regarding the relative lack of acceptance afforded to home grown produce, especially at the expense of tube amplifiers from overseas. On the evidence of my own ears and those who I spoke to on this subject

at the show, our own valve companies have far too much to offer to be disregarded. Certainly the Grant amps made a fine job of driving the Martin-Logans in all respects.

Another gentleman sharing the frustration of UK valve manufacturers is the proprietor of Concordant, Doug Dunlop. His small company gained legendary status mainly due to its modifications to old Quad valve power amps. It also manufactures a small range of tube preamps sold under the delightful titles of *Exhilarant*, *Excelsior*, and the top of the range *Exquisite*, all of which are regarded with equally high esteem amongst valve enthusiasts. Also on view in the Concordant room was a recently introduced monoblok power amp, the *Exemplar*, together with a rare sighting of the Townshend *Rock Reference* turntable and the DCM *Time Window* loudspeakers from the States. Doug occasionally interrupted his demonstrations to offer an explanation of his 'electronic petrol' principle with the aid of a blackboard and chalk!

Graham Nalty's Audiokits company has built up a considerable reputation as suppliers of high quality components to both home constructors and leading manufacturers. This is complemented by a range of amplifier kits for the technical hobbyist together with a recently introduced ready-made integrated amplifier, the *Sonic Link DM20*. This product was heard making light work of a pair of TDL *Studio 1s* with very acceptable results. Sharing the Audiokits' room was Analogue Experience which was demonstrating the benefits of dedicated outboard power supplies for turntables, most convincingly I might add. This room was but one of several where the exhibitors were using Origin Live turntables to good effect,

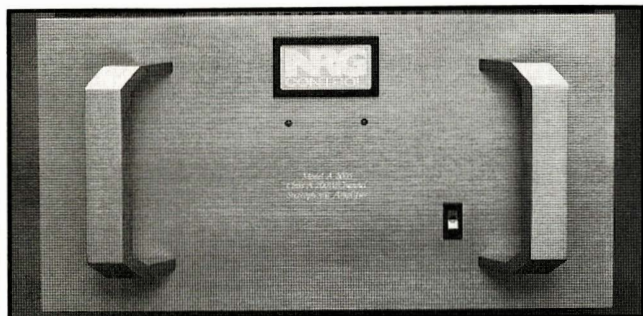


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# HI-FI CHOICE

SEPTEMBER ISSUE ON SALE  
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A recent addition to Origin Live's range of turntables.



Lynwood Electronics' high-end outboard phono stage.

suggesting that these decks are worthy of some success if they can make an impression on an already competitive turntable market. Another 'analogue' exhibitor was in evidence nearby in the shape of the Nottingham Analogue Studio and proprietor Tom Fletcher. Tom, who is perhaps best known for having designed the *Omega Point* turntable, has been involved in the manufacture of record players for over 20 years. Products on display were the *Mentor* turntable and *Space Deck* together with the *Mentor* and *Omega Point* tonearms.

Lynwood Electronics first came to my attention via advertised claims for the efficacy of its mains filters. These filters are very much in their element in the circumstances of a hi-fi show, so it was not too surprising to see them extensively in use in the Lynwood room. Also in evidence was another of the company's interesting developments, high quality outboard phono stages which can be plugged into any spare line input of, say, an integrated amplifier. These stages are available in two versions of differing quality (one is an upmarket valve stage) together with power supply options and upgrade kits for the cheaper stage.

An Origin Live turntable was also in use in the Lynwood room, which is perhaps not too surprising as Lynwood are now northern distributors for Mark Baker's range of front-ends. Also on demonstration was the recently introduced *Transtube* monoblok amplifier. Each unit contains a 50W transistor amp for the bass end and a 20W valve amp for the treble frequencies, with obvious benefits available from both bi-wiring and, at little extra cost, active operation. Once again the sounds to be heard were very impressive, in this instance via a pair of Royd *Apex* speakers. As if he isn't already busy enough, Lynwood Electronics' proprietor, David Rusby, is also editor of a growing quarterly magazine called *Audio Conversions* which is aimed primarily at the technically capable hobbyist and home constructor.

Last but by no means least, a description of the equipment and activities in the room occupied by Avondale Audio. I was somewhat surprised at the absence of a sign or poster proclaiming 'All My Own Work' in the vicinity of the equipment on display. Avondale supremo Les Wolstenholme was responsible for the design of the source, amplification and speakers on demonstration. The turntable was his own two-motor design which has been researched and refined over the last few years, and is now in production form. Amplification consisted of a modified Naim preamp feeding two Avondale-designed monoblocks which will be marketed under the modest monicker of 'Reference Music Systems' or RMS for short. Each loudspeaker consisted of two custom made bass-mid units and a Focal tweeter mounted in a braced 3mm steel enclosure. The stands are made of the same material, and are secured to the speaker by a substantial bolt which runs through the whole assembly. Rigidity is obviously of paramount importance in this design; not one single blob of Bluetak could be detected! Also in evidence at the show were a couple of Avondale-modified Moth tonearms, reputedly capable of competing with the very best arms available.

Avondale's modification activities have received a respectable amount of coverage in these pages and elsewhere, so I will refrain from further detailed comment. However, as these activities have given Avondale a reputation of notoriety in some circles, I am sure that one or two pertinent observations would not go amiss. The fact is that Avondale has a countless number of delighted clients who have achieved something at least approaching high-end performance for a very reasonable outlay, myself included. Furthermore, once Avondale has worked on a unit the company assumes total responsibility for guarantees and servicing, though these guarantees are not transferable. This has been said before, but on the

evidence of a couple of recent letters to the hi-fi press it needs saying again.

The insinuation from some manufacturers is that *they* are the only individuals either permitted to, or capable of improving their products. In the motor industry such attitudes would be subjected to mockery and disbelief. It's a shame that Avondale's detractors were either unable or unwilling to attend this show in order to both see and hear why this company has accumulated such a high reputation. In my view there is more than enough room in this industry for both manufacturers and modifiers to co-exist both profitably and peacefully.

Hand on heart, I can say that in the time that I was at the show I did not hear a single demonstration which was anything less than convincing. As someone who listens predominantly to records, I could not help but notice the overwhelming preponderance of turntables as front-ends; CD players were conspicuous by their absence. This, together with the prominence of valves occasionally gave the impression of a rather charming time-warp.

In conclusion, I would rate the British Audio Designers' Open Day the most enjoyable show I have had the privilege to attend. Whilst its attendance did not match the major shows, perhaps that was a large part of its appeal. It was so much easier and more leisurely to wander into the demonstration rooms and take a seat rather than have to queue or jostle for space in time-honoured tradition. Another positive aspect of this show was the undisguised camaraderie between fellow exhibitors. To hear the various exhibitors extolling the virtues of each other's demonstrations and encouraging those in attendance to listen to the sounds in other rooms was a joy to behold. I can only congratulate those responsible for the organisation of the show together with the rest of the exhibitors, and hope that next year's event is blessed with similar levels of both quality and informality. Roll on next March!



*When he moved house a former hi-fi engineer now working on the channel tunnel decided to install his hi-fi system for looks as well as sound. Dan Houston writes; photography by Chris Richardson.*

## Hidden assets

**T**his month we're visiting a flat in Tunbridge Wells where the hi-fi was chosen for its visual as well as sonic merits, but has nevertheless been installed outside the listening room. Chris Rassmussen, a former hi-fi engineer who now describes himself as a laser guidance consultant working on the channel tunnel, wanted only the loudspeakers to be visible in his south-facing groundfloor room. The rest of the equipment is on individual wall brackets, making a 'rack' in the recess of the 'L'-shaped corridor where it can be 'seen' by the infra-red remote control units. The whole system is refreshingly free of wiring – just over 20 metre lengths of loudspeaker cabling from the power amplifier under the floorboards to the speakers which are on fairly low stands and do not impinge on the general tone of the room.

The house is one of those Victorian wedding cake piles which were originally designed for large families and servants. It's now divided into flats two of which are owned by Chris. "My ambition, and it is very ambitious, is to own all the flats and to make it into a proper house again," he told me. Although he's owned this flat for two years, he only moved in (with his girl-

friend and her two teenage children) two months ago. The flat has been extensively refurbished and redecorated. It was while the carpet and floorboards were up that the loudspeaker cabling was laid. The listening room enjoys a lot of light, and the pine furniture and the pale coverings and carpet meant that a stack of black hi-fi equipment would look out of place. Chris already owned much of this hi-fi when he moved in: "because it's very large equipment, when we moved in we decided to put it onto shelves. Also, if I had put it in the listening room on the floor then anybody could have looked through the window and seen it in here. Seven and a half grand's worth of hi-fi isn't the sort of thing you want to leave lying around. But I also like the idea of having the equipment out of the room and just having the loudspeakers in here," he continued.

Now 30, Chris started getting into hi-fi at the age of 15 and has run the gamut of good and bad systems, slowly upgrading to achieve his aspiration. Choosing and using hi-fi was made easier by a spell in the trade, working at

*This system plays from the hall, through speakers in the lounge (above).*





Sevenoaks Hi-Fi (before the Tunbridge Wells branch opened). That partly explains his present mix and match set-up which demonstrates an eclectic taste. None of the components here represents one school of synergy or thinking and he has opted for products which have their own individual merits, before blending them into a system.

He's now one of the people responsible for making sure that the English section of the channel tunnel meets with the French; his company markets a laser guidance system which is used in the colossal (200M long) boring machines. The job has its interests; he reveals that late last year the engineers were having trouble establishing the direction of the tunnel, which they eventually pinned down to a faulty trig point on Dover cliffs. "Everything was tied back to the Central Trigonometry Network as a point of reference but the British side kept being out by a hundred mil. In the end they discovered that some sheep on Dover hill had managed to burrow under the trig pillar and it had shifted position slightly. Imagine that, a three billion pound project being nearly screwed up by a bunch of sheep!"

There was no trouble with tunneling the cable through his flat however. Chris brought in the services of Matt Sargent from the Tunbridge Wells branch of Sevenoaks Hi-Fi. He had bought his existing equipment from this dealer was in the process of buying some more. Matt's philosophy as an independent specialist is that he doesn't sell black boxes as much as a working hi-fi system. Installation is therefore free except where he has to call upon the services of a carpet fitter for example. In this situation so much work was being done to the flat that Matt could run his cabling at the same time that the floorboards were taken up, which represented minimal hassle and cost to Chris. While the main runs of loudspeaker cable are from the stack of hi-fi to the Musical Fidelity MC4s in the living room, Matt has also run some presently redundant interconnect cable from the hi-fi to the bedroom next door. This provides a future alternative: to wire the system through both that bedroom and the living room, allowing different sources to be used (providing a second amplifier was installed) and giving room for growth in the system. QED *Incon* was used, and commended, for its easy handling of signal over comparatively long distances. But the inter-

nect outlet is concealed behind a plain steel plate at present. The loudspeakers in the lounge are fed by two 20 metre lengths of Audio Technica (*AT6120*) cable. This is praised for its consistent performance over long runs – and at £10 a metre so it should be! Mains purity was also improved by running a spur directly from the fuse box to the hi-fi giving a dedicated supply.

While Chris was keen on the idea of having high quality cabling running out of sight, he balked at Matt's suggestion that he put his equipment on five individual Target *TTI* wall brackets. "I said to him 'you must be joking, it's not even going to look right', but once he had set them up I agreed and now I really like the look of them."

Liking the look of things is important to Chris. He says that all his equipment was bought on the basis of sound quality, build quality *and* style. "As an engineer I appreciate the build quality of things. For instance I really like the way Proton puts its amplifier together, it sounds great and it's built like a battleship. And I've had a look inside this Denon CD player. I've only got it for a few weeks because it's the first in the country – I think it's going to Alvin Gold for review next – but I'm definitely going to buy one when they get the first shipment in; it's all copper in there . . . you could probably get a fortune for it down the scrap yard!"

Chris was also tickled pink by the style of his record deck, now set off by some gorgeous interconnect running down the wall behind it from the cassette deck. The Pink Triangle record player replaced a Thorens model and Chris has maintained an interest in vinyl records – most of his collection is still boxed up – even though he's had a CD player since they were introduced. "I got caught up in the euphoria over the compact disc concept and I bought quite a few CDs before I decided that vinyl sounded better," he says, "I hadn't thought you could get a decent sounding CD player but this Denon sounds pretty good – I think they're getting a lot better."

The 18-months old Pink Triangle Projects *PT TOO* is armed with a SME 309, but Chris has heard a rumour that the company is about to release its own arm. This is quite a longstanding rumour but he is keen to buy one as soon as it arrives. "Knowing them (PT) it will look great and sound fantastic too," he enthuses. He is presently using



an Audio Technica *ATF5* cartridge – a *Solid Body* version modified by Stilton Audio of Peterborough – but has an Ortofon *Quasar* on order as an imminent upgrade to the system. Apart from the *Quasar*, the tonearm is just about the only change he would like to make to the system and he says: "At the moment I can't think of anything I want to change, apart from the cartridge in the system. It sounds how I want it to sound and I anticipate it being like this for at least five or six years."

Chris describes himself as a music lover rather than an audiophile; he's quite happy to listen to tapes and is one of the few people we have visited in





*Tweaked Quad feeds gutsy Proton (above)*

which is padded down via a resistor network to just half a volt to suit their power amplifiers. I had done something similar before when Quad told me what to do with one of their 34 preamps – you just take out a couple of resistors. The circuit board in this is a bit different but basically I did the same thing again and it sounds much better. The Proton loves it, it really gets it cooking.”

The installation here is a different approach to a common problem; where to put hi-fi without hiding it away in quasi regency repro furniture when you don't want to be faced with a row of black boxes. Having chosen his hi-fi for looks Chris can still see it whenever he leaves his room, or from his kitchen. But while he's relaxing on his sofa there is nothing to remind him that the music is coming from that rack of hardware; he can't even see a cable.

## The System

Pink Triangle PT-TOO	£690
SME 309 tonearm	£495
Audio Technica ATF5 Stilton cartridge	£149
Denon DCD3560 CD player	£1000
Akai GX95 cassette deck	£400
Quad 66 preamplifier	£650
Proton EMC1150A power amplifier	N/A
Musical Fidelity Reference 4 loudspeakers	£400
Target HJ17 stands	£90
Target TTI	£46 each
Audio Technica AT6120 Loudspeaker cable	£10/M
Audio Technica AT628 interconnect	£40/1.2m pair

**System supplied and installed by:**  
Sevenoaks Hi-Fi, 34 Mount Ephraim,  
Tunbridge Wells, Kent. Tel: (0892)  
541968.

*Pretty in pink: Cassette deck leads colourfully echo the turntable.*

Aspirations who admits to using the cassette deck for anything other than making tapes of favourite tracks for the car. “Lynn's got about 700 tapes and so we needed a good cassette deck for that. But my taste in music is just about anything from MOR pop to Led Zeppelin, except opera, I have to go out when she's playing opera.” His Akai sits at the top of the system and is remotely controllable like everything bar the record deck. “You can even eject the cassette door using the remote,” Chris said, demonstrating this natty feature from a

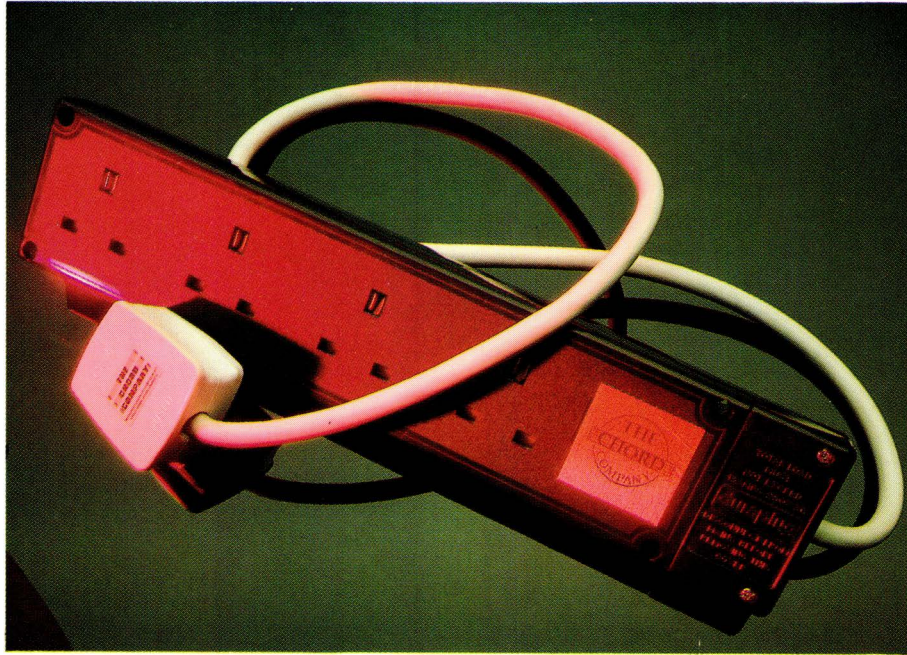
distance, “that's great, I spent a lot of time playing with that when it first arrived.” The remote control works well from the listening room to the system which is diagonally opposite in the corridor. Chris especially praised Quad's remote for always being powerful enough to cope – even when pointed in another direction.

While he may describe himself as a music lover, he nevertheless displays the symptoms of an audiophile in looking inside and tweaking equipment. For instance, he has altered the voltage output of his Quad preamplifier to better suit the thirst of the Proton. “The Quad 66 has an output of one and a half volts



# Statements

*Monitoring what's happening on the high-end scene . . . This month Roy Gregory discusses matters of the mains. Oh yes, to get the best from a hi-fi system – even if yours isn't a particularly esoteric set-up – the way it hooks up to the socket in the wall is of vital importance.*



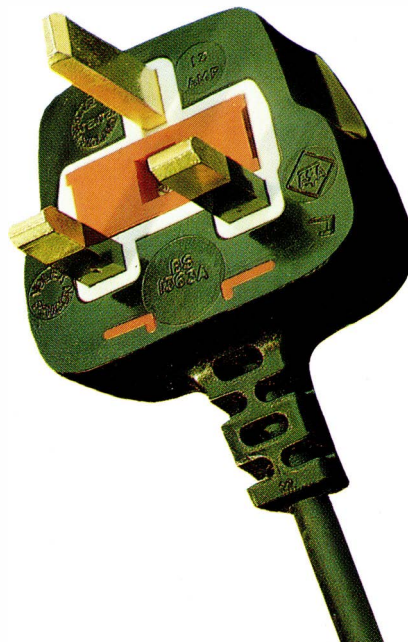
**A**t the best of times, moving house is a high stress occupation. And for anyone with a hi-fi system, you can add to the already long list of problems the horrors of a new listening room. Which way round will it sound best? What about furniture? Carpets? Windows? Power sockets? Ah yes, sockets . . .

You guessed it, we've just moved house. The setting is rustic, even idyllic; the power supply rather less so. Sockets are a little thin on the ground, and if the local ponies provide buckets of premium rose grower, their wooden, rocking brethren must have been responsible for the electrical outlets in this dwelling. That can be put right given time. Unfortunately, the wavering, weak-kneed product emanating from them is beyond my control. That's right, the SEB (New Forest Division) is not exactly Mr Popularity around here, a situation compounded by this year's storms which further enfeebled the supply. Electricity – or the lack of it – is something of a sore point.

Imagine, then, my interest when not one but two products sailed across my bow promising to improve exactly that area of system performance. Earlier this year, with cynicism diminished by frostbite and the onset of Troglydyte tendencies, I readily fell prey to the salesman's

*The Chord Company knows what's what: this extension block for audio systems is hard wired and has no degrading LED.*

patter. Sitting around with my new toys, I calmly awaited "the resumption of normal services". Whereupon I was even more surprised to discover that my hastily grasped comfort blankets actually did the business. Zounds! Could this be the answer to my current problems? Well, definitely worthy of further investigation . . .



## The magic of Pandora's box

So what are these miracle devices? First to appear was a small, black, sealed box (and I mean sealed – these people do not want you peeking inside). On one side exits a foot or so of mains cable with a decent 13 amp plug on the end. Next to it is an on/off switch (no LED) and on the other end an IEC type mains output. The graphics, screen printed onto the box, are worthy of mention. On one side is a cute cartoon of three caged gremlins. Elsewhere – in, er, distinctive script – is the unit's name, *Pandora*, and the name of the manufacturer, EC Audio – of *Finestra* preamp fame. The cartoon, as I said, is cute. The best thing that can be said about the other graphics, is that they don't need to be on show. Victoria, who shares the house and hi-fi, felt they'd look best on a Fisher mountain bike – and that, folks, is a serious edictment.

So what does it do? "Well", says Tom Evans, who designed the *Finestra* preamplifier and is also responsible for this device, "you just plug any low current component into it and it improves the sound; turntable, CD player, solid-state preamp." Unfortunately, valve units draw too much current, as do power amps, although a larger model will probably become available.



"Aha!" says I, "it's that most hated of all audio accessories, a mains filter".

"No, no it's not. It's not a mains filter" Tom quickly blurts.

"It's a transformer, then? A choke? Is it active or passive?"

"I can't tell you. Henry (the boss – and hence very important) would strike me dead. Why do you think *Pandora's* box is gummed up with Araldite?"

So here we have it: the *Pandora-not a filter* mains purifier/conditioner, a small black box which promises to trap all those mains nasties. Interestingly, I happen to know that Volker Kuhn of Audioplan in Germany has come up with a similar device completely independently. I have a healthy respect for Volker and that makes me a little more willing to tolerate the secrecy which EC Audio insists upon. That and the fact that the damn thing works!

I first tried a turntable which, sans *Pandora*, was sounding perfectly happy. Plugging it into the *Pandora* produced what can only be described as a jaw-dropping improvement. In detail, the results were as follows: the sound stage, which had been flat, suddenly gained depth and height – and became a perceptible volume of air. Images themselves gained in dimensionality and focus, and the stability of the stage became dramatically improved, with individual sounds locked in space. Instrumental timbre and tone became noticeably more natural, with strings in particular sounding much less scratchy and edgy. Dynamic range was greatly improved as was bass depth and clarity, and rhythmic and timing cues came across far better.

Before using *Pandora* the system had sounded fine. After plugging in *Pandora*, it sounded better in all the hi-fi senses outlined above. That's not the bottom line, though. The fact is that using *Pandora* the orchestra sounded like a much better orchestra, the performance a far

***Pandora, by EC Audio: it keeps those nasty mains gremlins locked away.***

greater one. They simply played better.

Everyone knows that turntables sound better with a good power supply. The thing is, the turntable I was using was a band new Roksan *Xerxes* with the updated power supply. More to the point, the *Pandora* has a similar effect on all turntables with which I've tried it: Linn, Well Tempered, Michell, VPI, etc. At £120 *Pandora* isn't cheap, but in the context of £1,000-plus system I certainly think it's worth the money. I've now used the *Pandora* on CD players, DACs, preamps, and in all cases the improvement has been immediately noticeable. However, ground rules have emerged. As *Pandora* will only power a single unit, the question of what you plug into it becomes important. You should connect it as near to the front of the system as possible, eg the turntable or CD transport. In my system, order of priority has been turntable, CD, DAC; the tuner and preamp are both awaiting units. The point here is that the three available units made most difference used like that. If I didn't use a turntable, the spare would probably find its way onto the preamp. It's very much a case of deciding where *Pandora* will be most effective in your system. In mine, it has proved just as effective on CD players as the turntable; I just happen to listen to the turntable a lot more.

### Sonik links – and more . . .

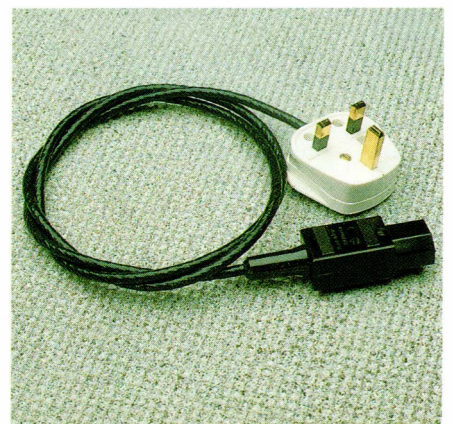
The second of my two 'discoveries' was a mains cable. Called *Sonik Link*, it appeared in the company of designer Graham Nalty and a rather nice sounding little amplifier he is now manufacturing. The improvement offered over the standard mains cable was, once again, very impressive. *Sonik Link* is a thin three-core lead made of silver plated copper multi stranded conductors, insu-

lated with Teflon. On one end is an IEC plug, on the other a gold plated 13 amp plug. The whole is nicely finished and easy to route in confined spaces.

Mains cables aren't exactly hot news. I've been using home-made solid core leads for some years with considerable benefits. The problem is that they are stiff, prone to fracture if bent back and fore too often, and need to be used with extreme care. Here was a good-sounding, commercially available, safe alternative. Improvements in dynamic range and image focus were far from subtle, and detail was also improved.

Trouble, so the saying goes, comes in threes. Chatting to Russ Andrews of the RATA company (Russ is definitely on one of the UK's more committed listeners), he pointed out that he markets a range of Kimber Kable mains leads. A length of Kimber *4TC* plus earth strand, exterior insulation and fitted with the necessary plugs duly arrived in the post. Its effect was even more impressive than the *Sonik Link* lead, offering a greater improvement in 'slam' and better dynamic and spacial resolution. It is, however, much thicker and stiffer and Graham Nalty's lead retains a sense of sweetness which some listeners may prefer. Curiouser and curiouser.

Opening my mouth again, this time to Mike Harris of Moth Marketing, I was promptly greeted by the response, "Well, I bet you haven't tried our *Masterlink* mains cable". Said cable duly arrived and with it a severe case of culture shock. At least the *Sonik Link* and *4TC* are recognisable as real world mains cables, at real world prices of around £35 for a standard length. Moth Marketing's *Masterlink*, however, comes from the land of the giants. Nine conductors are used, four each for live and neutral, one for earth. The cable is dou-



**Sonik Link silver-plated mains lead from the Audiokits company – from £35.**

ble insulated with a black mesh outer sheath which succeeds in making its 15mm diameter look almost acceptable. The price is fairly over-the-top at £120, and fitting a 13 amp plug (none is supplied) is best left until you are feeling particularly calm and at one with the world and your Karma (no, not the cartridge). Could it possibly be worth it? The cost, the frustration, the hernia?

My first experience of *Masterlink* was plugging it into an Arcam *Alpha 2* being used with a Marantz *CD50SE* and a pair of JPW *Sonatas*. I only wanted to make sure the plug was wired up correctly, but found the results really quite shocking. The system got louder. Dynamic range, focus and spacial information were improved to an extent at least equivalent to changing the amp up to a *Delta 60*. The improvement in bass slam went way beyond that. You can plug this lead into any amp and it's transformed. The sense of power, weight and scale given by this lead is most surprising; its effect on detail and the control exerted by the amp equally impressive.

## Searching for nirvana

At the moment I'm using *Pandoras* on source components, as I've already described. The preamp has its own solid-core mains lead and I'm going to use *Masterlink* on the power amps. My reasoning here is that although the effect of the *Masterlink* is more immediately impressive than that of *Pandora*, what the *Pandora* does is far more fundamental. And anyway, the overkill lead works best on power amps. The difference twixt it and *4TC* on a CD player is there, but for most people it wouldn't justify the difference in cost.

I'm now waiting for RATA to supply some IEC-to-IEC Kimber *4TC* leads to run from my *Pandoras*. I've also asked EC Audio to supply a *Pandora* with an IEC mains input socket. Running that off a *Masterlink* cable could prove very effective.

So where does all this leave us? Well, I'm recommending that you take a very careful look at your system's hook-up to the mains. The *Pandora* has to rate as

one of the best value upgrades I've made in a long time. *Masterlink* mains cable is shockingly good, but for most people prohibitively expensive. The *Sonik Link* and Kimber *4TC* cables offer exceptional value. However, the one thing all these products have in common is the quality of their connectors and the connections made inside them. As a bare minimum you should at least check that all your plugs are of good quality. If you have to use a ganged extension block make sure it too is of good quality. The Chord Company, of Salisbury, markets an excellent example from which they've removed the LED and hard wired all the connections.

Enough for now. I'll report back on the experiments with the *Pandora*, and Russ Andrews is threatening me with an *8TC* mains lead, or even one constructed from Kimber Kable's hideously expensive silver *4AG*. Now that I've cracked the quality of the cable running from the wall socket to the equipment, all I have to do is try to get the Southern Electricity Board to pull *its* socks up.

## High-end Update

The well tasty Oxford *Crystal Reference* turntable is back in the limelight. Now in mark two guise, this belle of the British record player market has been upgraded with a new power supply and enhanced suspension system. The power supply incorporates improved output stages designed to reduce cogging in the PAPST motor, and the suspension has had a sub-subchassis incorporated between the subchassis and floor stand. The *Crystal Reference II* now retails for £2,395 and the upgrades are retrofittable to existing decks.

Acoustic Energy has taken on distribution of Tara Labs *Space & Time* interconnects and speaker cables from the US of A. The range includes the extraordinary *Temporal Continuum* speaker cable which incorporates a 'Temporal Control' knob so that you can "unite your amplifier and loudspeaker so magically that they almost become one". Prices start at £29.95 for interconnect and £4.80 per metre for speaker cable. But don't worry, they rise to *Statements*-style figures for the more exotic varieties.

Conrad-Johnson has produced a new pre-power amplifier combo called



**Oxford Crystal Reference II: now that's what we call a record player!**

*Evolution*. The *Evolution 20* preamp mimics the company's flagship model, the *Premier 7* – inasmuch as it's entirely dual mono – except for the volume control and power supply. It also uses silver wiring and the phono input has sufficient gain for all but the feeblest of moving coil cartridges. The *Evolution 2000* is a 65kg hybrid power amplifier capable of delivering 200W

a side, using a valve driver stage and FET and MOSFET output devices. The power amp is notable for having no negative feedback at its output, which is said to have very beneficial effects on harmonic distortion.

Champagne gold amplifiers with specs and immaculate build quality like these don't come cheap, however. Each unit costs £4,995.

*On a rare visit to Britain  
Mr Kondo, the man behind  
Audionote of Japan, spoke*

# The Audio Silversmith

*to us about his life and  
philosophy. Dan Houston  
writes; portrait by Chris  
Richardson.*

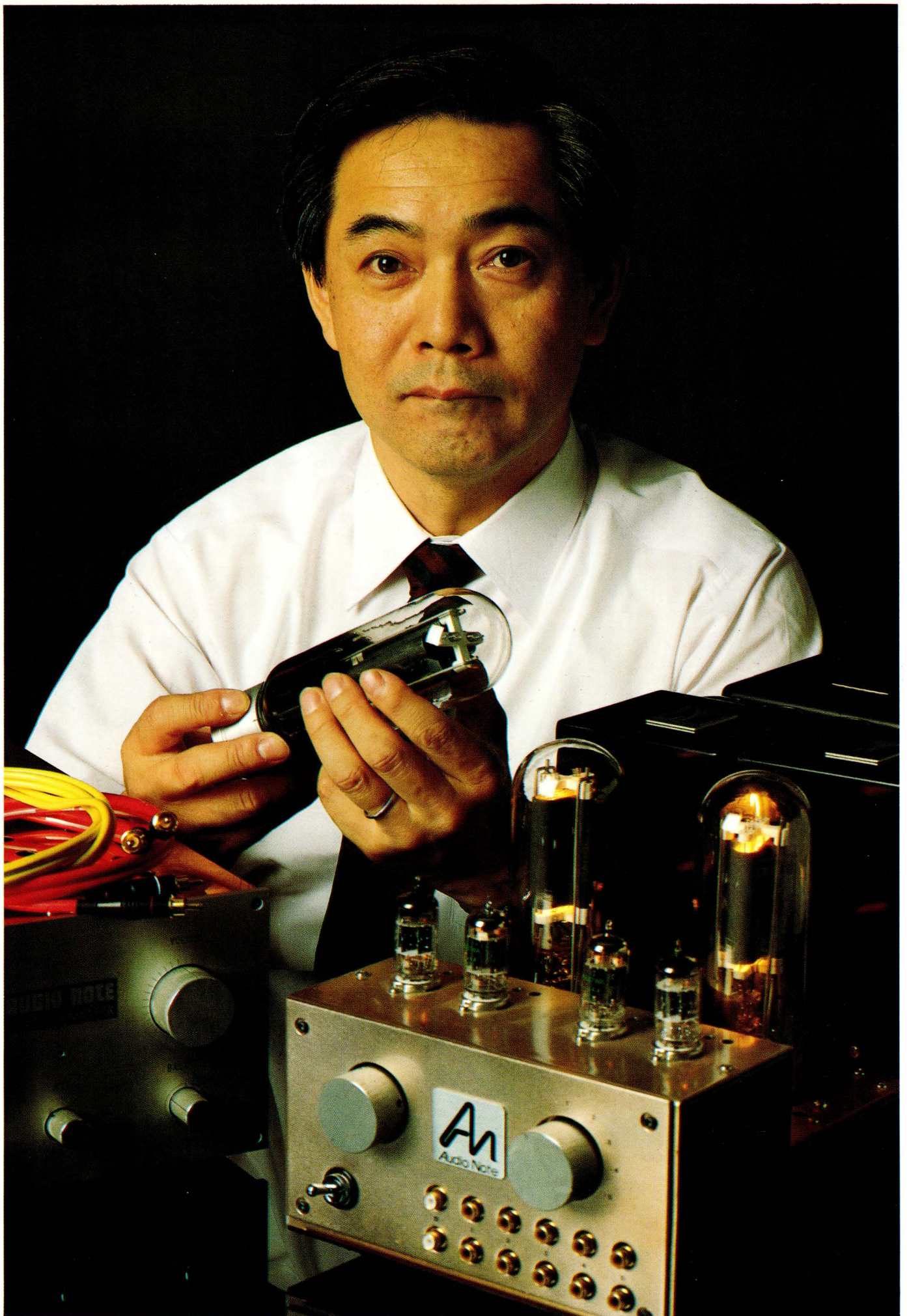
**I**n the late Seventies a Tokyo silver merchant received a strange request: could he deliver a kilogram of pure silver wire to a Mr Kondo, of Audionote? This material was rare in Japan – most of the silver used for jewellery was only available in thin rods, and no, Mr Kondo couldn't use those; he'd already extruded and used such stuff. Nor could he use braided silver litz cable. He needed proper wire this time. In due course the kilogram arrived and some very special pieces of hi-fi were on the way. Silver, it became apparent, not only embellishes the table or a body, it also enriches the sound of hi-fi. In using the white, lustrous, ductile, metallic element, Hiroyasu Kondo established himself as one of the first and finest sonic jewellers.

The *Choice* features team met Mr Kondo on his second visit to Britain in May. Now 48, his reputation is famous in Japan while his amplifiers, loudspeakers, cable and cartridges have found fans among the few European audiophiles who can afford them. He is best known in the UK for the legendary *IO* cartridge, which at £895 seems absurd for a 'needle' of limited life, until one comes across the £2,350 *IO Limited* with its own electrical power supply giving a constant magnetic field.

For someone who is credited with having strokes of genius in terms of

sound reproduction – he first thought of using silver wire while on the lavatory one day – Kondo had a straightforward if high-flying early career. After gaining an electronics degree at Tokyo University he joined the research and development department of Teac. The company was famous for its tape recorders and Hiroyasu's time was spent grasping and mastering the digital data recording methods which were then in the ascendant along with solid state technology. After a few years working in the hardware side of the recording industry Kondo applied to CBS Sony which was newly established. He says he was one of 80 engineers taken from 6,000 applicants which makes CBS in Japan look like Macdonalds in Russia! However, although many do have degrees, it's unlikely that young Russians serving a Big Mac will become writers on contemporary catering; soon after joining CBS Sony, Kondo started writing technical articles on audio circuitry for Japanese audio magazines. It's a pastime he is still very much involved with.

Having broken the 'work-for-one-company-all-your-life' Japanese ethic, and having established himself as a commentator on recording matters with a perspective on both sides of the fence, it comes as little surprise that Kondo decided to branch out on his own by founding Audionote in 1976.



His first audio product designs had come a lot earlier though. Indeed one needs to go back to Kondo's childhood in Hokkaido to appreciate the development and philosophy behind his work. Born in 1942, the 25th year of the Showa era, he is the second son of a Buddhist priest and grew up to a background of religious music and chanting. He describes the sacred songs – the Kyo – as sometimes intoxicating and, even amid the feverish post-war restructuring of the Japanese economy, came to appreciate the sound of silence. "Being quiet can be heard," he told me candidly, "and good philosophy is always about listening to the inaudible sounds of nature." From a background of Eastern religious vocal music he adopted a love of Western opera, and vividly remembers hearing Toscanini for the first time at the age of 15. It wasn't difficult to bridge the cultural gap: "I was always more interested in the sound rather than the religious meaning so I could naturally get into another kind of music from that," he says.

The mid Fifties saw the birth of hi-fi in Japan, led by do-it-yourself enthusiasts. His father's hobby was building amplifiers and he followed suit, making a three watt power amplifier using a single 2A3 valve. The hobby became a passion: "I confess my soldering iron was always in use 365 days a year," he laughs. He also joined a broadcasting club at school "where I could meet senior students who affected my thinking in that sphere". As the second son he was free to pursue a career of his

own choice and electronics was the obvious avenue. Although his first amplifiers had been simplistic tube types, the advent of solid state circuitry and the easy availability of components meant that most of his designs in the Sixties used transistors. Shortly after making the first Japanese differential amplifier – for his own use – he seems to have lost touch with his teenage Zen and didn't rediscover the valve amp until he founded Audionote.

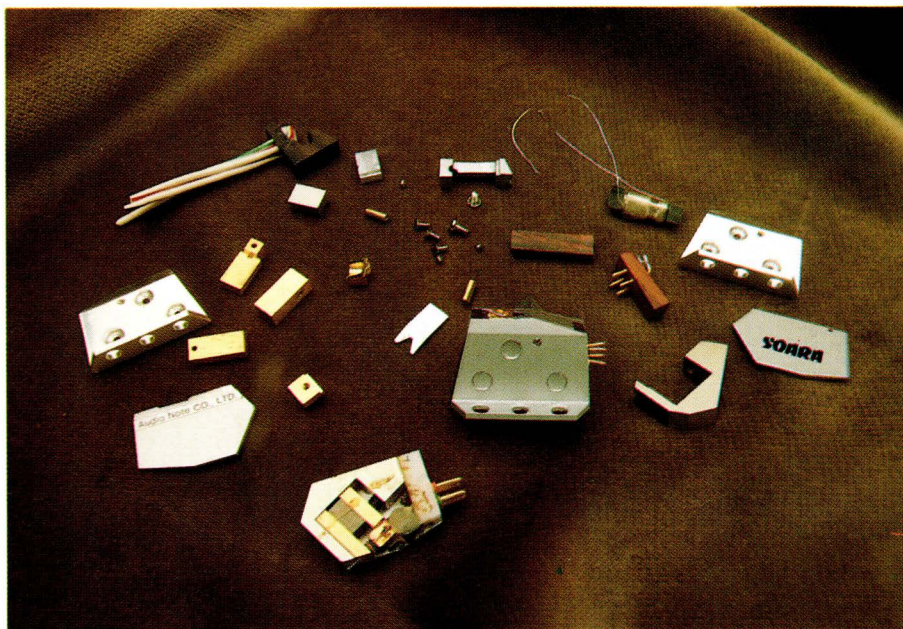
The Audionote factory is situated in the heart of a central Tokyo residential district, in the Shinagawa area of the city. The factory is small, even now it only employs five people, all hand-picked for their craftsmanship. The emphasis is on handcrafted precision engineered products, a third of which are sold abroad – mostly in Europe.

The company's first commercial product was a moving coil step up transformer, which enjoyed only mediocre success using copper wiring and had several competitors. The breakthrough came with using silver wiring – first in the primary and then secondary stage of the transformer. "The silver wire sound was quite different, it was pure, full and natural," he says, "and when I had the wire to use in the secondary stage it improved everything dramatically, especially in terms of low frequency resolution. It was very smooth and distortion free." Punning inadvertently through his interpreter Kondo mentioned that his use of silver wiring was widely praised by most who heard it: "There were some excep-

tions from those who loved the sound of copper – they were more resistant to the idea," he said.

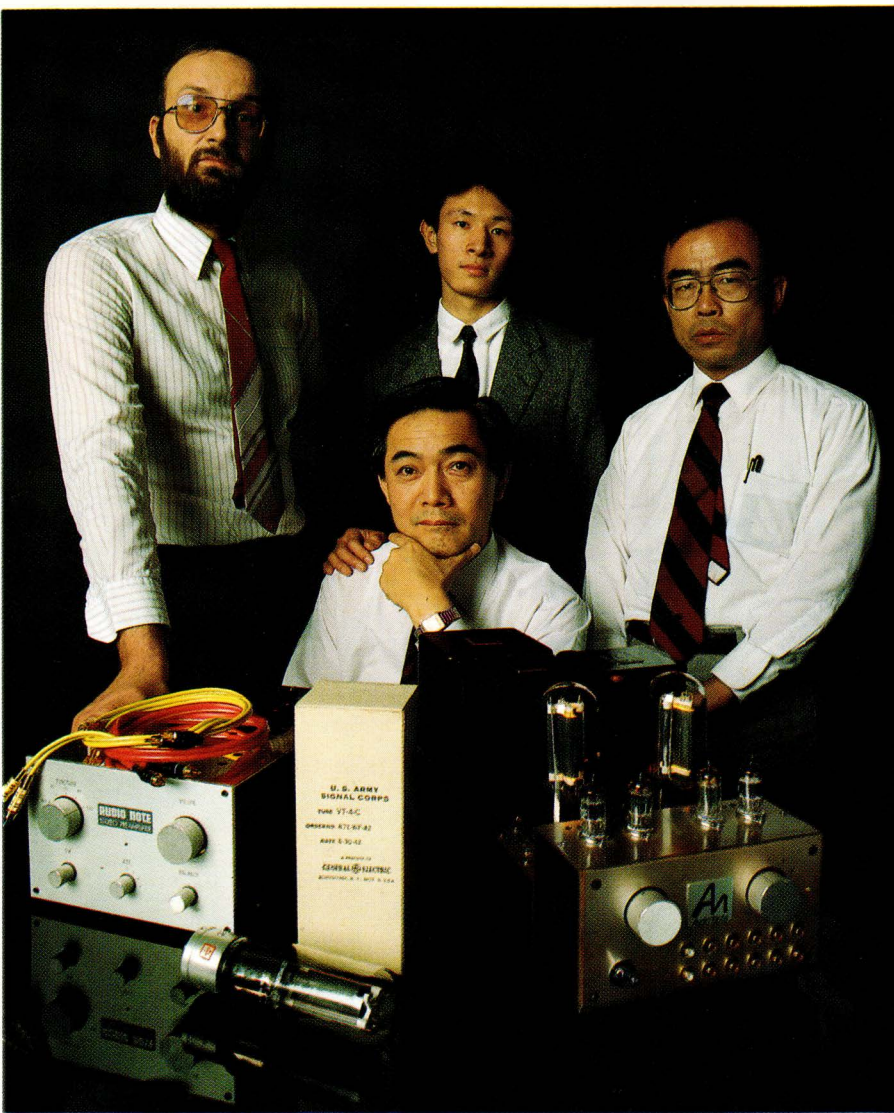
Having discovered a merchant who could deliver silver for wiring, Kondo set about designing other applications for the metal. His silver interconnects first appeared in Europe in 1978 and his M7 preamplifier also used the element. The M7 used FET transistors. "I had tried to build a valve preamplifier but just after I founded Audionote a very good transistor was brought onto the market," he remembers. "The FET had low distortion and didn't need negative feedback. It offered a simpler sound and functions compared to valves and was in mass production so it was easy to get hold of. Tubes were hard to get in Japan then and they were not consistent in terms of sound quality." Paradoxically the M7 is now an all valve design – the high voltage FETs which were designed for audio applications are now no longer available, but Mr Kondo praises the valve sound, saying it offers simpler and therefore better circuitry for the signal to pass through.

At the time of the original M7 he established the benefits of single earthing technology now widely adopted, but laments that he didn't apply for a patent. His first valve power amplifier was shown in London in 1979 sporting a then outrageously high price tag of some £6,000. Other valve amplifiers (the EL34s) improved upon the design in 1984 or thereabouts. He also started work on cartridges, rewiring the coils of an Ortofon SPU with silver (without using a microscope!) and offered the tweaked version to audiophiles as the SPU-AG after silver's nomenclature in the periodic table. Shortly afterwards, his own creation – the IO – was another first, using tiny screws to firmly bolt the coil assembly to the cartridge body and so reducing vibration. He says that Ortofon answered with the MC2000 using the cartridge body as a generator system in itself. The IO Limited (1983) was the culmination of his cartridge designs, and one of four products of which he is most proud. The Limited uses similar materials to the basic IO but has its own power supply (you'd need to rewire a tonearm) which creates a permanent magnetic electrically generated field through a coil, as opposed to the variable field used by most moving coil designs. He believes that analogue audio should be more treasured, saying that the human ear is more suited to analogue sound. Audio by Design, Kondo's European distribution



The guts of an Audionote cartridge: soon to be made in the UK.





*Kondo with (from left) his European distributor Peter Qvortrup, assistant manager Masaki Ashizawa, and international distributor M Shibazaki.*

outlet, is just about to take over the Audionote cartridge manufacturing; he was finalising details of the transfer during this visit and says that nothing will change in the intricate working of the IOs' manufacture.

Kondo is a little hazy about dates for some of his breakthrough designs. His (healthily Eastern) attitude seems to be: "it's there so it doesn't matter when it arrived". But by the early 1980s Audionote was successful enough for him to buy YL Acoustics – a loudspeaker firm. He has also developed his own loudspeakers using huge boxes often with single drivers and offers the Audionote In-Car range of loudspeakers with – believe it or not – valve amplification. He has made forays into turntable design and is now concentrating on a horn loudspeaker which will operate as a horn in configuration but which will have a 'soft' sound hitherto unheard of in this type of transducer. He is also keen to produce an economy priced valve integrated amplifier, though just what economy means to Audionote remains to be seen.

Along with the M7, his silver inter-

connects and loudspeaker cables and the IO Limited, he is most proud of the £30,000 Ongaku triode power amplifier which has captured the hearts of many with its purely silver sound (and perhaps golden silences). Ongaku can

apparently be translated as 'joy of music' and was born in 1988. There's a cruel irony in the fact that the amplifier uses valves bought from ex US military stock dating from the last war. Indeed a couple of samples he brought to show us dated from the year he was born and were almost certainly made to aid the American war machine in its ultimately crushing defeat of his country. Talk about turning swords into ploughshares...

## Curriculum Vitae

Hiroyasu Kondo

Born 1942

Married with a son and daughter

First Job: Researching recording technology at Teac

1968-76 CBS Sony Recording Engineer

1976 Founded Audionote

First product: Silver wired step up transformer

1977-78 Audionote Silver interconnect and loudspeaker cables.

1979 M7 preamplifier and IO cartridge

1983 IO Limited and buys YL Loudspeakers

1984 DL34 valve power amplifiers

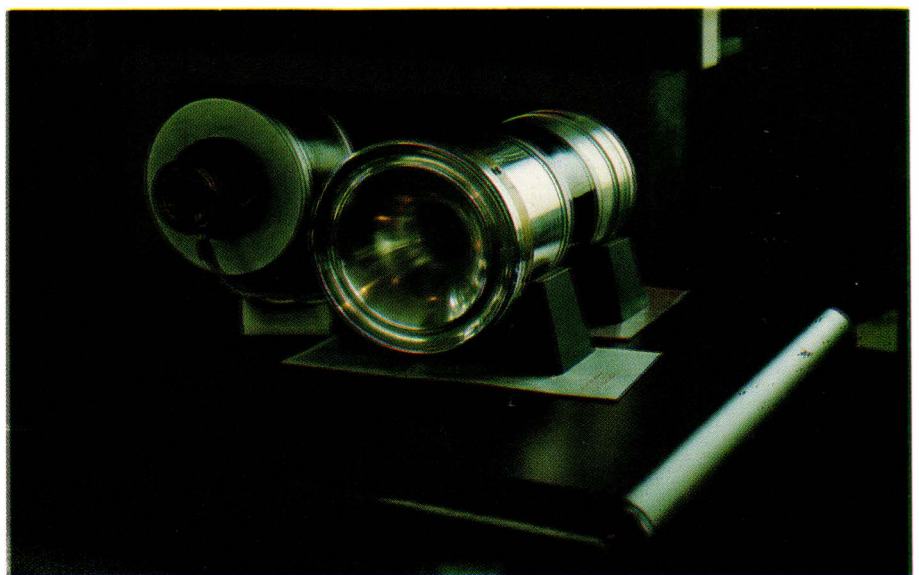
1988 Ongaku

Number of Employees: Five

Turnover £250,000

**Audionote**, 1-9-2 Koyama Shinagawaku, Tokyo, Japan. Tel: (03 787) 2011.

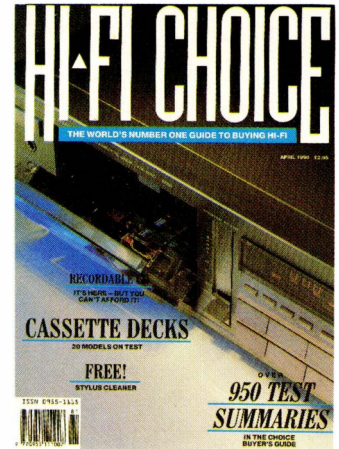
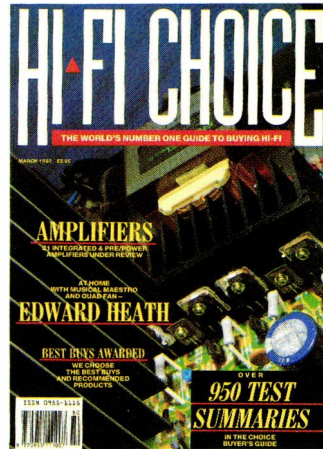
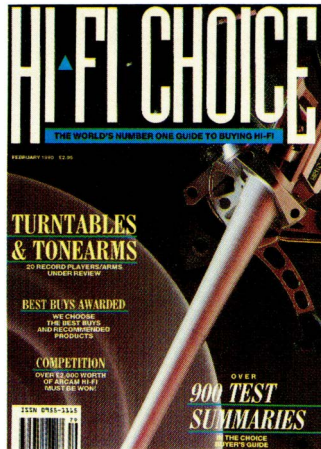
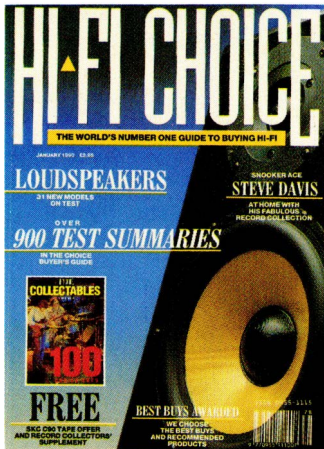
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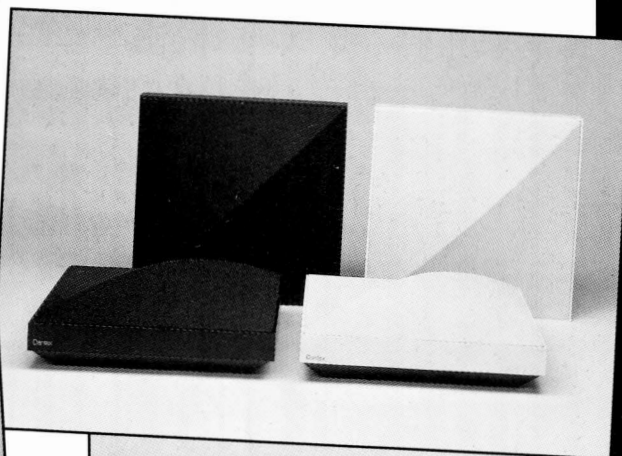
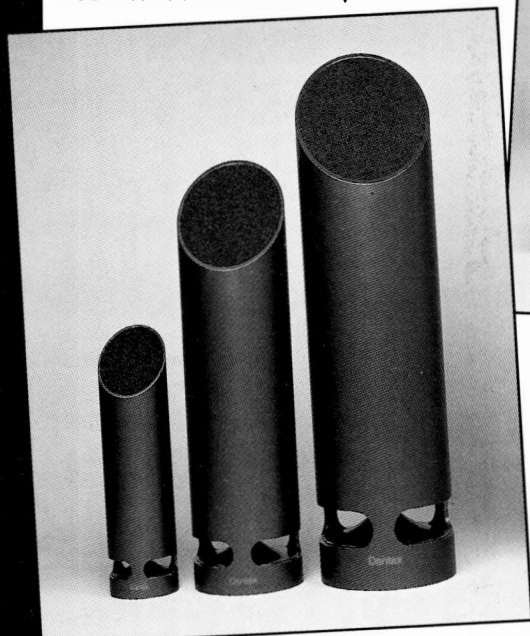
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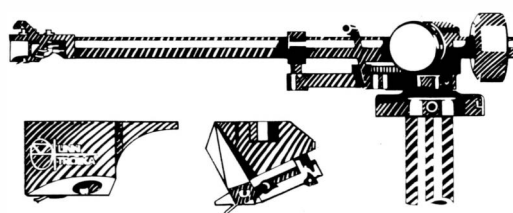
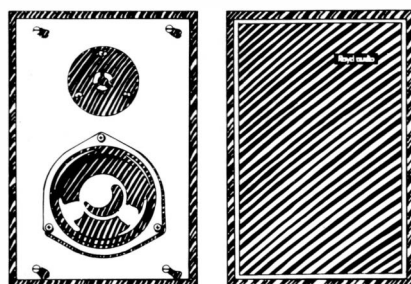
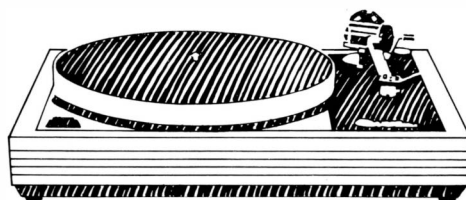
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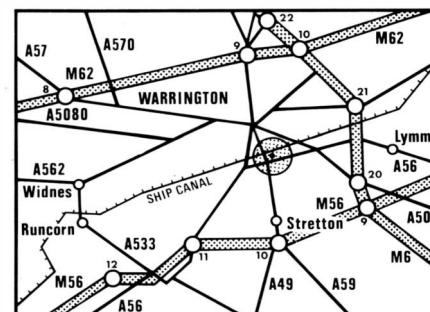
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# Readers Write Choice Answers

## Hooking up Elkie Brooks

What does it take to bring Elkie Brooks into your listening room? Five metres of 2.5mm ring main cable, that's what!

I read about this stuff somewhere and, feeling the urge to tweak my *Cyrus One*, Kenwood cassette deck and Dual 505-2 set up, used it for speaker leads (good) and then for power leads on the amp and turntable (amazing). I now have one lead from the mains plug that splits into two short leads that power the two components, this on account of the fact that it's difficult to put mains plugs on 2.5mm cable.

The end result is edging close to the sound of a real performance. And it isn't just power – my Mozart symphonies have been transformed as well. Other bored or broke readers should try this simple and cheap tweak.

IAN MATHEW,  
CULLOMPTON, DEVON.

See this month's Statements for more on this and related 'mains' topics – Ed.

## The right image

My current system consists of a Linn *Axis/Basik/AT-OC9* record player, Philips *CD473* CD player, Meridian modular preamp, Quad 306 power amp and B&W 801FS loudspeakers. Both components and loudspeakers are connected up with Monster cable.

Although the overall sound that I'm getting is good, stereo imaging is poor and voices and instruments do not seem to be clearly defined. Given a budget of £1,000, how would you suggest I go about upgrading the system in order to solve this problem?

MANOS LYKAKIS,  
ATHENS, GREECE

Looking through past reviews of the components in your system it's surprising how often one comes across comments

regarding the quality of stereo imaging, especially with the speakers and preamp. So one can surmise that the problem probably lies elsewhere.

The CD player was considered one of the best in its class, but that was the class of Spring '88 and digital technology has, to an extent, moved on since then. You could, for instance, do a lot worse than listen to one of the latest crop of PDM 'bitstream' players and onboard DACs which seem to achieve more tactile imaging than similarly priced 16-bit alternatives. Try and listen to players like the Rotel RCD-865 or the converters from Meridian and Deltec.

It would also be worth auditioning a couple of power amps. We aren't familiar with the Quad 306 but it's possible that this could be letting things down a bit. Try comparing your 306 to a Sumo Polaris or a pair of Denon POA-4400 mono-blocks which are pretty good for the money.

On the black disc side, major improvements could be achieved by replacing both turntable and arm with something like a Systemdek IV and Rega or Heliuss arm. The performance of this turntable can further be enhanced with a Mana table, a glass-topped design that improves both bandwidth and musical coherence – at a price.

Other things to check and adjust include interfacing and placement of the speakers. If you haven't already fitted spikes, put them on the bottom of the 801s

and experiment with positioning – where you put the speakers and how you angle the tweeter will have a greater influence on the imaging capabilities of your system than you might expect.

This is really a case of whittling away at the system and finding out which component(s) is being least helpful in creating believable images. And if you use CDs or LPs predominantly, it makes sense to concentrate funds on the appropriate source rather than spread them out over both. Really good imaging is not that easy to achieve – especially if you want good bandwidth – and is intrinsically tied into system set-up, the room and that old chestnut, system synergy.

Getting a dealer to visit your home with a few alternative components is probably the most cost effective approach in the long run.

## Beam me up, Dave

I have just (belatedly) read Paul Messenger's piece on CD modification in *Choice* Issue 81 (April '90) and found it very interesting, both technically and as an example of what happens when a specialist in one field (hi-fi engineer) finds himself in another's field (optical engineering).

I cannot claim much knowledge of CD as a whole. I am still firmly in the analogue camp and do not as yet have a CD player – although I listen to new ones once in a while, to check that

my prejudice is still valid, before retreating once more to the Linn. I am, however, a photographer and can claim an element of expertise in camera design, if only as a professional user. I was thus amazed by your comments on the potential problems of reflectivity in both CDs and the transport mechanisms of their players, not because I could not see the problem, or why the treatment with the felt pen should work (the reaction you say you expect) but because I could not believe that no one had thought of this before.

Since reading your article I have been peering into the innards of friends' CD players' transport mechanisms, and you are right, many do have polished metal surfaces in evidence. The laser pick up of a CD player is an optical device and is, essentially, a form of camera, but one developed by hi-fi engineers. Had Nikon or Leica developed CD rather than Philips, such a state of affairs would never have arisen.

One of the easiest ways to degrade a photographic image is to allow reflected light to bounce around inside the camera body/lens barrel or for that matter the enlarger/projector body and lens or even the dark room. You will, therefore, find that if you take the lens off even the humblest of modern cameras/projectors/enlargers you will find them and their lens barrels coated with very absorbent (ie non reflective) matt black paint and likewise dark rooms are usually painted matt black. If you should doubt their effectiveness, try scraping the paint off the inside of an old camera body and see what you get. The answer will be a dramatic decrease in the contrast of the image and hence its clarity, the result of reflected light (if you like, noise) hitting the film.

In record players, which are mechanical systems, spurious vibration is noise and we are used to talking



Hear the acoustic image 'snap' into focus with a Systemdek IV.

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about the effectiveness of different designs in eliminating it. In an optical system like CD spurious light will play exactly the same negative role as spurious movement in a mechanical system and CD designers should be devoting just as great an effort to eliminating it. Certainly both the non-playing areas of the discs themselves and the whole of the inner area of the transport should be every bit as matt black as the inside of a camera (no, different colour inks will not help), but there is one further tweak I could suggest which you may have the expertise to try.

No matter what you do to black out the CD's non-playing surfaces and the player, the playing surface of a CD is inherently highly reflective. There is not much that can be done about that, and it means that however good the rest of the blackout may be (short of perfect), the CD player will always be reading the disc against something of a bright field. Again we have the same problem in photography: it is called the sky and as an all round bright field it sends spurious light into camera lenses from all directions well outside the actual imaged field. However good the camera's internal blackout, spurious light bounces around inside the actual glass of the lens elements themselves so that some will inevitably reach the film as noise, which again results in a diminution of contrast and thus clarity. A number of tricks are employed to counter this, for example coating the lens elements with ever more sophisticated anti flare coatings, but by far the simplest and most effective is simply to shade the lens. Just as we shade our eyes in a glare ridden environment so the photographer fits a lens hood. The effect can be startling and at times fitting £4 worth of lens hood is noticeably more effective than replacing a £30 lens with a £300 one. Why not, then, try fitting a lens hood to the reading mechanism of a CD player? For all I know it is



**Sony V3: closed backed, compact and quite capable.**

standard practice, such is my lack of knowledge, but if it is not, how about having a go? DAVID WOOLLISCROFT, MANCHESTER.

*Cracking open and inspecting the laser units on a couple of CD players revealed that the plastic lenses do not really have anything that could be called a hood, but then again they do sit very close to the surface of the disc and therefore a hood wouldn't really be able to sit any higher than the lens itself. What could be employed to good effect would be an outer ring that stuck out as far as the highest point on the lens, akin to the metal body of a camera lens, to cut down on spurious light entering the side of the lens. It's an interesting idea and one that someone who knows about the optical side of CD technology might shoot down in flames, but on the other hand it may represent a step forward that manufacturers should investigate.*

*To pick up one point you make, about different colour inks not making a difference, it has been suggested that because CD lasers are red, green is a better absorber than black. In fact some enthusiasts claim improvements by sticking green labels around the drawers in their CD players and using green rather than black ink on the edges of discs.*

*We'll make CD a hands-on medium if it kills us!*

## Quality Cans

I want to upgrade the rather naff headphones that I use

with my Sony WM-DC2 Pro-Walkman. I have an absolute maximum budget of £50 and I listen mainly to strong rock music.

Reading the various hi-fi magazines on the market I've noticed that opinion on headphone performance is totally conflicting.

Bearing in mind my budget and preferred music style, I would be utterly grateful if you could give me a sensible shortlist.

By the way, I have listened to the Sennheiser HD480 Classics and did not find them to have the clarity and faithfulness that I know the Pro-Walkman is capable of producing.

In-ear phones are also out of the question because I find them uncomfortable and I think they look absolutely terrible! Please help!

ALEC FU,  
HENDON, LONDON.

*Given that you agree with us about the HD480s we have a good chance of being able to pick a headphone that will suit your tastes. At under £100 (let alone £50) taste is what it's all about as utmost fidelity is out of the question.*

*Looking through our listings there only seems to be one headphone that meets your specs, that being the Sony V3 at £30. There are other good sub-£50 cans but they are equipped with quarter inch jacks and thus not well suited to personal stereos – unless you don't mind fiddling with an adaptor.*

## Easy listening

Following your Best Buy recommendation I bought a Technics SL-P202A CD player. But playing it through my laid back system – Quad 33/303 amps and KEF Corelli loudspeakers – results in a very bright sound. High frequencies are metallic and full of glare, the midrange is quite thin and bass lacks substance. Altogether not a very warm sound.

If I dig a little deeper into my pockets I could stretch to spending £250 on a new player, but I want one with a richer tonal balance. Or, to put it another way, something that makes listening to CDs less fatiguing.

ALAN SYKES,  
DRIFFIELD, N. HUMBERSIDE.

*Of the latest crop of CD players reviewed in our June issue, there only seems to be one that comes close to meeting your specifications, and oddly enough it's another budget Technics like the 202. The SL-P277A is a £160 machine that our reviewer found to have an unusually sweet treble and the ability to produce a very competent and civilised sound which should be easy to live with. There are a couple of other players that MC found a little boring but which may well suit your taste for grain-free listening, namely the Harman Kardon HD7300 (£199) and the Akai CD-55 (£230).*

*If your pockets were a little deeper you could afford to listen to Arcam's least expensive player, the £380 Alpha. This is a nicely built machine that comes as close to your requirements as any we've heard. On the other hand a machine that we haven't had so much experience of but that looks very much like your cup of tea is Rotel's RCD-865, a £300 PDM 1-bit player that Paul Miller considered to have a sweet and detailed treble coupled with a rich and mellifluous midband.*

*We suggest you go listen to some of these in your local dealer's dem room. If he's got as much spare time as most of those we talk to, then he should be able to spare you an hour or so to find something moderately listenable!*

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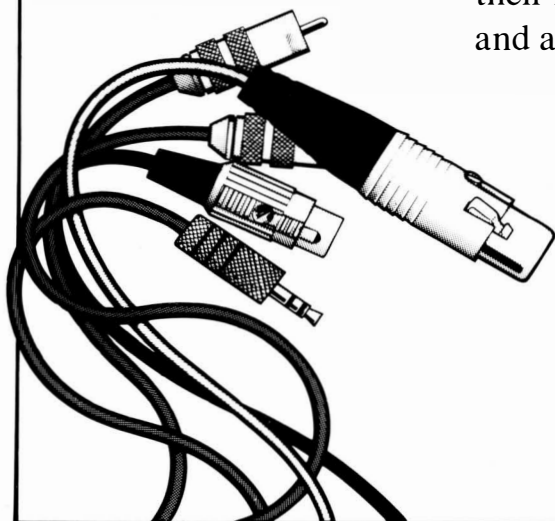
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# Choosing and Using . . . Amplifiers

Cliché or not, the amplifier is the heart of the hi-fi system. Its purpose is to accept the different signals from the various sources, conform and order them as necessary, and then provide the power to drive and control the loudspeakers. In what is known as an integrated amplifier, the first part of this task is carried out in the preamplifier section, while the power amplifier part deals with the loudspeakers, but the whole is contained within a single box. In more costly systems these two sections are often separate units, and power supplies may also be separately cased. The tasks are quite distinct, so integration is only a matter of cost, convenience and compactness.

Twenty years ago amplifiers were mostly low powered, using Class A circuitry with valves and output transformers. Then the transistor took over rapidly, offering higher specification power, lower cost, and improved longevity. So far, so good, but the valve amplifier – like the moving coil cartridge – never quite died. And after a couple of false starts it is currently enjoying its strongest revival yet, albeit at prices which will make many readers blanch.

The other historical trend concerns the complexity of the preamplifier section. When hi-fi had to make the best of barely adequate source quality, a complicated and flexible pre-amplifier section was a useful means of making the best of a bad job. During the Japanese invasion of the '70s, rival manufacturers vied with each other to invent and incorporate more and more extensive features: tone controls became graphic equalisers, and the often baffled user was encouraged to fantasise that he was on the bridge of the Starship Enterprise. However, improvements in sources have since started a 'simply better' backlash. Ten years ago a fledgling Naim Audio abandoned tone controls on the grounds that they

degraded sound quality. This was a major heresy at the time, but the trend is now firmly established, and even some of the Japanese manufacturers have since followed suit.

## Two Markets

There are now two distinct types of hi-fi amplifier. The so-called 'bells and whistles' models still exist, though they now tend to be down-rather than upmarket products. Those who appreciate the flexibility of extensive switching and tone shaping can now take advantage of the low prices which derive from highly efficient manufacture for a mass market.

However, the real hi-fi amplifier action has been towards improvements in sound quality, much of which has been due to simplifying the circuitry by eliminating as many frills as possible, and even in some cases omitting a complete gain stage through the use of the latest transistors. The ear has proved a more subtle tool than any spectrum analyser in adjusting circuit topography, simplifying earth patterns, beefing up power supplies, and selecting key passive components, all in the interests of improving sound quality.

## Preamplification

As hi-fi amplifiers become increasingly minimalist, the pre-amp now only retains two key functions: the sorting out of the signals from the vinyl disc source, and the switching of the various inputs and outputs. Tuners, cassette decks, CD players, and what-have-you all put out more or less the same sort of signal, which is already equalised to 'flat'. Vinyl disc apart, the pre-amp then becomes little more than a glorified switch with volume and balance controls. Which explains why suchlike devices – using purely passive components and hence inherently simple – are now becoming available in the most specialist end of the market.

Vinyl disc replay is quite a different kettle of fish. The pre-amp is connected directly to the transducer itself, with no intervening electronics, and this introduces all sorts of difficulties. Furthermore, the signal from the cartridge is very small, and requires two distinct stages of equalisation to get a 'flat' end result. To add insult to injury, there are now two popular kinds of cartridge, the high output moving magnet and low output moving coil (plus a few odd permutations), and they are different enough to need quite separate treatment. There's not even a standard for the source or input impedance of low-output cartridges.

For the future, it is quite possible we will see wider use of turntables with built-in cartridge preamps, so that each source feeds a 'flat' signal at line level to a simple switching and attenuating preamp. But now that the first digital signal source (CD) is fully accepted, with others planned for the future, we are beginning to see a new type of preamp which accepts digital signals directly, carrying out various functions by means of an on-board microcomputer before finally converting the signal back to analogue before feeding to the power amplifier.

## Power Amplifiers

This is the part of the amplifier whose job it is to drive the loudspeakers – and a right old job that can turn out to be. Like the cartridge, a loudspeaker is a transducer, and the task is to turn the electrical model of the music signal back into a mechanical (acoustical) signal for the benefit of the ears. The loudspeaker is a form of motor, but its task of covering the whole range of audio frequencies is mechanically almost intolerable, and there is an inevitable lack of control at various resonance points. While the amplifier provides the loudspeaker with a voltage which corresponds to the amplified music signal, it

is the characteristics of the loudspeaker itself which determines the current demand. This current demand can be very unpredictable, particularly at resonance points, which is why serious hi-fi amplifiers are usually designed with plenty of surplus current capacity, and with an eye on the stability of the voltage signal whatever the current demand.

The main measurements on amplifiers relate to power output and distortion, but more important than the maximum power output itself is the way the power is maintained into different loads, and this is analysed in the reviews. The various distortion measurements also help explore the limits of the amplifier, but paradoxically, striving for very low distortion seems to prejudice sound quality.

## Choosing

There are a number of criteria one could use when selecting an amplifier, and the most valid is probably sound quality. Despite the attention it attracts, power output comes much further down the list, because the differences between most models is not in fact that great, and measured power is by no means a reliable indicator of subjective loudness capability.

The range of facilities required should naturally be taken into account, paying particular attention to the type of cartridge being used. But it should also be borne in mind that every unused feature contributes nothing and will probably have a negative effect upon the potential sound quality.

The reviews provide an excellent guide to shortlisting some of the better sounding bargains in amplifiers around. But as ever they cannot replace an individual's selection to his or her own tastes, preferably in the correct system and ideally in an 'own room' context. Once again, the conscientious specialist dealer provides a vital link.

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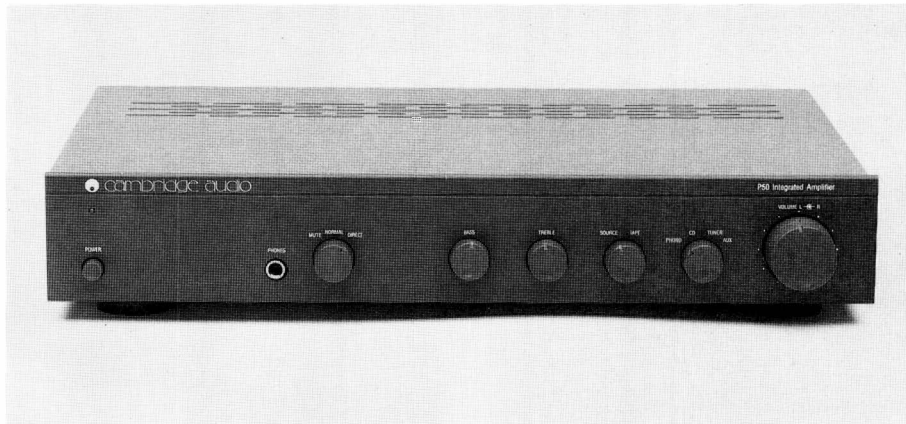
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# Cambridge P50

CAMBRIDGE AUDIO SYSTEMS, BURREL ROAD, ST. IVES IND. EST., CAMBS PE17 4LE. TEL: (0480) 496496.



Now owned by Hi-Fi Markets, Cambridge Audio has spent the last 12 months or so rationalising and 'tidying up' its product range. The design and construction of its products has been consolidated, improving both consistency and reliability. All the units, CD players and amplifiers, are now decked out in a light matt grey livery.

The P50 is Cambridge's entry-level amplifier and is based on the older P40, although it is now equipped with passive bass and treble tone controls in the style of the earlier P55. There is no centre-detent position for these controls, and it is possible to bypass them completely in 'direct' mode. Inputs for four line sources and both MM and MC cartridges are provided.

Inside, Cambridge has adopted a cost-effective modular construction, with individual boards for disc equalisation/input selection, tone control and power output stages. These boards are easily utilised in other products, the disc stage employing a standard shunt-feedback RIAA network, while the quasi-complementary power amp uses two pairs of Sanyo D1046 transistors per channel. No speaker protection, other than rail fuses, is provided.

## Lab Report

On the face of it, the P50 is a lusty enough amplifier with a healthy +1.4dB dynamic headroom (taking the 80mW power figure to 78W), fair load tolerance (+1.8dB power rise from 8 to 4 ohm) and a substantial 18.2A current delivery. Output impedance is usefully low as well, but, as is shown by the 3D plot, distortion is dominated by the integral power amp and tends to increase with frequency.

Fortunately it is the sweeter 2nd-order artefacts that persist. As far as spurious RF is concerned the P50 seems most sensitive to CD/broadcast noise in

the 75, 150, 275 and 470MHz bands, a result that could tie-in with the listening tests. Channel balance is poor at low levels and the excellent noise performance via MM disc (-85dB, A-wtd) is compromised on the MC input by Cambridge running the NE5534AN head-amp at too high an overall gain. The MC sensitivity of 434µV for 1V is bang on target however. The MM/MC disc response shows some early tailoring of the bass output but there is no problem with headroom nor any sign of slew-limiting on either input below 20kHz. Do watch the phase-inversion though.

## Sound Quality

Considered to be pleasant overall, the P50 offered a very composed and well-positioned sound, yet one that lacked crystalline focus. This was particularly true of the bass which, though rich and full, was almost too ebullient for its own good. Vocals were articulate but slightly edgy, a trend that continued through to the extreme treble which sounded a little grainy.

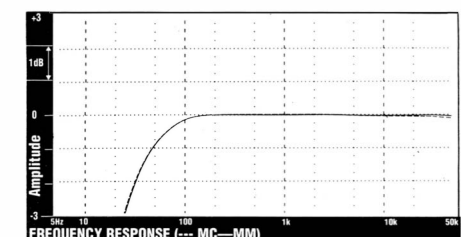
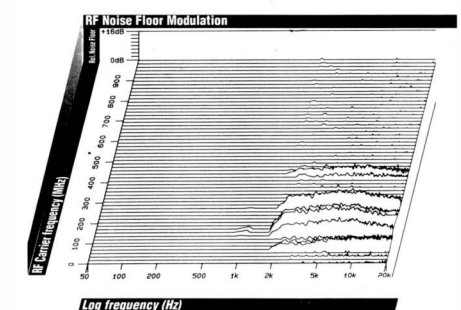
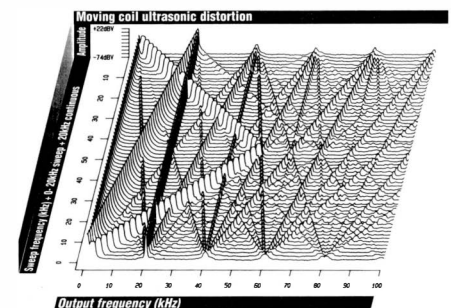
Some listeners also felt the sound was rather mechanical, lacking 'naturalness', and yet, when all's said and done, they could not fail to appreciate its performance as a whole. Treble quality actually seemed to improve in sweetness and spaciousness via MM disc, yet the midband, perhaps now heightened in presentation, seemed harder. Bass notes still sounded warm and full but vocals were rendered unemotive as a result.

## Conclusions

The P50 clearly has a lot going for it, yet with extended listening our panel were disturbed by a certain lack of refinement. Difficult loudspeakers hold little fear for the P50 but, somewhere along the line, the spontaneity and vibrancy of the music is lost.

## TEST RESULTS

	20Hz	1kHz	20kHz
<b>Maximum Continuous Power Output, 8 ohms</b>	54.0W	56.0W	55.9W
4 ohms	77.9W	85.6W	78.4W
<b>Dynamic Headroom (IHF)</b>		+1.44dB (78.0W)	
<b>Peak Current (5msec, 1% THD)</b>			18.2A
<b>Output Impedance</b>	0.024 ohm	0.022 ohm	0.029 ohm
<b>Damping Factor</b>	333.1	370.2	277.8
	<b>CD/Aux</b>	<b>mm</b>	<b>mc</b>
<b>Stereo Separation (20Hz)</b>	100.3dB	80.5dB	75.3dB
(1kHz)	68.4dB	67.9dB	66.0dB
(20kHz)	49.7dB	49.6dB	49.5dB
<b>Channel Balance (1kHz, -20dBV)</b>	0.32dB	0.35dB	0.37dB
(-60dBV)	8.75dB	14.7dB	14.9dB
<b>Total Har. Dist. (0dBW)</b>	-73.3dB	-73.2dB	-73.1dB
(2/3 power)	-73.2dB	-73.1dB	-72.9dB
<b>CCIR Intermod. Dist. (0dBW)</b>	-78.8dB	-75.9dB	-73.5dB
CCIR IM Dist. (2/3 power)	-80.1dB	-76.5dB	-73.5dB
<b>Rise Time</b>			5µsecs
<b>Squarewave linearity</b>			-93.4dB
<b>Absolute Phase</b>		Inverting (disc only)	
<b>Noise (A wtd, 0dBW)</b>	-75.3dB	-74.9dB	-68.2dB
(2/3 power)	-89.4dB	-84.7dB	-68.6dB
<b>Residual noise (unwtd)</b>	-63.5dBV	-63.6dBV	-63.5dBV
<b>Input Sensitivity (for 0dBW)</b>	41.2mV	599.5µV	63.8µV
(for full output)	311.9mV	4.490mV	433.5µV
<b>Disc Overload (20Hz)</b>		18.7mV	1.86mV
(1kHz)		153.7mV	16.2mV
(20kHz)		1450mV	149.3mV
(50kHz)		1673mV	171.6mV
<b>Tape Output/Impedance</b>		10.62V (disc)/2.0kohm	
<b>Input loading</b>	14.6kohm/50pF	47.0kohm/120pF	46kohm/120pF
<b>DC offset, left/right</b>		+23.4mV/+37.8mV	
<b>Typical retail price</b>			£200



# 'The Revolutionary Chord' 'Will power amplifiers ever be the same again?'

Hi Fi Answers April 1990



Hi Fi Answers said it was impressed with the SPM 900's innovative design and build quality. The magazine praised its 'Immaculate construction... fine finish... clean, neutral sound... and its impressive power', concluding that it 'offers stiff competition to established high end amplifiers from home and abroad.'

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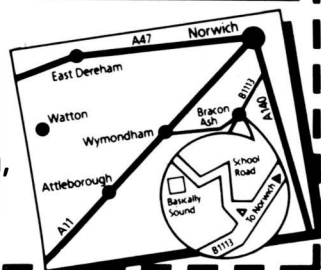
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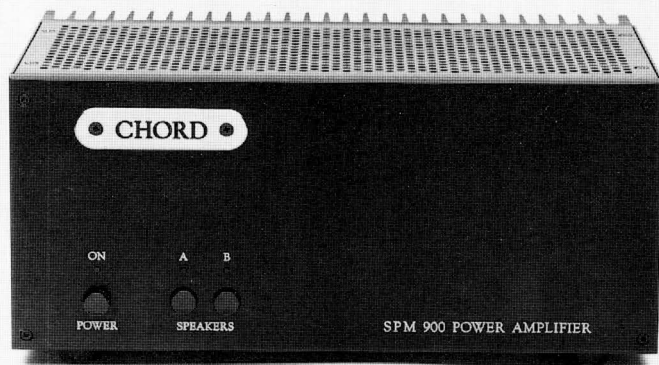
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# Chord SPM-900

**Recommended**

SPENDOR AUDIO SYSTEMS LTD., UNIT 12, STATION RD. IND. EST.,  
HAILSHAM, SUSSEX BN27 2ER. TEL: (0323) 843474.



A new and innovative addition to the hi-fi arena, the Chord *SPM-900* is a UK-designed power amplifier marketed through Spendor. It is not particularly cheap, though its cost is largely justified by the inventive electronics that lie packed inside the black-anodised case-work. Chord's use of a switch mode power supply has stretched the efficiency of the amplifier – how else could they offer over 200W from a shallow 14x30cm box?

Employing a sophisticated switch-mode supply has enabled Chord to incorporate a mutually-coupled output inductor (or choke) between the output rectifier and main reservoir capacitors. This technique minimises ground-loop distortions because the peak demands of one rail are duplicated on the other.

The audio electronics comprise NE5534 op-amps at the input followed by a high-voltage differential amplifier and a series of low-gain current-mirrors, culminating in the two pairs of lateral-structure Hitachi FETs that form the main output stage. Comprehensive electronic protection is provided, both in the relay-switched speaker selection and, in the event of a sustained fault, by automatically disconnecting the oscillator to the switch-mode power supply.

Beautifully constructed though it is, with female and male XLR sockets for input/output connection, the *SPM-900*'s auxiliary 4mm binding posts are rather cramped by the surrounding heatsinks. And the amp does run very warm indeed.

## Lab Report

Strictly speaking, this is a Class D amplifier that offers a high midband power output of 301W into 4 ohm falling to 220W at 20kHz and limited to just 150W at 20Hz by relay protection. The low-impedance peak current test gave a similarly restricted result while

the ingress of switching waveform distortion limits the linearity of the amp to -50 or -60dB.

As expected, THD is primarily 2nd-order at low power levels but 3rd, 4th and 5th-orders increase with increasing output, frequency and reducing load impedance. This is clear enough from the 3D plot which shows 2nd-4th order IM routes tracking into the audio band. Nevertheless the excellent -115dB A-wtd noise figure demonstrates the lack of direct oscillator noise in the audio band. Note that the *SPM-900* is phase-inverting, so do experiment with the polarity of your speaker leads.

## Sound Quality

The powerful stature of this amp was never in doubt during the listening tests even though it avoided advertising the fact with an abrupt or overly forward sound. Indeed its presentation was pleasantly refined, almost to the point of being laid back. Bass transients were quick and detailed, crisp in impact and with a natural sense of resonant decay that inferred great depth and weight. The only criticism was of a loss of the finest background nuances, ambience that was not strictly audible but somehow swallowed up by the velvety-black silence of the amplifier. This proved a touch artificial but failed to compromise its relaxing demeanour.

Fine percussive details were keenly defined, blending the right degree of sharpness with a mollifying sweetness. Yet despite the fine spatial resolution of these percussive elements, there was some question over the exact purity of the sounds which did not sound quite as 'metallic' as perhaps they might.

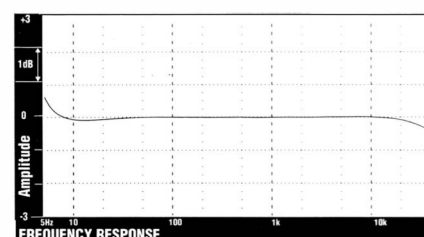
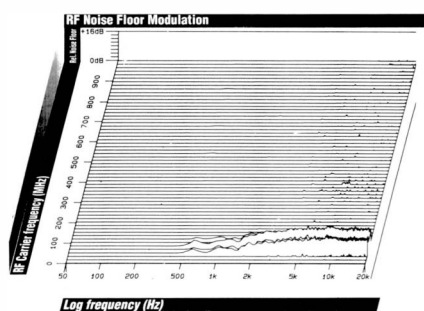
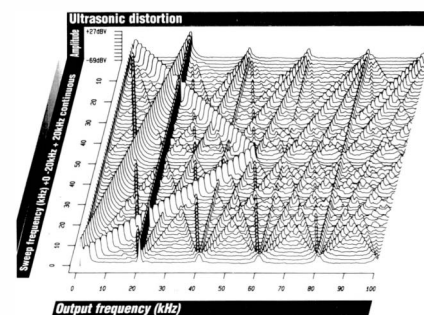
## Conclusions

This is no wolf in sheep's clothing, rather a Goliath in Lilliputian attire that trades the last drop of linearity for the

efficient usage of power. The design ideas adopted by Chord, however ingenious in their application, do have some sonic consequence, so it is fortunate indeed that their 'fingerprint' does little to detract from the general well being or emotional satisfaction of the music. A flexible performer, costly but Recommended.

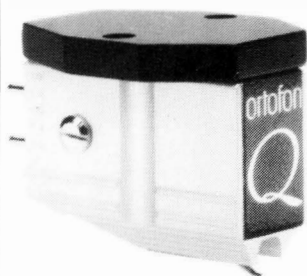
## TEST RESULTS

	20Hz	1kHz	20kHz
<b>Maximum Continuous</b>			
Power Output, 8ohms	229.5W	235.8W	185.5W
4ohms	150W*	300.9W	220.1W
Dynamic Headroom (IHF)		+1.20dB	(310.5W)
Peak Current (5msec, 1% THD)			11.5A
Output Impedance	0.054ohm	0.047ohm	0.073ohm
Damping Factor	147.1	168.7	108.9
Stereo Separation (0dBW)	79.3dB	90.8dB	78.4dB
Total Har. Dist. (0dBW)	-68.4dB	-67.3dB	-58.7dB
( <sup>2</sup> / <sub>3</sub> power)	-63.3dB	-63.7dB	-54.4dB
CCIR Intermodulation Distortion (0dBW)			-62.8dB
CCIR IM Distortion. ( <sup>2</sup> / <sub>3</sub> power)			-56.9dB
Rise Time (@ 10kHz)			2.2µsecs
Squarewave linearity			-91.6dB
Absolute Phase			Inverting
Noise (A wtd, 20Hz-20kHz) 0dBW			-94.6dB
(A wtd, 20Hz-20kHz) <sup>2</sup> / <sub>3</sub> power			-115.1dB
Residual noise (unwtd)			-78.8dBV
Input Sensitivity (for 0dBW)			88.4mV
(for full output)			1371mV
Input loading		26.8kohm/240pF (inc leads)	
DC offset, left/right			-1.5mV/-2.6mV
Typical retail price			£1,725



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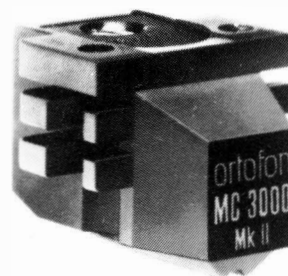
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# Harman/Kardon HK6800 **R**ecommended

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



Brutish to a fault, this new heavyweight from Harman/Kardon is neither the biggest nor the most powerful model in the company's current range. Nevertheless the general standard of construction and range of features that grace the top HK6900 model are also found on this more affordable HK6800. In addition to the volume control, four large rotary selectors dominate the black fascia of the amplifier, facilitating the selection of A/V, Aux, tuner and phono sources as well as connecting the power amp to A, B or A+B speaker pairs.

The remaining selectors cater for VCR/tape monitoring (separate video buffers are incorporated) together with tape-to-tape and source-to-tape dubbing, even though a fully independent record-out option is not available. Below these controls lie ancillary facilities that cater for bass, treble and balance, MM/MC input switching (a separate double-differential headamp is provided for MC cartridges), video switching, loudness and subsonic filtering.

In addition to a conventional tone defeat option, Harman has also equipped the HK6800 with a 'main direct' signal routing facility which bypasses tone, subsonic and loudness circuits but leaves volume and balance controls in circuit. In general terms the amp is robustly constructed, featuring all discrete circuitry, rugged Toshiba devices in the power amp and a substantial power supply.

## Lab Report

Harman/Kardon makes a feature of HCC or 'High Instantaneous Current Capability', claiming that the HK6800 is capable of pushing out  $\pm 70A$ ! I am not aware of how such a figure is supported though because on my own 5msec/1 ohm gated impulse test the amplifier's protection circuitry clamped down on any current higher than 24.4A.

Still, measured in its '4 ohm' speaker mode, the HK6800 was capable of providing some 115W into 8 ohm and 179W into 4 ohm though it suffered a slight shortfall at lower frequencies. Insensitive speakers will not prove a burden to the amp, either way.

H/K's MC input is extremely sensitive, offering an increase in gain of +26dB (instead of +20dB) over the MM input and requiring just 0.13mV for full power output.

## Sound Quality

In contrast to the dynamic sound of earlier H/K amps, our listeners felt this unit was more evenly paced, possessed of good stereo imagery and broadly neutral. When the occasion demanded it was capable of great dynamic swings, though its casual demeanour defied the more obvious descriptions of 'effortless' or 'powerhouse'. Much the same character, or lack of it, was evident via disc - confident but responsive and nimble.

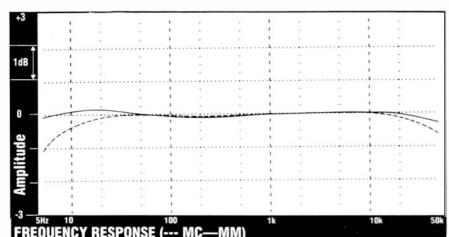
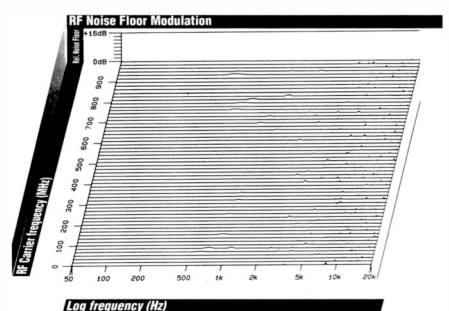
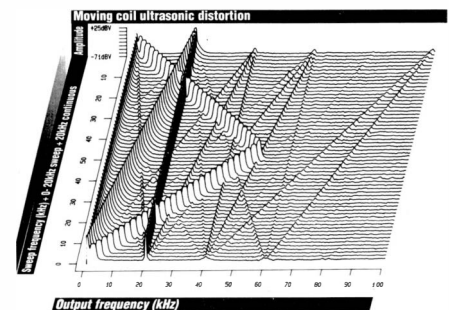
Tonally it was one of the more even-handed amplifiers in this month's test, though its strict impartiality tended to imply that subtle musical details were being surreptitiously skirted-over. Fortunately it was not smooth or innocuous to the point of blandness, it simply ticked over with a comforting sense of security until called upon to dig into its reserves of power.

## Conclusions

Harman/Kardon has successfully engineered an amplifier that is both comprehensively equipped and 'unflappable' in the vast majority of systems. It is smoother and perhaps slightly less obvious or direct in its approach when compared to H/K's earlier super-amps, yet by opting for a more balanced perspective H/K has stood itself in good stead for the future.

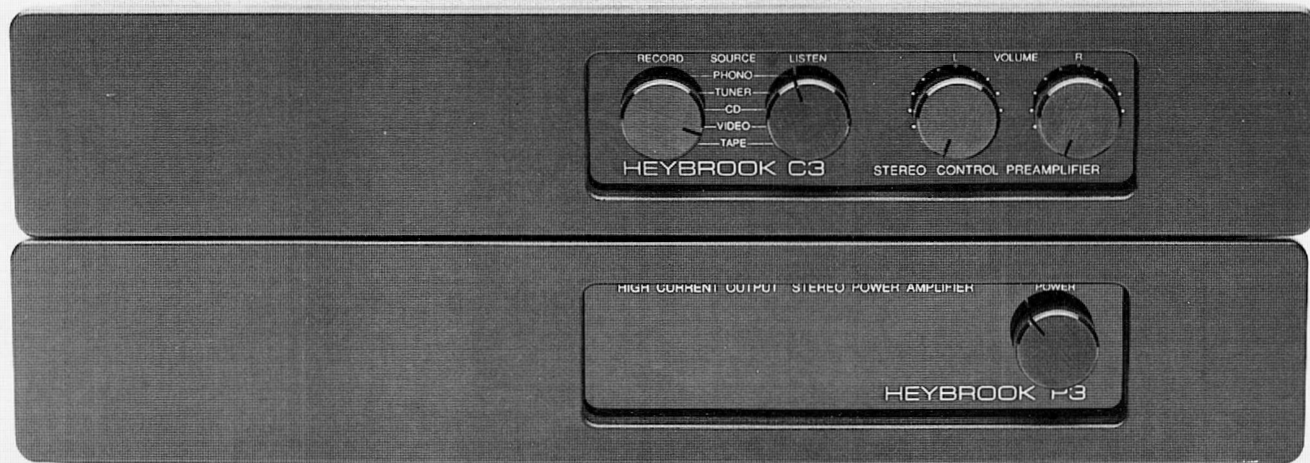
## TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output, 8ohms	111.2W	114.7W	111.6W
4ohms	164.8W	179.1W	173.8W
Dynamic Headroom (IHF)	+1.32dB (155.3W)		
Peak Current (5msec, 1% THD)	24.4A*		
Output Impedance	0.069ohm	0.064ohm	0.075ohm
Damping Factor	115.4	124.2	106.4
	CD/Aux	mm	mc
Stereo Separation (20Hz)	74.9dB	71.6dB	66.5dB
(1kHz)	64.6dB	62.8dB	59.7dB
(20kHz)	39.2dB	39.4dB	39.7dB
Channel Balance (1kHz, -20dBV)	0.23dB	0.05dB	0.02dB
(-60dBV)	0.63dB	0.45dB	0.30dB
Total Har. Dist. (0dBW)	-85.4dB	-82.7dB	-69.8dB
( $\frac{2}{3}$ power)	-74.3dB	-72.3dB	-66.9dB
CCIR Intermod. Dist. (0dBW)	-79.1dB	-74.9dB	-78.9dB
CCIR IM Dist. ( $\frac{2}{3}$ power)	-76.2dB	-73.2dB	-73.3dB
Rise Time			1.9µsec
Squarewave linearity			-90.1dB
Absolute Phase	Non-inverting		
Noise (A wtd, 0dBW)	-82.8dB	-82.1dB	-72.3dB
( $\frac{2}{3}$ power)	-95.1dB	-87.4dB	-72.4dB
Residual noise (unwtd)	-75.3dBV	-75.4dBV	-76.0dBV
Input Sensitivity (for 0dBW)	24.2mV	255.7µV	12.4µV
(for full output)	262.1mV	2.635mV	133.2µV
Disc Overload (20Hz)			13.32mV
(1kHz)			116.6mV
(20kHz)			1144mV
(50kHz)			2441mV
Tape Output/Impedance			10.19V (disc)/3.86kohm
Input loading			29.5kohm/285pF 47kohm/160pF 57ohm/2.7nF
DC offset, left/right			-13.5mV/+10.1mV
Typical retail price			£599



# Heybrook C3/P3

HEYBROOK HI-FI LTD., ESTOVER CLOSE, ESTOVER IND. EST.,  
PLYMOUTH, DEVON PL6 7PL. TEL: (0752) 780311.



Having established itself as a specialist loudspeaker manufacturer, Heybrook has steadily built up a range of audio products during the past decade. First came a high quality turntable, and later a not inexpensive pre/power amplifier combination. Those original amplifiers have now been upgraded to C3/P3 status. Both products are decidedly minimalist in design and execution, Heybrook making use of Medite panelling for the fascias and textured black Perspex for much of the casework. Light oak wooden cases are available at an extra £50 per unit.

Full input and record-out selection is provided for the four line inputs and phono stage, the latter equipped to handle both MM and MC cartridges. No balance control is fitted but two independent volume controls are used instead, linked mechanically via a (rather stiff) thread and pulley system.

Because Heybrook has eschewed any active line circuitry, its designers have also opted for low impedance volume potentiometers, if only to limit the maximum output impedance of the preamplifier. Still, the output impedance does rise to a few kohm and varies with position, causing some attenuation of very high (treble) frequencies with long capacitive interconnect cables. The tape output, which is correctly buffered, enjoys a low output impedance of just 140 ohms.

A single-rail shunt-regulated power supply feeds the disc stage which incor-

porates no less than three transconductance gain stages coupled with wholly passive disc RIAA equalisation. An extra 20dB gain stage is available to suit MC cartridges, grounding the separate MM input in such circumstances. The input impedance of the MC stage is also very high, presenting an easy load for most cartridges.

The P3 power amplifier is based around two mono modules, each equipped with two pairs of complementary Sanken output transistors bolted onto a small alloy heatsink. The amplifier runs very cool in general use while the slotted top plate ensures a free flow of air. The amplifier modules share a 500VA toroid transformer and two 22000µF DNM-style slotted-foil electrolytic reservoir capacitors. Unscreened DNM solid core cable is used for signal routing. The output is direct-coupled to two pairs of chunky 4mm binding posts - no in-line fuse or relay protection is deemed necessary.

## Lab Report

In keeping with the 'High Current' logo tucked away under its fascia, the P3 power amplifier did indeed offer a substantial 27.5A over a 5msec time period into 1ohm with a maximum THD of just 1 per cent. Taken in isolation this result would imply a fine tolerance of 'awkward' loudspeaker loads.

However the left channel incurred severe waveform distortion at these low impedances resulting in a peak current

output of just 2.6A under the very same conditions. No other measurement - power, distortion or otherwise - revealed any subsequent difference between the left and right channels, though subjective repercussions of this anomaly cannot be ruled out.

Open-loop non-linearities are revealed by the RF IMD plot which highlights sensitivity to broadcast noise in the 150MHz and 580MHz regions, the latter very close to a TV baseband frequency.

The preamp's line inputs are all 'passive', so the fractionally high 1005mV input sensitivity, 75-99dB separation, 0.001 per cent THD and 0.0005 per cent IMD are all the result of switch, track and contact non-linearities. Disc equalisation has a built in LF roll-off (-3dB @ 14Hz) while the MC stage introduces a further attenuation of -3dB @ 20kHz - an audible tailoring. Nor is the disc stage particularly sensitive, requiring a high 7.5mV for 1V out via MM disc. Few moving magnet cartridges will achieve this at 5cm/sec. Furthermore the high excess gain required by the passive eq network has resulted in low overload margins, just +16.9dB for MM and +16.5dB for MC, while the plastic casework allows hum products to dominate the noise spectrum. In fact the 77.6dB S/N ratio via MM disc could be improved by over 10dB with better screening. THD is also rather high, hovering around 0.5 per cent (MM) and 0.8 per cent (MC).



## Sound Quality

For one reason or another this combination elicited a reaction of general disappointment from the assembled 'blind' listeners, their opinions unanimous on this occasion. Via any of the passive line inputs its sound was glassy, mechanical and steely. Laying the blame at the foot of the power amp, its reproduction of percussion and strings highlighted these colorations in particular.

There was a general lack of cleanliness about the soundstage. Compared to the QED pre/power combo tested for this issue, for example, the soundstage was constricted while the images seemed faintly overblown.

No semblance of the lush and spacious sound provided by our PDM CD player was detected, for though the amplifier clearly did not strain to achieve high volume levels most instruments were still glassy and grainy in timbre, giving rise to an uncouth 'loudness'. With PDM in full flight it is more common to experience a widening and deepening of the reproduced acoustic with increasing volume, a characteristic that generally distinguishes low-bit from multi-bit technology.

To add insult to injury, our listeners were unable to find anything particularly complementary to say about either disc stage. The MM input was marginally less tizzy than the MC stage in the extreme treble but most forms of music still sounded hard, wooden and lacking temporal structure. The pace or tempo of music, for instance, seemed subconsciously uncertain or directionless.

## Conclusions

The results of our listening tests are likely to come as something of a shock to Heybrook which, if nothing else, certainly has its corporate heart in the right place. A disappointing conclusion then, but perhaps one linked to the oddities noted during the laboratory testing, particularly the discrepancy over peak current. It makes us wonder whether this might not be a rogue sample; if Heybrook would like to submit another sample we will endeavour to test it again in the near future.

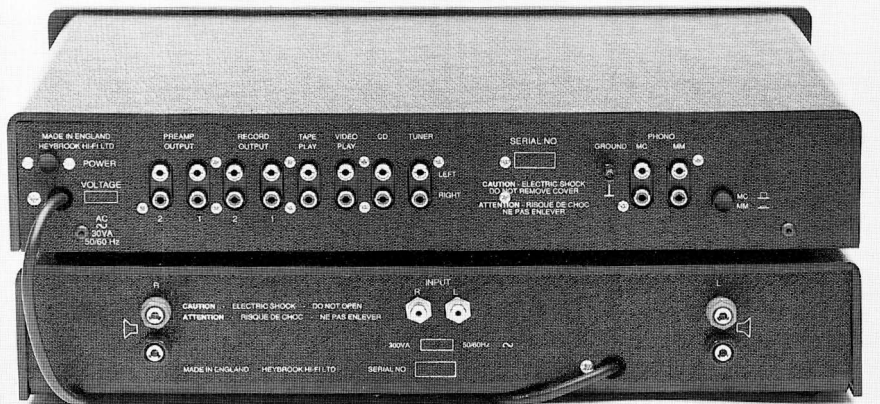
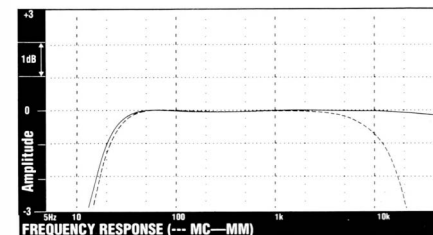
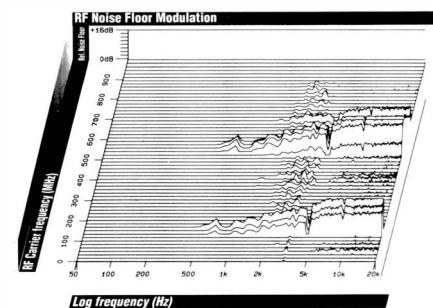
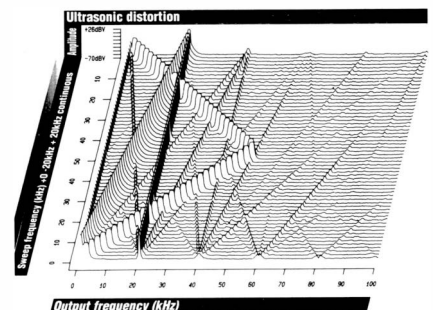
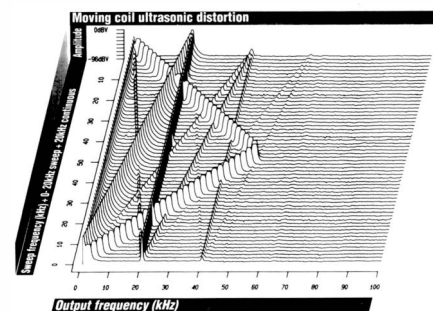
## TEST RESULTS

### Preamplifier

	Aux/CD	MM	MC
<b>Stereo Separation (20Hz)</b>	98.7dB	83.5dB	65.2dB
(1kHz)	96.1dB	82.1dB	81.5dB
(20kHz)	74.7dB	66.3dB	66.4dB
<b>Channel Balance (1kHz, 0dBV)</b>	0.01dB	0.03dB	0.06dB
-20dBV	0.13dB	0.08dB	0.05dB
-60dBV	0.30dB	2.65dB	3.29dB
<b>Total Har. Dist. (0dBV, 1kHz)</b>	-102.5dB	-49.6dB	-41.5dB
(20kHz)	-97.5dB	-45.2dB	-42.7dB
<b>CCIR Intermod. Dist. (1:1)</b>	-99.2dB	-68.1dB	-54.9dB
<b>Squarewave linearity</b>			-104.2dB
<b>Absolute Phase</b>			Non-inverting
<b>Additional Phase shift (20Hz)</b>	0°0'	+25°0'	+20°0'
(1kHz)	0°0'	-49°30'	-54°0'
(20kHz)	0°0'	-90°0'	-90°0'
<b>Noise (A wtd, 20Hz-20kHz)</b>	-109.9dB	-77.6dB	-73.4dB
<b>Residual noise (unwtd)</b>	-107.8dBV	-108.0dBV	-108.0dBV
<b>Input Sensitivity (for 0dBW)</b>	1005mV	7.542mV	721µV
<b>Disc Overload (20Hz)</b>		3.440mV	336.1mV
(1kHz)		34.89mV	3.330mV
(20kHz)		350.6mV	34.95mV
(50kHz)		785.6mV	75.50mV
<b>Input loading</b>	5.2kohm/10pF	51kohm/60pF	4.1kohm/22nF
<b>Preamp. Output (max)/Impedance</b>		4.700V (disc)/1.42kohm	
<b>Tape Output (max)/Impedance</b>		4.702V (disc)/137ohm	
<b>DC offset, left/right</b>			0mV/0mV
<b>Typical retail price</b>			£399

### Power amplifier

	20Hz	1kHz	20kHz
<b>Maximum Continuous Power Output, 8 ohms</b>	136.4W	137.8W	135.4W
4 ohms	218.7W	219.8W	208.2W
<b>Dynamic Headroom (IHF)</b>		+1.14dB	(179.2W)
<b>Peak Current (5msec, 1% THD)</b>			27.5A
<b>Output Impedance</b>	0.052 ohm	0.071 ohm	0.100 ohm
<b>Damping Factor</b>	152.5	113.1	79.9
<b>Stereo Separation (0dBW)</b>	128.6dB	118.2dB	101.6dB
<b>Total Harm. Dist. (0dBW)</b>	-79.3dB	-69.6dB	-50.5dB
(2/3 power)	-65.7dB	-68.5dB	-62.4dB
<b>CCIR Intermodulation Distortion (0dBW)</b>			-76.5dB
<b>CCIR IM Distortion (2/3 power)</b>			-66.1dB
<b>Rise Time (@ 10kHz)</b>			6.6µsecs
<b>Squarewave linearity</b>			-91.8dB
<b>Absolute Phase</b>			Non-inverting
<b>Noise (A wtd, 20Hz-20kHz) 0dBW</b>			-92.1dB
2/3 power			-109.9dB
<b>Residual noise (unwtd)</b>			-77.6dBV
<b>Input Sensitivity (for 0dBW)</b>			74.10mV
(for full output)			884.1mV
<b>Input loading</b>			32.8kohm/270pF
<b>DC offset, left/right</b>			+12.8mV/-17.7mV
<b>Typical retail price</b>			£499



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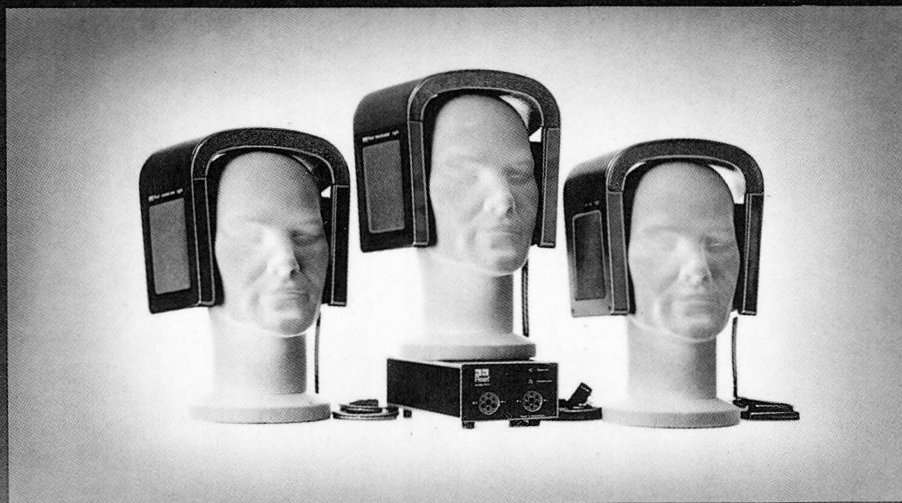
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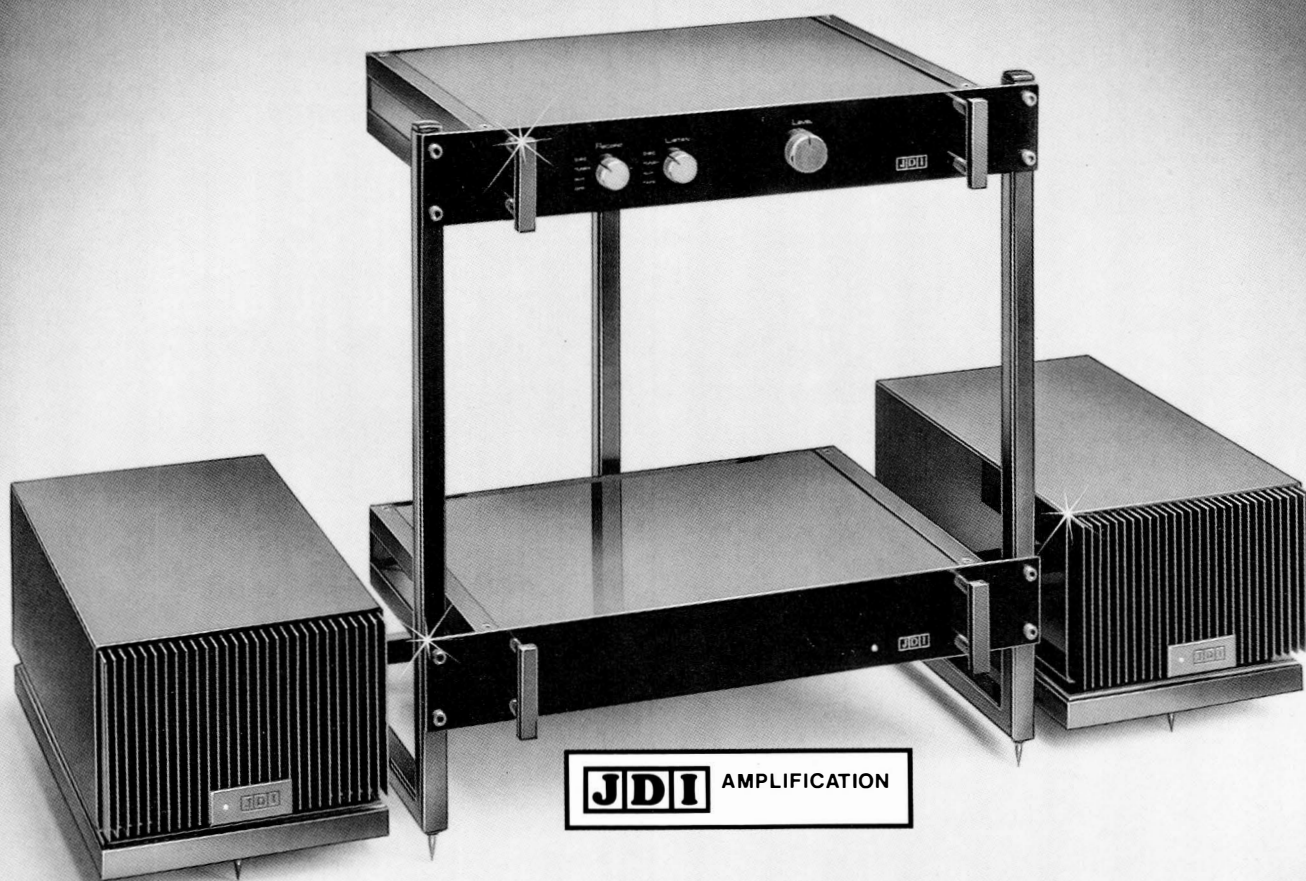
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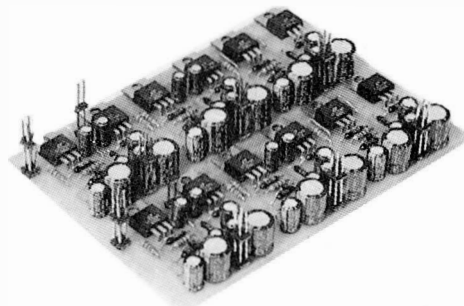
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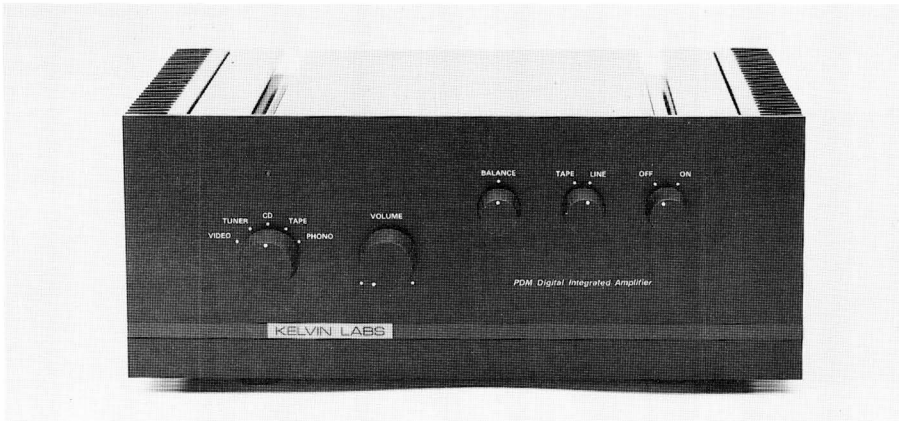
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# Kelvin 'Digital' Integrated **R**ecommended

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Since *Choice's* last amplifier tests (March issue) Kelvin has not only modified its well received *Integrated* model but has also used it as a building block for another version – the so-called *Digital Integrated*. The construction and styling of the *Digital* is almost indistinguishable from the company's standard *Integrated* model, however in this instance the CD input accepts a digital feed (via coaxial cable) from CD player or CD transport. No optical input is provided.

A separately powered and shielded section within the amplifier plays host to a Philips SAA7320 'bitstream'/PDM DAC which converts the data accessed by a Sony receiver and proprietary tuned-amplifier. This contrasts with the more common approach of using a VCO and PLL to regenerate the clock frequency from incoming data. Kelvin's post-DAC processing is also very interesting, for it uses an external NE5532AN op-amp driven in single-ended Class A mode together with extra filtering above 100kHz.

As far as the amplifier itself is concerned, Kelvin has upped the supply rails (boosting its output) but has also simplified the power amp so that it is now essentially Class AB in operation. Furthermore the MC input has been dropped on this model.

## Lab Report

Compared to the Class A *Integrated* that was featured in *Choice's* last amplifier tests, this latest version offers double the output at 34W into 8 ohm together with a marginal increase in dynamic headroom and a significant improvement in available current (11.8A).

On the debit side there has been a slight deterioration in separation while the 2.6dB channel balance error (at -60dB) remains pretty much the same. Changes to the disc stage mean that the MM input is now that much more sensi-

tive (requiring 1.6mV for full output) even though the available headroom has remained at +24.4dB. The RIAA eq response is flatter too. Noise is fractionally worse as are both THD and IMD.

On the digital front Kelvin's single-ended PDM 1-bit converter offers a low 0.0013 per cent THD, 0.0006 per cent IMD (both at -10dB) and excellent linearity down to -80dB. At -90dB the maximum error reached -2.5dB while the overall S/N ratio bettered all other SAA7320-based systems at 103dB (with emphasis).

## Sound Quality

Recent modifications to the power amp section of both the *Integrated* and *Digital Integrated* amplifiers have been rewarded, most notably by retrieving the midband transparency, delicate poise and sheer detail resolution of the very earliest samples produced by Kelvin.

Strong bass lines were reproduced with a good sense of depth and conviction, despite limits on its headroom. Vocals were equally expressive, a little rich perhaps, but smooth and very realistic in the musical context. Notes decayed in a natural fashion, striking up a fine sense of ambience and drawing the listeners into the music rather than forcing it down their throats.

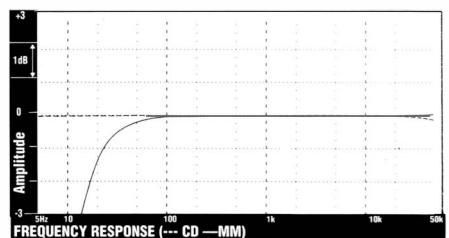
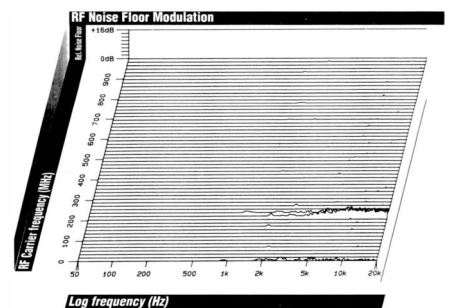
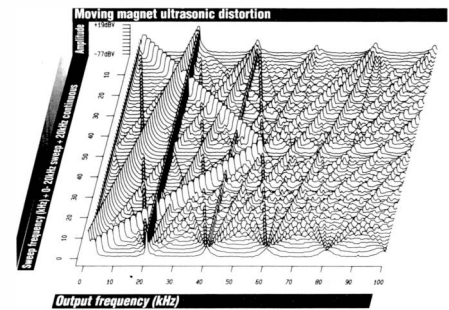
This same powerful and ebullient sound was evident via MM disc, the strength and solidity of bass proving quite a surprise in the light of the amp's diminutive stature.

## Conclusions

Kelvin can chalk-up yet another success, courtesy of the latest in a line of seemingly very flexible *Integrated* amplifiers. This model offers exceptional value for money bearing in mind that many hi-fi enthusiasts would expect to pay a considerable sum for the PDM D-to-A converter alone.

## TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output, 8ohms	33.2W	34.0W	32.8W
4ohms	50.9W	52.6W	49.8W
Dynamic Headroom (IHF)			+0.89dB (41.7W)
Peak Current (5msec, 1% THD)			11.8A
Output Impedance	0.009ohm	0.019ohm	0.023ohm
Damping Factor	886.3	420.6	342.6
Stereo Separation (20Hz)	103.1dB	93.7dB	
(1kHz)	87.6dB	87.9dB	
(20kHz)	62.1dB	63.5dB	
Channel Balance (1kHz, -20dBV)	0.20dB	0.20dB	
(-60dBV)	2.60dB	2.65dB	
Total Har. Dist. (0dBW) (2/3 power)	-86.1dB	-86.7dB	
(2/3 power)	-67.0dB	-67.6dB	
CCIR Intermod. Dist. (0dBW)	-87.5dB	-74.1dB	
CCIR IM Dist. (2/3 power)	-76.7dB	-71.0dB	
Rise Time			3.5µsecs
Squarewave linearity			-84.1dB
Absolute Phase			Non-inverting
Noise (A wtd, 0dBW) (2/3 power)	-83.7dB	-80.2dB	
	-92.7dB	-82.4dB	
Residual noise (unwtd)	-69.4dBV	-69.3dBV	
Input Sensitivity (for 0dBW) (for full output)	29.8mV	275.9µV	
	176.3mV	1.595mV	
Disc Overload (20Hz)			9.295mV
(1kHz)			83.15mV
(20kHz)			798.0mV
(50kHz)			1849mV
Tape Output/impedance			8.826V (disc)/150ohm
Input loading			47kohm/47pF 10kohm/50pF
DC offset, left/right			-1.15mV/-6.80mV
Typical retail price			£549



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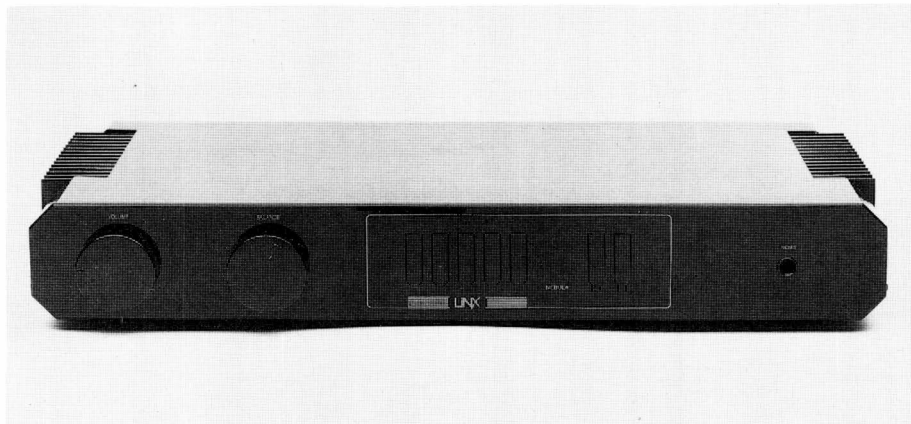
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# Linx Nebula

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Having transferred its manufacturing base from New Zealand to the UK in recent times, Linx Audio now sees its amplifiers combining the virtues of solid audio engineering together with a sense of style more commonly associated with overseas products. The general build and aesthetics of the *Nebula* tend to justify these aspirations, the glossy Perspex fascia featuring a series of laser-cut switches which trigger a bank of gold-plated relays. CMOS logic controls the input selection, while the devices used are unlocked which helps cut down on spurious interference.

Four line sources are accommodated in addition to both MM and MC cartridges, the latter being selected by a further switch at the rear of the amp. This button alters both the input loading and gain of the *Nebula's* OP27-based phono headamp.

Truth be told, the disc network is rather similar to that employed by Ben Duncan in his *AMP-01* project, as equalisation is performed using shunt-feedback around a J-FET op-amp. Chunky Hitachi MOSFETs form the amp's complementary output stage (unprotected), and each pair of devices is bolted to fluted alloy heatsinks which protrude at either side of the chamfered steel case.

## Lab Report

On test the *Nebula* met its continuous power rating with room to spare, the generous power supply with decent 250VA toroid and slit-foil reservoir capacitors helping maintain some 88W into 8 ohm and 122W (+1.4dB) into 4 ohm. By contrast I feel Linx's claim for 160W dynamic power to be a little over-ambitious - 116W is closer to the mark while the peak current rating steadied at an acceptable 12.3A.

Premature slew limiting restricts the HF headroom of both disc inputs, falling from +32.7dB at 1kHz to +22.5dB

at 20kHz on the MM stage. Nevertheless distortion is dominated by the integral power amp which increases markedly at high frequencies, giving rise to the spray of 2nd-10th order mechanisms visible on the 3D plot. These non-linearities, together with the abrupt RF sensitivity at 80-90MHz (Radio 2!), should be addressed by Linx.

## Sound Quality

Our early impressions of this amplifier were very favourable. Several listeners commented on its good sense of pace and drive coupled with an admirable ability to retrieve subtle dynamic contrasts. However, at higher levels much of this clean civility was lost. This in turn led to a gradual increase in confusion, hardening the sound slightly and encouraging a degree of fatigue on the part of the listeners. As implied by Linx's literature, the *Nebula* certainly altered with time, yet there was some dispute as to whether the changes in performance were wholly beneficial.

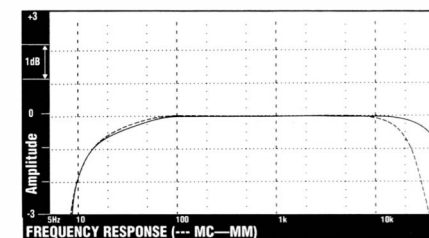
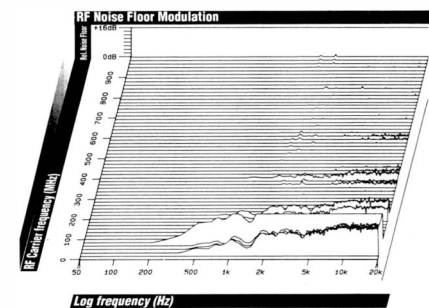
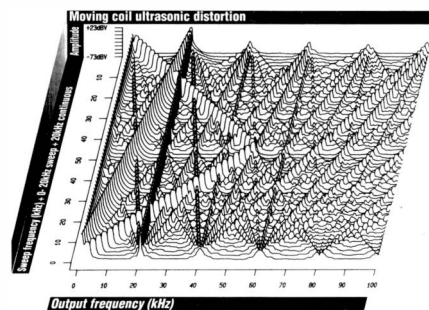
Either way, these characteristics were maintained via the disc input though, unfortunately, the collapse of imagery with complex classical works was all the more obvious. On the other hand the amp balanced its two-dimensional soundstage with an undeniably positive presentation, confident and possessing plenty of impetus or drive. The subjective annoyance of this amp's flattened soundstage will very much depend upon the system in which it is used.

## Conclusions

This is a stylish, if expensive, amplifier which should prove very popular in the marketplace. Although the current *Nebula* did not quite fulfill its promise in our test system, it is clearly worth hearing if the price suits your pocket and you value rhythm, pace and dynamics over image depth and 'delicacy'.

## TEST RESULTS

	20Hz	1kHz	20kHz
<b>Maximum Continuous Power Output, 8ohms</b>	79.5W	87.7W	85.7W
<b>4ohms</b>	116.6W	121.7W	120.4W
<b>Dynamic Headroom (IHF)</b>		+1.20dB	(115.5W)
<b>Peak Current (5msec, 1% THD)</b>			12.3A
<b>Output Impedance</b>	0.033ohm	0.038ohm	0.070ohm
<b>Damping Factor</b>	243.7	212.2	114.5
	<b>CD/Aux</b>	<b>mm</b>	<b>mc</b>
<b>Stereo Separation (20Hz)</b>	92.6dB	88.9dB	85.3dB
<b>(1kHz)</b>	63.3dB	65.9dB	66.8dB
<b>(20kHz)</b>	37.9dB	39.7dB	40.9dB
<b>Channel Balance (1kHz,</b>			
<b>-20dBV)</b>	0.30dB	0.30dB	0.31dB
<b>(-60dBV)</b>	1.48dB	0.45dB	0.37dB
<b>Total Har. Dist. (0dBW)</b>	-71.6dB	-71.3dB	-69.2dB
<b>(<sup>2</sup>/<sub>3</sub> power)</b>	-67.8dB	-67.1dB	-69.0dB
<b>CCIR Intermod. Dist. (0dBW)</b>	-77.8dB	-75.3dB	-74.2dB
<b>CCIR IM Dist. (<sup>2</sup>/<sub>3</sub> power)</b>	-75.7dB	-73.1dB	-72.1dB
<b>Rise Time</b>			2.5µsecs
<b>Squarewave linearity</b>			-89.0dB
<b>Absolute Phase</b>			Non-inverting
<b>Noise (A wtd, 0dBW)</b>	-76.2dB	-74.7dB	-66.2dB
<b>(<sup>2</sup>/<sub>3</sub> power)</b>	-87.1dB	-82.7dB	-67.6dB
<b>Residual noise (unwtd)</b>	-56.6dBV	-56.6dBV	-56.6dBV
<b>Input Sensitivity (for 0dBW)</b>	15.3mV	127.5µV	12.5µV
<b>(for full output)</b>	145.6mV	2.466mV	117.5µV
<b>Disc Overload (20Hz)</b>		24.6mV	2.413mV
<b>(1kHz)</b>		214.5mV	20.5mV
<b>(20kHz)</b>		670.3mV	54.2mV
<b>(50kHz)</b>		327.5mV	65.9mV
<b>Tape Output/Impedance</b>		12.42V (disc)/10.2kohm	
<b>Input loading</b>	24.5kohm/72pF	47kohm/117pF	102.9ohm/1.5nF
<b>DC offset, left/right</b>			+8.2mV/+31.6mV
<b>Typical retail price</b>			£499



# Magnum MP150/MF150

HAILEY AUDIO LTD., 328 WARE ROAD, HAILEY, HERTS SG13 7PG.  
TEL: (0922) 714811.



After a brief spell of success in the UK under the auspices of Pure Gain, the production of Magnum amplifiers was taken up by a new company called, rather confusingly, A.C. Magnum. Some two years later the availability of Magnum amplifiers has been bolstered with the appointment of Hailey Audio as official UK distributors, a move that leaves Magnum's overseas business quite unaffected.

The Magnum amplifier range is quite comprehensive, encompassing two integrated models and no less than four preamps and seven power amplifiers, the largest of which is a 320W monoblok costing just under £2,000. By contrast the *MP150/MF150* represents Magnum's entry-level pre/power combination.

Four milled alloy knobs grace the slim (though rather deep) preamp, catering for 5-way input selection, tape monitoring, volume and balance – though the latter could do with a centre-detent if only to ensure correct channel matching. Interestingly, Magnum has facilitated the independent selection of either MM or MC cartridges via the front panel, instead of fitting a gain-switch on the rear of the amp as tends to be common practice. All input selection is effected via remote 4052 CMOS switches, one provided for each channel to minimise crosstalk. Further to this the phono selection is distinguished via a bank of encapsulated relays, Magnum employing two 741 op-amps in the form

of a headamp (with additional op-amp based regulation) prior to the actual RIAA eq section. An Hitachi HA12071 three-stage op-amp is used for active disc equalisation, an option also exercised by Kelvin.

The output/line stage of the *MP150* preamp is rather unusual, utilising a single Motorola 2N3906 transistor as a driver with a BC182B providing a constant-current source. The latter covers the negative excursion of the waveform while the driver covers its positive excursion. The transistor never switches off and so is effectively operating in single-ended Class A mode!

Magnum's *MF150* power amplifier is altogether simpler though no less elegant; the recessed heatsinking near the rear of the case is just one example of its sensible construction. The guts are based on Hitachi's original power MOS-FET application circuit though the *MF150* features newer 2SK1058/2SJ162 devices which, though not super-fast, are perhaps better suited for duty in an audio amplifier. A full Zobel network is incorporated but Magnum has eschewed any form of output protection circuitry.

## Lab Report

Magnum's *MP150* preamp is an interesting blend of compromises. On the one hand it offers a good midband separation of 80dB, very low A-wtd noise figures such as -84dB for MM disc, sensible input sensitivities and sufficient

+29.5dB/+25.3dB headroom for MM/MC cartridges. On the other it suffers from a constant 0.7dB channel error because the balance knob has to be visually aligned, an unusual negative 20Hz phase shift on MM (note the 0.3dB bass boost below 20Hz on the RIAA plot), and very high levels of THD (typically 1.3 per cent all inputs).

THD falls to 0.11 per cent via the internal TL072 tape buffer which offers a high 8.3V at just 1 per cent distortion whereas the main preamp output is limited to 0.87V @ 1 per cent THD rising to 6.89V @ 5 per cent THD. This is due to non-linearities inherent in the preamp's single-ended Class A output stage, giving rise to the strong 2nd-4th harmonics on the 3D plot in addition to some very characteristic IM routes.

Interestingly, the *MF150* power amp offers a similar range of summation IM distortions (extending to 5th order) but with relatively innocuous 2nd and 3rd order IM routes extending into the audio band. Open-loop non-linearities are also reflected in this amp's sensitivity to RF noise in the 100, 180, 350 and 470MHz regions – Magnum should investigate and cure this breakthrough.

Power-wise the *MF150* is healthy enough, offering 89W into 8ohm with a +1.5dB rise into 4ohm and peak current of 12.5A. Noise is very low, stereo separation good and the output impedance held down to a creditable 0.014 ohm, equivalent to a notional 8ohm damping factor of 587 at 20Hz.



## Sound Quality

During and after the listening tests our panel commented on what they considered to be a marked discrepancy in performance between the line and disc stages of the preamp, despite being very impressed at the overall sound of the combo. Specifically, the line input was thought to sound smooth and very tidy with a balanced, strain-free and extended bandwidth. Furthermore it offered a good sense of pace and involvement and while there was a hint of graininess at the very top of its range this did little to dampen our listeners' enthusiasm for the emotive accuracy of the music.

Meanwhile the combo failed to reveal all the spatial qualities available from the PDM compact disc source which we used during the listening tests, even though this omission was traded for a degree of comfort and fluidity missed by many other amplifiers – a justifiable bargain in the view of the assembled listeners. On the downside there was an immediate narrowing of the soundstage, though no apparent loss in stereo depth via MM disc.

In tonal terms the sound of the MP150/MF150 combination was smooth and even; strings were a little strained but were certainly not hard or edgy. However, the music, though not totally lacklustre, was neither particularly vivid nor alive, and was described as 'languid' by one listener when compared to the radiance of the CD input.

Via the CD input it was the subtle captivation of the amp – its sheer lack of the obvious – that dawned on our listeners over a period. One erudite panelist implied that it homed-in on the

intellectual centres of the brain rather than going for the throat!

## Conclusions

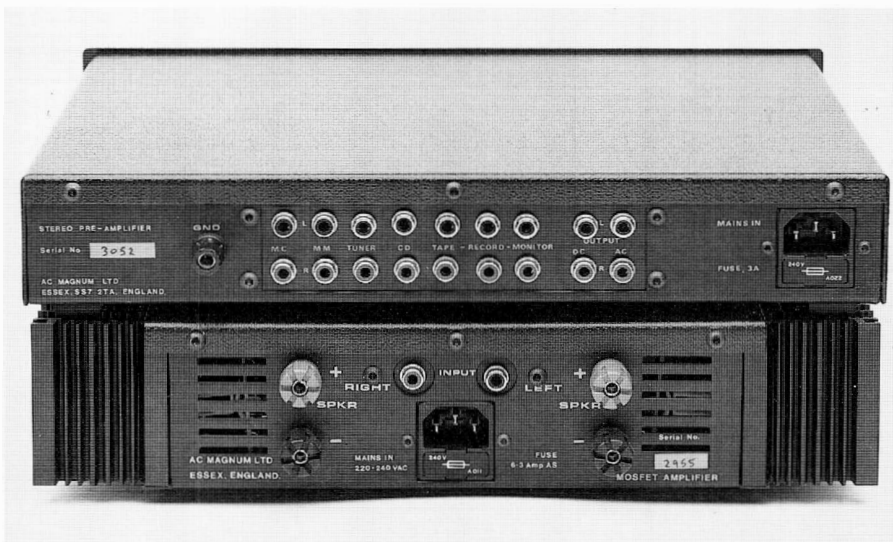
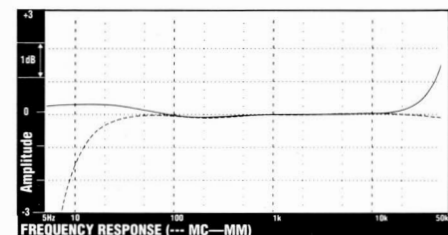
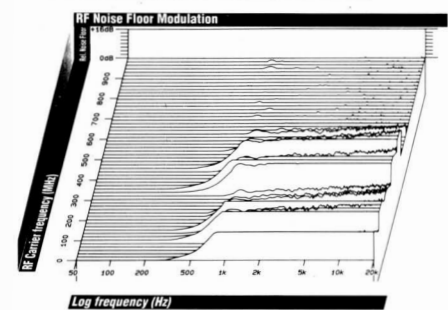
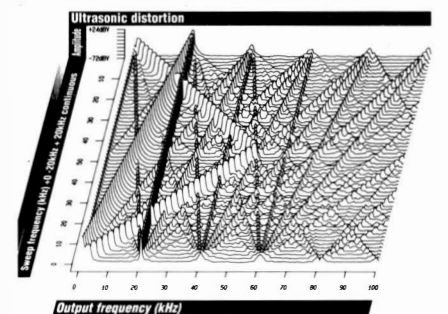
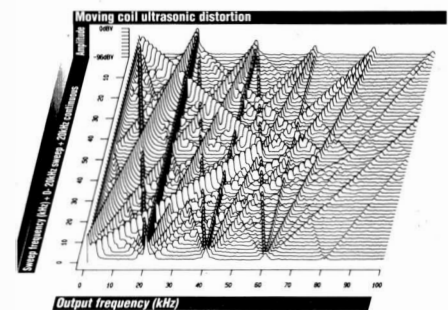
If only from the subjective standpoint this pre/power combination is particularly suited to CD-based systems, with records as a secondary source. The MOSFET power amp is clearly the more successful of the duo, for the preamp's value – though still high – is inevitably compromised by its flexible but inferior disc stage. Still, with these provisos in hand, and bearing in mind the keen pricing of the amplifiers, a qualified recommendation seems most appropriate.

## TEST RESULTS

	Aux/CD	MM	MC
<b>Stereo Separation (20Hz)</b>	109.3dB	95.7dB	88.7dB
(1kHz)	78.6dB	79.6dB	80.4dB
(20kHz)	53.1dB	57.6dB	58.4dB
<b>Channel Balance (1kHz, 0dBV) 0.59dB*</b>		0.81dB	0.82dB
-20dBV)	0.47dB	0.71dB	0.75dB
(-60dBV)	0.73dB	0.85dB	0.98dB
<b>Total Har. Dist. (0dBV, 1kHz)</b>	-38.7dB	-38.8dB	-38.9dB
(20kHz)	-38.2dB	-38.0dB	-37.9dB
<b>CCIR Intermod. Dist. (1:1)</b>	-37.1dB	-37.4dB	-37.5dB
<b>Squarewave linearity</b>			-63.5dB
<b>Absolute Phase</b>			Non-inverting
<b>Additional Phase shift (20Hz)</b>	+2°0'	+14°30'	+7°0'
(1kHz)	0°0'	-50°30'	-50°30'
(20kHz)	-8°0'	-75°30'	-75°30'
<b>Noise (A wtd, 20Hz-20kHz)</b>	-92.4dB	-84.4dB	-71.5dB
<b>Residual noise (unwtd)</b>	-88.2dBV	-88.2dBV	-88.3dBV
<b>Input Sensitivity (for 0dBW)</b>	187.3mV	2.521mV	154.5µV
<b>Disc Overload (20Hz)</b>		15.29mV	1.001mV
(1kHz)		149.5mV	9.173mV
(20kHz)		1390mV	84.4mV
(50kHz)		2655mV	74.5mV
<b>Input loading</b>	14.5kohm/60pF	50kohm/100pF	100ohm/23nF
<b>Preamp. Output (max)/Impedance</b>		871mV* (disc)/260ohm	
<b>Tape Output (max)/Impedance</b>		8.284V (disc)/105ohm	
<b>DC offset, left/right</b>		+693mV/+850mV (DC coupled)	
<b>Typical retail price</b>			£320

## Power amplifier

	20Hz	1kHz	20kHz
<b>Maximum Continuous Power Output, 8ohms</b>	84.5W	88.9W	84.5W
4ohms	108.6W	125.5W	104.5W
<b>Dynamic Headroom (IHF)</b>		+1.07dB	(113.8W)
<b>Peak Current (5msec, 1% THD)</b>			12.5A
<b>Output Impedance</b>	0.014ohm	0.012ohm	0.024ohm
<b>Damping Factor</b>	587.1	650.2	339.9
<b>Stereo Separation (0dBW)</b>	122.5dB	124.7dB	96.8dB
<b>Total Harm. Dist. (0dBW)</b>	-74.6dB	-83.7dB	-65.4dB
( <sup>2</sup> / <sub>3</sub> power)	-72.7dB	-70.7dB	-51.1dB
<b>CCIR Intermodulation Distortion (0dBW)</b>			-81.7dB
<b>CCIR IM Distortion (<sup>2</sup>/<sub>3</sub> power)</b>			-61.8dB
<b>Rise Time (@ 10kHz)</b>			500nsecs
<b>Squarewave linearity</b>			-89.6dB
<b>Absolute Phase</b>			Non-inverting
<b>Noise (A wtd, 20Hz-20kHz) 0dBW</b>			-90.7dB
( <sup>2</sup> / <sub>3</sub> power)			-106.8dB
<b>Residual noise (unwtd)</b>			-69.2dBV
<b>Input Sensitivity (for 0dBW)</b>			91.20mV
(for full output)			868.0mV
<b>Input loading</b>			8.2kohm/110pF
<b>DC offset, left/right</b>			-2.4mV/-3.8mV
<b>Typical retail price</b>			£320





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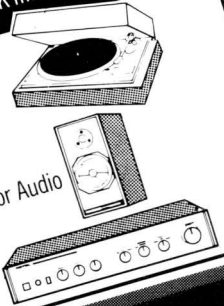
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# SUGGESTED SYSTEMS

The suggested systems priced below all include the popular Dual CS503/1 turntable, but an alternative turntable or CD player is available at extra cost. Please see "OPTIONS" list below for further details.

SPEAKERS All system prices include the Dual CS503/1	W/dale Diamond III Goodmans Maxim II W/dale Delta 30 JPW Minim Gale GS210	Celestion 3 JPW Sonata Goodmans Sterling Pt 3 Royd A7 M/Short MS 3.10	Celestion DL4 II Tannoy E11 A/Research 112 JPW Sonata+	H/brook Pt 5 A/Research 122 Celestion DL6 II Monitor Audio R7	Tannoy M15 Castle Warwick Wharfedale 505.2 Monitor Audio R9 M/Short MS 3.30	KEF C45 Castle Durham Celestion DL8 II A/Research 132 Rogers LS4A Add £30	Heybrook HB1 Tannoy M20 (BII) Heybrook HB100 Tannoy DC 2000 (Add £50) M/Audio R352MD (Add £50)
Rotel RA820AX	294.95	309.95	329.95	349.95	369.95	389.95	429.95
Rotel RA820BX4	329.95	339.95	359.95	379.95	399.95	429.95	469.95
Cambridge P50	349.95	359.95	389.95	399.95	409.95	429.95	469.95
Nad 3130	289.95	299.95	309.95	324.95	344.95	359.95	419.95
Rotel RA840BX4	379.95	389.95	409.95	419.95	429.95	459.95	499.95
Harman PM6100	299.95	299.95	309.95	324.95	344.95	359.95	419.95
Rotel RA810A	264.95	284.95	284.95	299.95	319.95	339.95	384.95
QED A240CD II	334.95	354.95	379.95	379.95	399.95	419.95	434.95
Yamaha AX330	274.95	349.95	349.95	379.95	399.95	419.95	469.95
Arcam Alpha II	329.95	449.95	469.95	469.95	479.95	499.95	549.95
Rotel RA870BX	429.95	359.95	389.95	389.95	399.95	409.95	429.95
Kenwood KA5010	349.95	299.95	314.95	314.95	329.95	334.95	374.95
Nad 3225PE	289.95	289.95	309.95	309.95	324.95	329.95	364.95
Nad 3020 i	279.95	289.95	309.95	309.95	324.95	329.95	364.95
Kenwood KA550D	279.95	284.95	309.95	309.95	324.95	329.95	364.95
Technics SU 800K	279.95	284.95	309.95	309.95	324.95	329.95	364.95
Musical Fidelity B1	334.95	354.95	379.95	379.95	389.95	399.95	419.95

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## OPTIONS

The following Compact Disc Player or Turntable may be ordered instead of the Dual CS503/1 in the above systems.

### CDs

- Denon DCD520 add £50
- Denon DCD620 add £80
- Denon DCD820 add £130
- Denon DCD920 add £180
- Marantz CD40 add £80
- Marantz CD50 add £130
- Marantz CD50SE add £180
- Marantz CD60 add £230
- Marantz CD60SE add £70
- Nad 5320 add £100
- Nad 5325

- Philips CD840 add £220
- Philips CD610II add £50
- Rotel RCD855 add £130
- Rotel RCD865 add £180
- Sony CDP770 add £70
- Technics SLP227 add £40
- Technics SLP337 add £60
- Technics SLP447 add £80
- Technics SLP550 add £100
- Technics SLP570 add £160

### TURNTABLES

- Dual CS503-2 add £20
- Dual CS505-3 add £25
- Dual CS430 deduct £20
- AR EB 101 add £100
- Nad S120 deduct £20
- Revolver black inc. arm add £100
- Revolver Rebel add £40
- Systemdek + moth add £150
- Systemdek inc. arm add £125
- Ariston "Q" Deck add £30
- Ariston "CON" add £70
- Thorens TD280 II add £80
- Thorens TD166 V add £8
- Rotel RP855 add £8

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Cartridge supplied with these systems

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Carriage for mail order customers on all systems in excess of £250 (UK mainland only) NB speaker stands are NOT included but highly recommended — wide range available from £20 per pair

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# Marantz PM-80

**R**ecommended

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



Marantz's *PM-80* amplifier is a beefy integrated model which enjoys the smoother matt-black aesthetics and copper-plated screws that distinguish the company's latest units. Large rotary volume and input select knobs dominate the fascia, accounting for phono and four line sources, while independent switching for up to three tape decks is accomplished beneath.

Bass, treble and balance facilities are removed from the circuit in 'source direct' mode while, at the push of a button, the *PM-80* is instantly turned into a lower-powered Class A amplifier. In this instance the four pairs of chunky Toshiba output transistors are run at an enriched bias level.

The construction of the *PM-80* follows an established theme: symmetrical near-dual-mono layout, a low impedance power supply, low-noise FET-based disc input and relay switching for A/B speaker selection. By any standards the general build quality of this amp is certainly rugged, though the internal wiring could be tidied up.

## Lab Report

Operated in standard Class AB mode the *PM-80* exceeded its specification with some 133W into 8 ohm followed by a rise of +2.2dB to 223W into 4 ohm. Peak current clocked in at a speaker-frying 29A while the output impedance registered a low 0.04 ohm. Things were less impressive in Class A mode where the *PM-80* offered just 17W pure Class A, clipping at 25.9W into 8 ohm and 46.5W into 4 ohm by lapsing into Class AB. Sensitive speakers are a must if the *PM-80* is to be auditioned in this less efficient mode.

It revealed a textbook 20dB difference in sensitivity and headroom between the MM and MC disc stages while providing a disc response -3dB down at 22Hz and flat to within 0.24dB limits

between 100Hz and 20kHz. Immunity to on-line RF noise is also very good (save for a sharp break in the 1-5MHz region) while conventional closed-loop compensation techniques help maintain THD to within 0.0011-0.0014 per cent at all power levels through all inputs. Distortion does climb with increasing frequency, particularly via MM disc.

## Sound Quality

The *PM-80* received a more favourable reaction from the assembled 'blind' listeners than have other Marantz integrated amplifiers in previous *Choice* tests. Its solid, tactile and nicely focused sound was commented upon almost immediately though there was also a little disappointment over the marginal loss of stereo depth. Strong bass lines were handled with a reassuring sense of security and control, actually losing some of this rugged impact for an extra 'rosiness' when used in its lower power Class A mode.

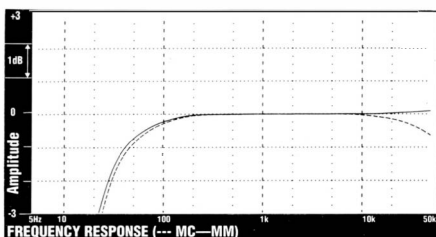
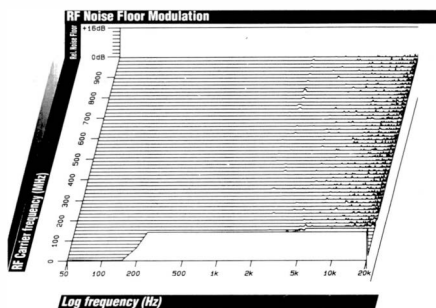
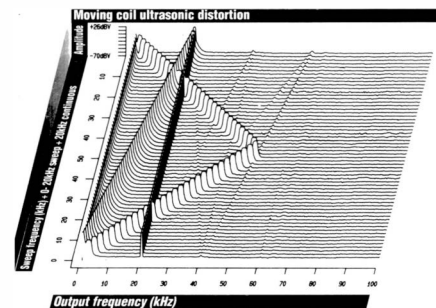
The MM disc input offered a moderately smoother and richer tonal balance though the side-to-side resolution and general poise of the amplifier was still clearly manifest. Returning to the CD input it was felt that the *PM-80* just failed to fully grasp the ambient tension of music played via our PDM decoder even though its neutrality and overall competence could not be faulted.

## Conclusions

In this instance Marantz has succeeded in treading a path between objective accuracy and long term listening pleasure. The *PM-80* may not sound as lush or beguiling as its more specialised competitors, but its performance remains reliably and predictably solid. As such it represents an excellent choice for those enthusiasts saddled with 'difficult' or power-hungry loudspeakers.

## TEST RESULTS

	20Hz	1kHz	20kHz
<b>Maximum Continuous Power Output, 8ohms</b>	132.8W	133.1W	129.8W
4ohms	223.2W	222.8W	217.3W
<b>Dynamic Headroom (IHF)</b>	+1.15dB (173.5W)		
<b>Peak Current (5msec, 1% THD)</b>	29.3A		
<b>Output Impedance</b>	0.044ohm	0.042ohm	0.049ohm
<b>Damping Factor</b>	183.6	189.9	161.7
	<b>CD/Aux</b>	<b>mm</b>	<b>mc</b>
<b>Stereo Separation (20Hz)</b>	77.3dB	83.7dB	84.1dB
(1kHz)	70.3dB	70.3dB	70.4dB
(20kHz)	52.6dB	52.5dB	52.4dB
<b>Channel Balance (1kHz,</b>			
-20dBV)	0.57dB	0.43dB	0.35dB
(-60dBV)	1.24dB	1.35dB	1.55dB
<b>Total Har. Dist. (0dBW)</b>	-99.2dB	-97.9dB	-99.5dB
( $\frac{2}{3}$ power)	-99.4dB	-96.2dB	-97.6dB
<b>CCIR Intermod. Dist. (0dBW)</b>	-95.9dB	-72.8dB	-74.7dB
<b>CCIR IM Dist. (<math>\frac{2}{3}</math> power)</b>	-84.7dB	-70.8dB	-75.9dB
<b>Rise Time</b>	3.9µsecs		
<b>Squarewave linearity</b>	-106.1dB		
<b>Absolute Phase</b>	Non-inverting		
<b>Noise (A wtd, 0dBW)</b>	-83.4dB	-82.4dB	-72.9dB
( $\frac{2}{3}$ power)	-97.2dB	-90.0dB	-72.7dB
<b>Residual noise (unwtd)</b>	-99.4dB	-72.7dB	-72.9dB
<b>Input Sensitivity (for 0dBW)</b>	15.65mV	247.8µV	24.90µV
(for full output)	182.7mV	2.855mV	287.2µV
<b>Disc Overload (20Hz)</b>	22.70mV	2.300mV	
(1kHz)	141.8mV	14.12mV	
(20kHz)	1218mV	125.8mV	
(50kHz)	1507mV	170.4mV	
<b>Tape Output/Impedance</b>	9.016V (disc)/221.7ohm		
<b>Input loading</b>	30.5kohm/240pF 45kohm/380pF 100ohm/1.9nF		
<b>DC offset, left/right</b>	-3.1mV/-4.5mV		
<b>Typical retail price</b>	£400		



# Mission Cyrus One

**Best Buy**

MISSION ELECTRONICS, STONEHILL, HUNTINGDON, CAMBS  
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From time to time it does no harm to re-evaluate some old favourites. The stalwart *Cyrus One* from Mission is an immensely popular amplifier constructed on a rugged cast alloy chassis and finished in either matt black or a grey Nextel material. A small power-on LED has replaced the illuminated 'Cyrus' logo of older models while the rather fiddly miniature headphone socket has finally been dropped altogether, and a good thing too.

The facilities are basic but sufficient, comprising a detented volume control with peripheral balance adjustment and independent record-out/input selection for four line sources as well as both MM and MC disc. The latter are selected by a small switch on the rear of the amplifier which adjusts the gain (but not the loading) of an internal NE5534N headamp.

All other inputs and outputs are easily accessible, the line sources being routed directly to the volume control before passing to a high gain quasi-complementary power amp. The devices, manufactured for Mission by SGS, are firmly clamped to an internal cast alloy heatsink for efficient cooling.

The universal PCB has been relaid in recent times and particular attention paid to its earthing pattern. Furthermore, polypropylene caps are now used throughout the amp, with some polyester types being employed when higher values are required. This, a new 100VA toroid and slit-foil reservoir capacitors, completes the *Cyrus One's* evolution to date.

## Lab Report

This is a solid enough performer offering low distortion (0.0019 per cent via line), a lowish 0.07 ohm output impedance and very low -85dB A-wtd noise via MM disc. The MC input is a little noisier and its 20kHz phase shift marginally higher as a result of running

a common NE5534 op-amp at two alternative gain (and therefore feedback) settings.

Power output holds up well between 8 and 4 ohm (+2.0dB), bolstered into lower impedances by a substantial 12.8A current delivery.

## Sound Quality

The calibre of this amp was evident from the outset of our listening, all panellists being struck not only by the powerful, almost 'meaty' solidity of the sound but also by its effortless fluidity. The CD input was the best we had heard in this month's tests, inherently musical and quite capable of retrieving the subtlest of musical nuances.

Not only did the *Cyrus One* possess this wonderful lightness of touch and poise but it was also remarkably solid and confident in its presentation - firm and tightly focused but not forward or aggressive. It certainly hit an emotional chord with our listeners who were able to sit back, relax and enjoy the sound of music without being bothered by niggling shortfalls in its performance.

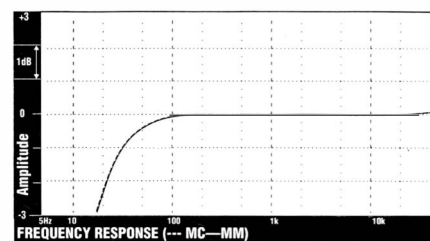
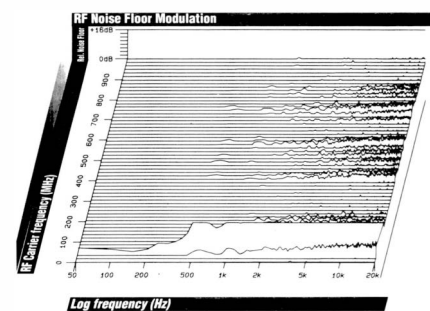
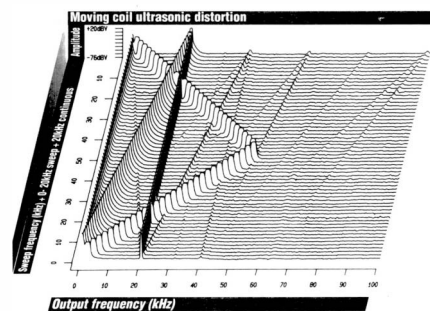
Switching to the disc input brought about a slight loss in clarity, vocal articulation and stereo focus even though the overall balance of the phono stage was warm and eminently comfortable. Crisp bass transients were now reproduced with a vaguely spongy texture though it is true to say that in a lesser amplifier these subjective differences would be less easy to discern.

## Conclusions

The *Cyrus One* appears to have added yet another string to its bow, a string that can only hone its razor-sharp competitiveness. Notwithstanding the disc input, which only just fails to make the top grade, the exemplary performance of the *Cyrus One's* CD input ensures a continued Best Buy rating.

## TEST RESULTS

	20Hz	1kHz	20kHz
<b>Maximum Continuous Power Output, 8ohms</b>	32.0W	33.8W	32.8W
<b>4ohms</b>	46.5W	54.1W	51.7W
<b>Dynamic Headroom (IHF)</b>		+1.04dB	(43.0W)
<b>Peak Current (5msec, 1% THD)</b>			12.8A
<b>Output Impedance</b>	0.075ohm	0.074ohm	0.066ohm
<b>Damping Factor</b>	106.3	108.3	120.5
	<b>CD/Aux</b>	<b>mm</b>	<b>mc</b>
<b>Stereo Separation (20Hz)</b>	55.1dB	53.8dB	52.8dB
<b>(1kHz)</b>	54.9dB	54.5dB	54.4dB
<b>(20kHz)</b>	50.9dB	49.9dB	49.6dB
<b>Channel Balance (1kHz, -20dBV)</b>	1.11dB	1.07dB	1.02dB
<b>(-60dBV)</b>	13.5dB	14.9dB	16.3dB
<b>Total Har. Dist. (0dBW)</b>	-94.5dB	-90.4dB	-88.1dB
<b>(2/3 power)</b>	-90.1dB	-86.7dB	-84.2dB
<b>CCIR Intermod. Dist. (0dBW)</b>	-95.8dB	-85.3dB	-84.7dB
<b>CCIR IM Dist. (2/3 power)</b>	-92.9dB	-84.6dB	-82.9dB
<b>Rise Time</b>			6.1µsecs
<b>Squarewave linearity</b>			-107.3dB
<b>Absolute Phase</b>			Non-inverting
<b>Noise (A wtd, 0dBW)</b>	-89.4dB	-83.8dB	-65.8dB
<b>(2/3 power)</b>	-99.9dB	-85.3dB	-66.1dB
<b>Residual noise (unwtd)</b>	-77.8dBV	-77.5dBV	-77.6dBV
<b>Input Sensitivity (for 0dBW)</b>	63.8mV	451.1µV	45.4µV
<b>(for full output)</b>	376.7mV	2.617mV	202.9µV
<b>Disc Overload (20Hz)</b>		11.20mV	1.115mV
<b>(1kHz)</b>		82.84mV	8.318mV
<b>(20kHz)</b>		771.2mV	74.95mV
<b>(50kHz)</b>		1034mV	102.7mV
<b>Tape Output/Impedance</b>		11.79V (disc)/157.5ohm	
<b>Input loading</b>		13.4kohm/110pF	47kohm/270pF
<b>DC offset, left/right</b>			-0.5mV/+10.6mV
<b>Typical retail price</b>			£200





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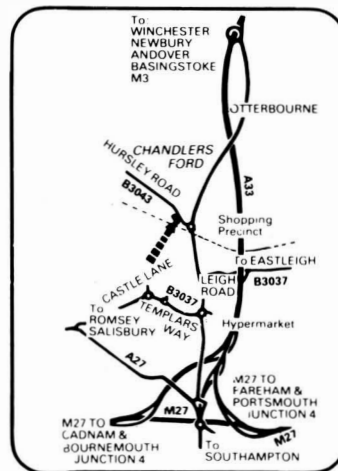
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# Musical Fidelity A1

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This hot little number has steadily evolved over the last few years, prompting a *Choice* re-review. The *A1* retains its characteristic styling and basic facilities for four line and both MM/MC disc sources, though the price has risen by around £50-£60.

No ambitious claims are made these days for the Class A output of this amplifier, though despite reducing the value of the series-coupled emitter resistors its 8 ohm Class A power has remained pretty much fixed at 9W. The most efficient Class A transfer will only occur into loads above an impractical 28 ohm, however. This said, the *A1* now runs rather cooler than its predecessors thanks, in the main, to a new one-piece top-plate (with an improved black surface coating) and fluted casework, all of which improve the amplifier's 60W heat dissipation. A single-ended, rather than differential, disc headamp is employed followed by an all-active RIAA eq section based around a TL084CN op-amp – a particular favourite of Musical Fidelity.

## Lab Report

An odd one, this. The amplifier is most content driving easy non-reactive loads, offering 26W into 8 ohms, but distortion mounts rapidly both with decreasing load impedance, increasing frequency and with time! Hence the *A1*'s output is limited to 18W into 4 ohm at 1 per cent THD or 25W at 5 per cent THD. Similarly the peak current (into 1 ohm) is restricted to 1.6A at 1 per cent THD or 2.8A at 5 per cent THD. All this is due to the use of a constant-current source feeding the main output stage.

Some things never change, however, and the disc response still shows its characteristic -0.35dB shelving above 5kHz, sufficient to 'sweeten' the sound slightly (note the high negative phase shifts at 20kHz). Stereo separation and

channel balance are superb and noise is low too, yet with an oddly 'shaped' white noise floor that serves to mask the effects of RF IMD. One way or another it is probably a good result!

## Sound Quality

Oddly enough, bearing in mind the reputation of the *A1*, neither our first nor second set of panelists were overly excited by the sound of this amp, both referring to it as comfortable yet innocuous. All commented on its smoothness and lack of fatiguing 'nasties' but were equally aware of subtle musical detail being furtively glossed over. To some extent, then, our listeners found it difficult to get to grips with the fundamental sound or 'character' of the amp.

If the CD input was thought to sound a trifle 'sleepy' and lacking in bite then the disc input revived interest with improvements in sparkle and tactility that allowed the music to 'breathe' in a more convincing fashion. Finally this latest spec *A1* was compared to an original sample (three-and-a-half years old) which was thought to provide a slightly sweeter but marginally more dynamic and transparent sound. In the event, this old *A1* simply captured the imagination of our listeners in a fashion lost to the new sample.

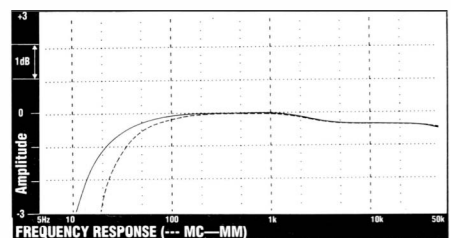
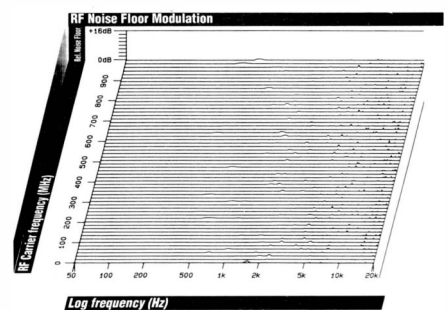
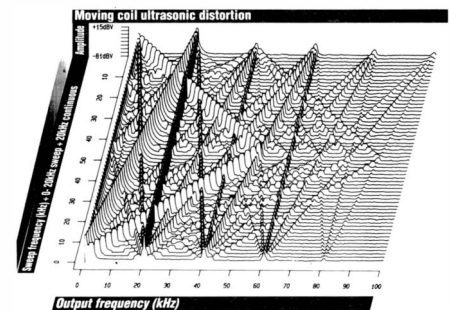
## Conclusions

Clearly many of the technical features of the *A1* remain unchanged, yet this up-to-date model doesn't have quite the charm and 'sweetness' of the original version. This implies that some of Musical Fidelity's revisions might actually constitute retrograde steps, a situation that may easily arise on a day-to-day production basis.

Clearly the *A1* is still a good amplifier for the price, but Musical Fidelity might be well advised to look to the past before implementing further changes.

## TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output, 8ohms	25.3W	25.7W	22.6W
4ohms	18.5W*	18.3W*	17.9W*
Dynamic Headroom (IHF)		+0.41dB	(28.2W)
Peak Current (5msec, 1% THD)			1.6A**
Output Impedance	0.316ohm	0.352ohm	0.382ohm
Damping Factor	25.3	22.7	20.9
Stereo Separation (20Hz)	118.9dB	97.6dB	89.5dB
(1kHz)	105.1dB	99.6dB	94.3dB
(20kHz)	104.4dB	92.6dB	86.1dB
Channel Balance (1kHz, -20dBV)	0.10dB	0.07dB	0.05dB
(-60dBV)	0.46dB	0.20dB	0.05dB
Total Har. Dist. (0dBW)	-73.9dB	-72.5dB	-57.6dB
(2/3 power)	-56.1dB	-55.6dB	-50.5dB
CCIR Intermod. Dist. (0dBW)	-73.1dB	-52.2dB	-28.7dB
CCIR IM Dist. (2/3 power)	-58.4dB	-50.3dB	-28.6dB
Rise Time			3.5µsecs
Squarewave linearity			-83.0dB
Absolute Phase			Non-inverting
Noise (A wtd, 0dBW)	-89.5dB	-82.6dB	-71.9dB
(2/3 power)	-94.7dB	-82.9dB	-71.0dB
Residual noise (unwtd)	-66.6dBV	-66.6dBV	-66.6dBV
Input Sensitivity (for 0dBW)	26.5mV	481.5µV	39.6µV
(for full output)	141.2mV	2.510mV	180.5µV
Disc Overload (20Hz)		15.95mV	1.605mV
(1kHz)		136.7mV	11.0mV
(20kHz)		1133mV	100.3mV
(50kHz)		969.6mV	91.75mV*
Tape Output/Impedance		7.560V (disc)/17.6ohm	
Input loading		47kohm/35pF	13kohm/7.3kohm
DC offset, left/right			-3.5mV/-6.5mV
Typical retail price			£269



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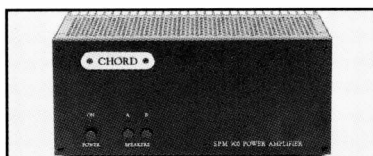
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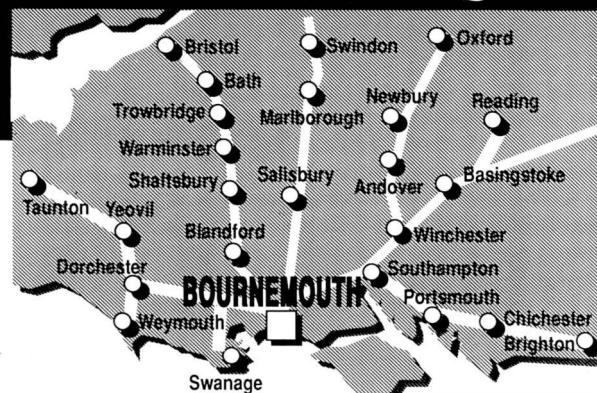
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# NAD 3020i

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As the company which spearheaded the trend in beer-budget 'audiophile' amplifiers, NAD has a high reputation to maintain. This it does by regularly breathing new life into the stalwart 3020, now in its 'i' guise after more than ten years in production. The 3020i's general appearance, layout and complement of facilities parallels that of its predecessor, the 3020e, though a number of technical revisions have been implemented.

Gold-plated phono sockets marry up with an all-discrete MM phono stage that is similar to that found in the costlier 3225PE. There have been minor improvements to the layout of the disc stage and in the rejection ratio of the power supply, bolstering the overall signal-to-noise ration. Changes have been made to the value of both bass control and volume potentiometers, though I still found some 70-80 per cent of the latter's range to cover only 20dB or so.

NAD is also making play of the fact that the 3020i is equipped with chunky 4mm socket/binding posts, in place of the spring-clip terminals fitted to the 3020e. However it is worth bearing in mind that older 3020s (like the 3020B) already benefited from such luxuries, so you could argue that this is no big deal.

## Lab Report

Once again this latest version of the 3020 exceeded its conservative 20W power specification – though, despite NAD having tightened the regulation on its mains transformer, I must take issue with the claimed IHF dynamic headroom of +3dB. Interestingly enough, if we take 20W as the nominal continuous output then a +3dB increase does take it to 40W, which is precisely the figure obtained when the true IHF headroom of +1dB is added onto its true continuous output of 31W. Creative accounting at its best . . .

NAD could improve the low level channel balance of the volume potentiometer but other areas, such as disc sensitivity, overload margins (+32.8dB), noise (-83dB A-wtd) and THD (typ 0.0032 per cent) are all beyond reproach.

## Sound Quality

Recent incarnations of the 3020 have enjoyed a very quick and lucid but also slightly lightweight sound. For one reason or another this latest 3020i (which has been further improved since its inception) actually sounds that bit better balanced. It was applauded by our panel of listeners for its ability to accurately portray low level detail, revealing much of the fluid and 'musical' quality inherent in our PDM compact disc source.

Bass notes are evenly balanced in weight, impact and focus, neither too deep nor excessive in terms of overhang or 'bloom'. In general the amplifier's presentation was coherent, comfortably detailed and certainly very relaxing – there was no hint of aggression or undue forcefulness in its presentation.

NAD's MM disc stage tended to highlight surface noise but the fundamental tonal and structural qualities of the recorded instruments were revealed intact. Fortunately it retained the comfortable and yet surprisingly tactile stereo displayed by the CD input, all sources enjoying a consistent level of fluency even as the amp was pushed to the limits of its output.

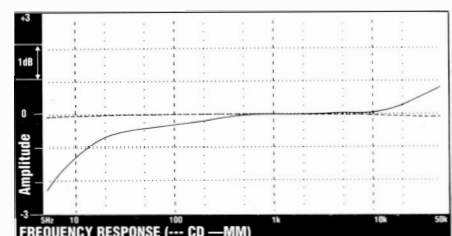
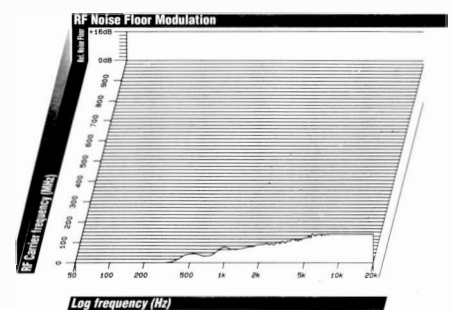
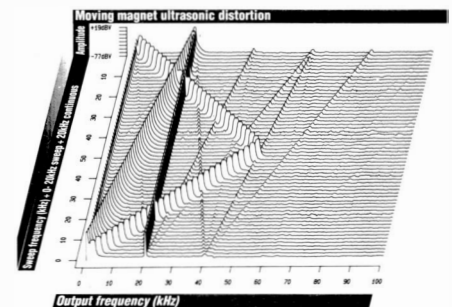
## Conclusions

Musically enjoyable, if not as transparent or neutral as possible, the 3020i nevertheless made a hit with the listening panel.

For the price it put in a sterling, balanced performance that firmly maintains the 3020 lineage and earns NAD a *Choice Best Buy* rating into the bargain.

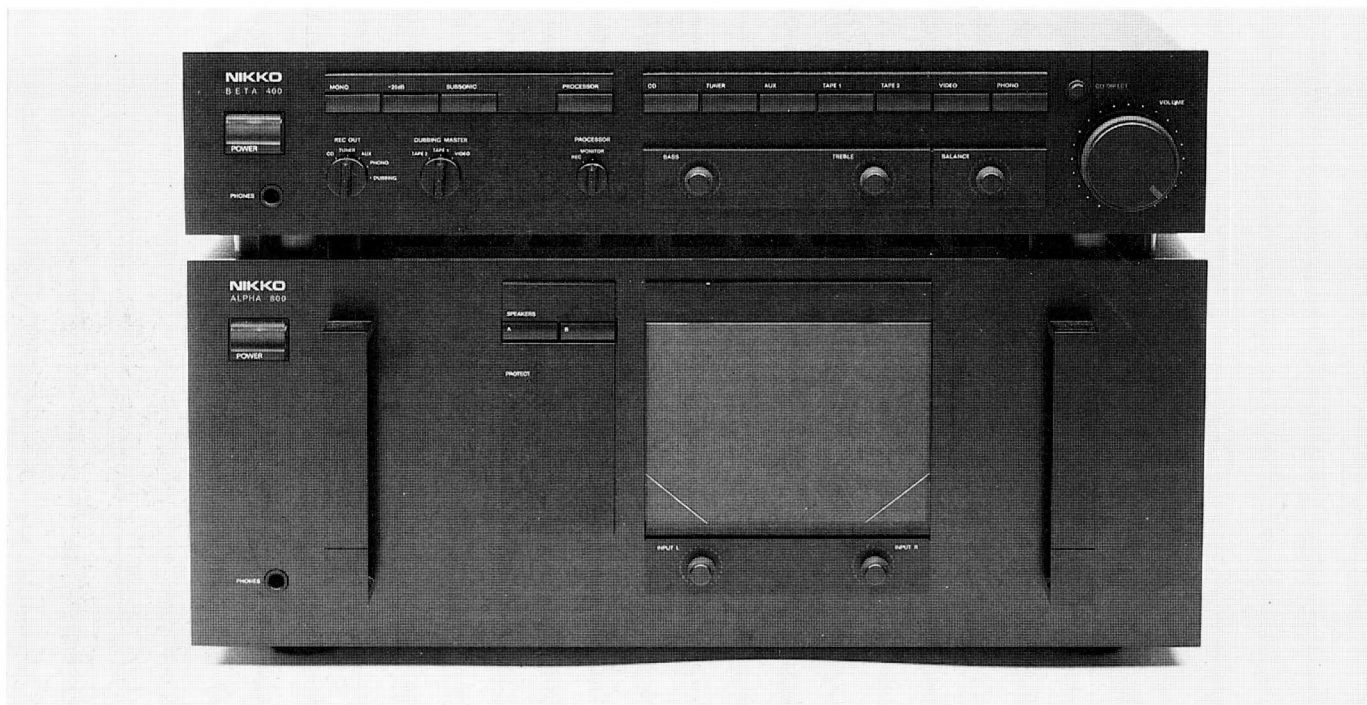
## TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output, 8ohms	26.7W	30.5W	30.1W
4ohms	34.5W	46.6W	47.1W
Dynamic Headroom (IHF)		+0.98dB (38.2W)	
Peak Current (5msec, 1% THD)			9.5A
Output Impedance	0.162ohm	0.166ohm	0.177ohm
Damping Factor	49.3	48.1	45.1
	CD/Aux	mm	
Stereo Separation (20Hz)	71.6dB	73.4dB	
(1kHz)	78.8dB	76.7dB	
(20kHz)	58.7dB	55.2dB	
Channel Balance (1kHz, -20dBV)	0.95dB	1.75dB	
(-60dBV)	7.12dB	8.55dB	
Total Har. Dist. (0dBW)	-92.5dB	-89.0dB	
( <sup>2</sup> / <sub>3</sub> power)	-92.5dB	-89.1dB	
CCIR Intermod. Dist. (0dBW)	-87.3dB	-81.4dB	
CCIR IM Dist. ( <sup>2</sup> / <sub>3</sub> power)	-87.2dB	-81.7dB	
Rise Time			8.5µsec
Squarewave linearity			-102.9dB
Absolute Phase			Non-inverting
Noise (A wtd, 0dBW)	-89.2dB	-81.7dB	
( <sup>2</sup> / <sub>3</sub> power)	-97.5dB	-83.1dB	
Residual noise (unwtd)	-79.1dBV	-78.9dBV	
Input Sensitivity (for 0dBW)	33.4mV	504.7µV	
(for full output)	186.7mV	2.848mV	
Disc Overload (20Hz)		25.2mV	
(1kHz)		217.6mV	
(20kHz)		1907mV	
(50kHz)		3142mV	
Tape Output/Impedance		13.92V (disc)/1.72kohm	
Input loading	46.3kohm/270pF	45.7kohm/220pF	
DC offset, left/right		+3.0mV/+1.9mV	
Typical retail price			£140



# Nikko Beta 400/Alpha 800

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In most amplifier issues of *Choice* we tend to include at least one 'monster' product, an amp that, superficially at least, seems to offer an abundance of power and kilos per pound sterling! In this instance Nikko's gargantuan *Alpha 800* power amplifier fits the bill quite admirably, a 23kg steel crate that comfortably exceeds its 250W per channel power rating.

In comparison the prospect of Nikko's top power amp – the 330W *Alpha 2000* – is little short of terrifying. Both models are styled in a similar fashion and come complete with huge analogue power meters which glow with an attractive blue hue once the unit is switched on. Handles at the front and rear of the case help in man-handling the box while, once comfortably sited, either phono or unbalanced XLR sockets are available for connection to the preamplifier. Attenuators for left and right channels are included under the power meters – a useful addition that allows the *Alpha 800* to be connected directly to any CD player.

Much of the amp's prodigious weight is accounted for by the screened, though mechanically noisy, toroidal mains transformer and alloy heatsinking which supports the three pairs of chunky Sanken output transistors used per channel. Full electronic protection is built-in and A/B speaker selection is switched via a bank of four high current relays on the underside of the case.

A basic range of facilities is provided

on the *Beta 400* preamp, (the costlier *Beta 600* is festooned with features in comparison), including input/record-out selection for four line sources, two tape decks and either MM or MC cartridges. An external processor loop is fitted for use with a graphic equaliser or surround-sound decoder while mono, mute, subsonic filter, tone and balance controls add to its flexibility. In CD-Direct mode the illuminated periphery of these latter controls is defeated, indicating their omission from the signal path.

The internal architecture of the '400 is a practical example of cost-over-engineering, Nikko making use of ICs wherever possible. Still, the active RIAA network is discrete (if not the MC headamp) while trendy Nichicon Muse electrolytics are to be found in the localised power supply. I was impressed with Nikko's choice of a sealed 'blue box' ALPs volume control which offers excellent channel matching right down to very low levels. On the other hand the input switching is convoluted and this tends to impair stereo separation throughout the treble.

## Lab Report

A brief perusal through the specifications does little to discredit the indomitable reputation of Nikko's *Alpha 800*, yet there are one or two cachets associated with its 'real world' performance. With an 8 ohm load the amp's output remains fairly steady at 353-

366W but as the load is reduced (as it does on a dynamic and frequency-dependent basis with most loudspeakers) the output falls from 530W at 1kHz to 473W at 20Hz where clipping distortion is particularly harsh. Above 1kHz a fast-acting protection relay limits the maximum output of the amplifier still further.

Nikko has opted for a fairly 'stiff' power supply, responsible for the +1.7dB power increase between 8 and 4 ohm but also responsible for the limited +0.3dB headroom under dynamic conditions. Furthermore at lower impedances still (1 ohm) the output of the amplifier is quickly distorted, resulting in a peak current rating of just 11.5A. Plenty of compensation is used so the output impedance, THD and IMD are held to tight limits.

One bugbear concerns the *800's* noise spectrum which was dominated by a large 'hump' in the 50-800Hz region, a property of the fields associated with Nikko's noisy mains transformer. As a result the unwt'd hum figure clocked in at a poor 59dBV while even the two-thirds power A-wtd noise figure (which should have been in the 110-115dB range) was reduced to -100dB.

By contrast the CD and MM inputs of the *Beta 400* preamp were commendably silent, an A-wtd figure of -90dB for the latter being a particularly good result. THD and IMD are very low too, increasing from 0.0008 to just 0.0023 per cent at 20kHz on the MC input. These values,

in common with the 0.0028 per cent for CCIR IMD, fall below the noise floor of the MC input and so give rise to the admirably 'clean' 3D plot.

## Sound Quality

Auditioned with the preamp in its ideal 'CD-Direct' mode, this combination offered a deep and very powerful sound, pulling out oodles of bass detail in an almost effortless fashion. There was also a little emphasis at the top of the musical spectrum but in general it was bold, stable and well controlled – authoritative rather than damped. Only the most uncharitable of listeners suggested there was a touch of the boom 'n' tizz about the sound of this duo.

Its MM disc input was marginally less grainy if anything, inferring a generous, big-hearted character to the sound. There was a general loss of fine detail but any cloudiness was evenly distributed and therefore quite inoffensive. Stereo depth was creditable too, allowing the listeners to easily identify individual strands in the music. Nevertheless this could not be described as a 'high resolution' combination. It was not quite as exciting nor as involving as, say, the Magnum amplifiers tested this month, but because it was very powerful it avoided any sense of stress or strain. Indeed this very relaxed and unfatiguing quality proved pivotal to its success in the listening tests. As a consequence music was conveyed in a confident but workmanlike fashion.

## Conclusions

Big, bold, gutsy and with a potent sting in its tail, Nikko's *Alpha 800* is the perennial party amp, provided you

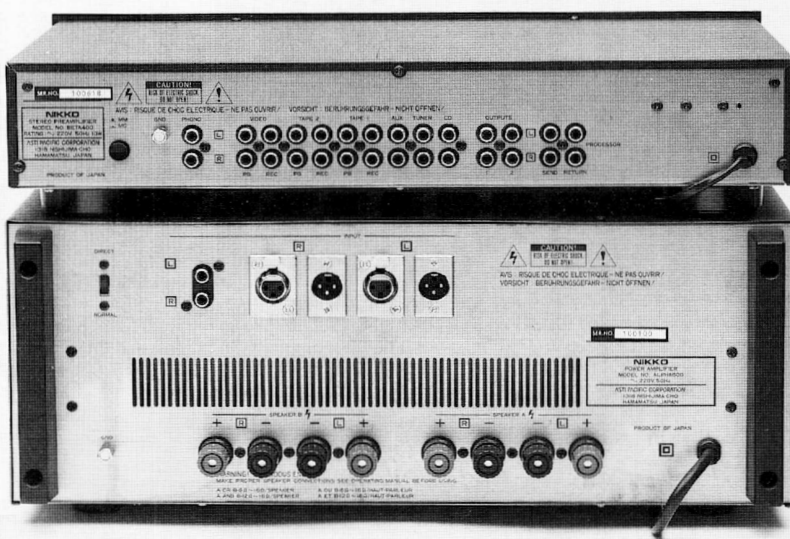
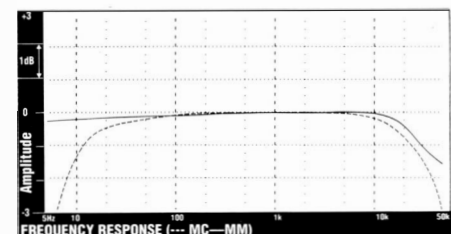
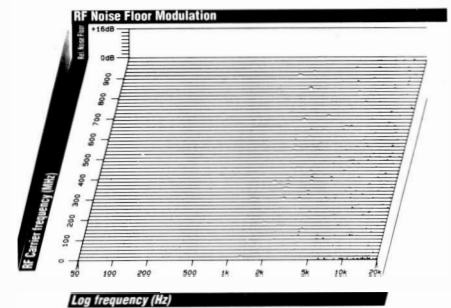
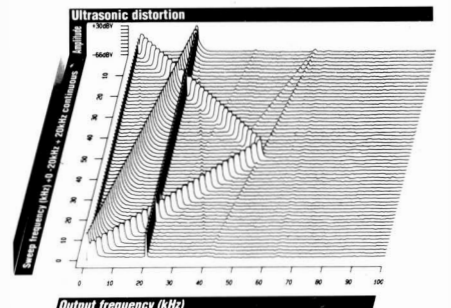
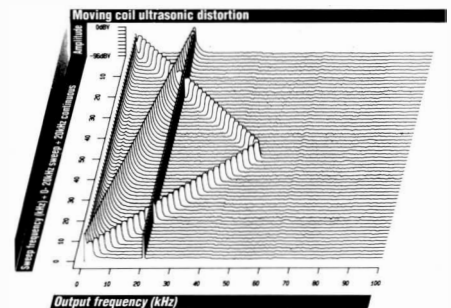
have speakers with sufficient bottle! To some extent finesse has been traded for brute force but the 400/800 combo remains a 'real hi-fi' product with built-in flexibility suited to good quality domestic as well as professional installations. Certainly these products should do much to re-establish Nikko's reputation for offering good value for money.

## TEST RESULTS

Preamplifier			
	Aux/CD	MM	MC
Stereo Separation (20Hz)	88.3dB	78.6dB	73.4dB
	(1kHz) 62.9dB	61.6dB	60.5dB
	(20kHz) 39.4dB	36.9dB	35.1dB
Channel Balance (1kHz, 0dBV)	0.15dB	0.14dB	0.08dB
	-20dBV) 0.25dB	0.31dB	0.17dB
	(-60dBV) 0.14dB	0.09dB	0.21dB
Total Har. Dist. (0dBV, 1kHz)	-101.1dB	-101.9dB	-102.0dB
	(20kHz) -87.3dB	-93.6dB	-92.9dB
CCIR Intermod. Dist. (1:1)	-92.7dB	-85.4dB	-84.9dB
Squarewave linearity			-112.5dB
Absolute Phase			Non-inverting
Additional Phase shift (20Hz)	18°30'	+2°30'	+10°30'
	(1kHz) 0°30'	-50°30'	-50°30'
	(20kHz)-25°0'	-104°30'	-118°30'
Noise (A wtd, 20Hz-20kHz)	-95.9dB	-90.2dB	-74.3dB
Residual noise (unwtd)	-102.2dBV	-102.2dBV	-102.1dBV
Input Sensitivity (for 0dBW)	100.8mV	1.619mV	169.4µV
Disc Overload (20Hz)	24.55mV	25.95mV	
	(1kHz)	218.2mV	22.80mV
	(20kHz)	171.7mV	192.9mV
	(50kHz)	1831mV	232.4mV
Input loading	88kohm/400pF	46kohm/340pF	102ohm
Preamp. Output (max)/Impedance		12.45V (disc)/61.2ohm	
Tape Output (max)/Impedance		13.65V (disc)/570.4ohm	
DC offset, left/right			0mV/0mV
Typical retail price			£225

## Power amplifier

	20Hz	1kHz	20kHz
Maximum Continuous Power Output, 8ohms	366.1W	358.3W	353.0W
4ohms	473.3W	529.7W	454.5W*
Dynamic Headroom (IHF)		+0.30dB	(383.5W)
Peak Current (5msec, 1% THD)			11.5A*
Output Impedance	0.064ohm	0.069ohm	0.089ohm
Damping Factor	125.2	116.8	89.6
Stereo Separation (0dBW)	106.6dB	104.6dB	84.2dB
Total Harm. Dist. (0dBW)	-89.2dB	-95.4dB	-85.5dB
	( $\frac{2}{3}$ power)	-85.5dB	-92.1dB
CCIR Intermodulation Distortion (0dBW)			-89.9dB
CCIR IM Distortion ( $\frac{2}{3}$ power)			-82.5dB
Rise Time (@ 10kHz)			700nsecs
Squarewave linearity			-106.2dB
Absolute Phase			Non-inverting
Noise (A wtd, 20Hz-20kHz) 0dBW			-77.7dB
	$\frac{2}{3}$ power		-99.8dB
Residual noise (unwtd)			-58.9dBV
Input Sensitivity (for 0dBW)			72.0mV
(for full output)			1381mV
Input loading			51kohm/570pF
DC offset, left/right			+9.7mV/+24.9mV
Typical retail price			£799



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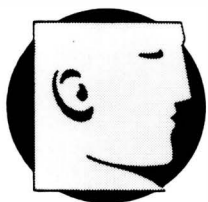
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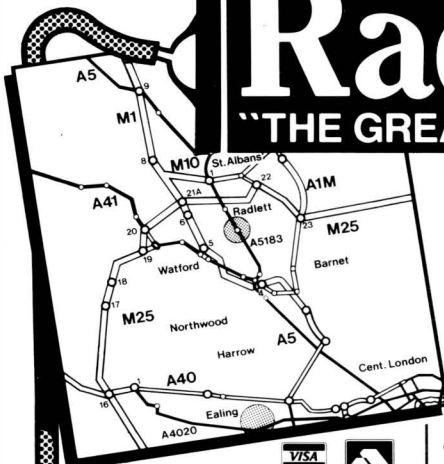
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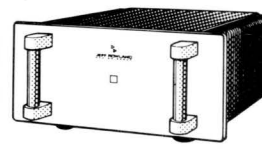
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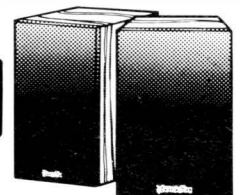
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# Onkyo A-8000

**Recommended**

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Cheapest in a comprehensive range of integrated and pre/power amplifier combinations, the *A-8000* still maintains Onkyo's reputation for rugged build quality. Pride of place on the brushed alloy fascia goes to a large rotary volume control which is flanked by a bank of logic controlled input selection keys. Two tape decks, three line sources and disc (MM only) are catered for with additional facilities including bass, treble and balance controls. Each of the latter is equipped with a nominal centre-detent position but are only truly defeated from the signal path once the amplifier's 'source direct' button is activated. In this instance all line-level sources (tuner, CD and Aux/video) are routed directly to the high-gain power amp via the volume control.

The wiring between the logic input switches, volume control, power amp, speaker selection switch and output terminals is performed with a light ribbon cabling – which is hardly ideal in a moderately powered amplifier. Still, Onkyo has specified a fully discrete voltage gain and power output stage, the latter using chunky A1490/C3854 devices from Sanken which are bolted onto a light cast-alloy heatsink. Though it features no thermal protection, the *A-8000* runs very cool in operation and incorporates some mild relay-activated electronic protection instead.

## Lab Report

A competent set of results was forwarded by the *A-8000*, including a healthy +1.6dB increase in power from 64W to 92W into 4 ohm and a substantial 14A current delivery limited only by the amp's protection circuitry. Channel balance was maintained to within 1dB limits all the way down to -60dB while the crosstalk held up to 60dB at 20kHz – a good result considering Onkyo's convoluted internal wiring.

Little RF sensitivity was observed though this has as much to do with the amp's tough input filtering (note the high input capacitance on all inputs) as any inherent open-loop linearity.

The 2.7mV disc input sensitivity and +30dB headroom are textbook results while the small, negative 2 degree phase shift observed at 20Hz tallies with the very extended bass response of the MM disc input. In fact the disc stage is only -0.4dB down at 5Hz!

## Sound Quality

Judging by the enthusiastic reaction of our panel I would say that Onkyo has hit upon a winner in the *A-8000*. In fact its surprisingly lusty and free-spirited presentation elicited a very positive 'subconscious' reaction from the listeners who were soon gently nodding their heads in approval of both CD and disc inputs. Indeed, the *A-8000* possessed a very consistent sound; it was critical of absolute level but once established washed over the listeners in a smooth, undemanding fashion.

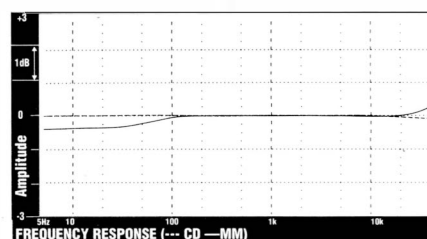
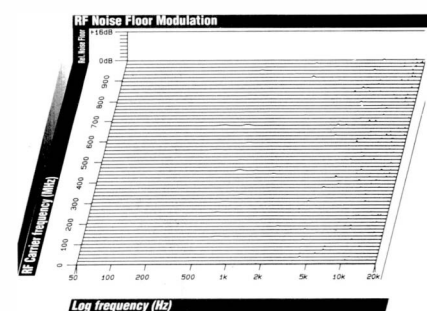
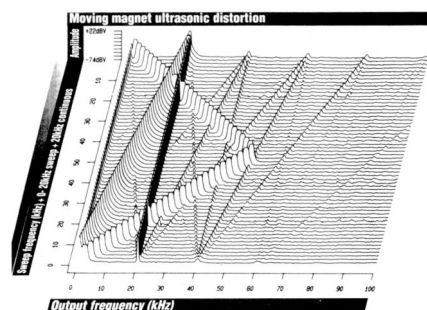
Clearly the amplifier was not perfect for it did lack a little musical richness or 'inner warmth'. One listener commented constructively on the free, transparent and crisp sound of the amp but still felt mildly 'cheated' of some elusive musical or emotive quality. Yet all admitted to being less concerned with its technical shortcomings once they had latched onto the music itself.

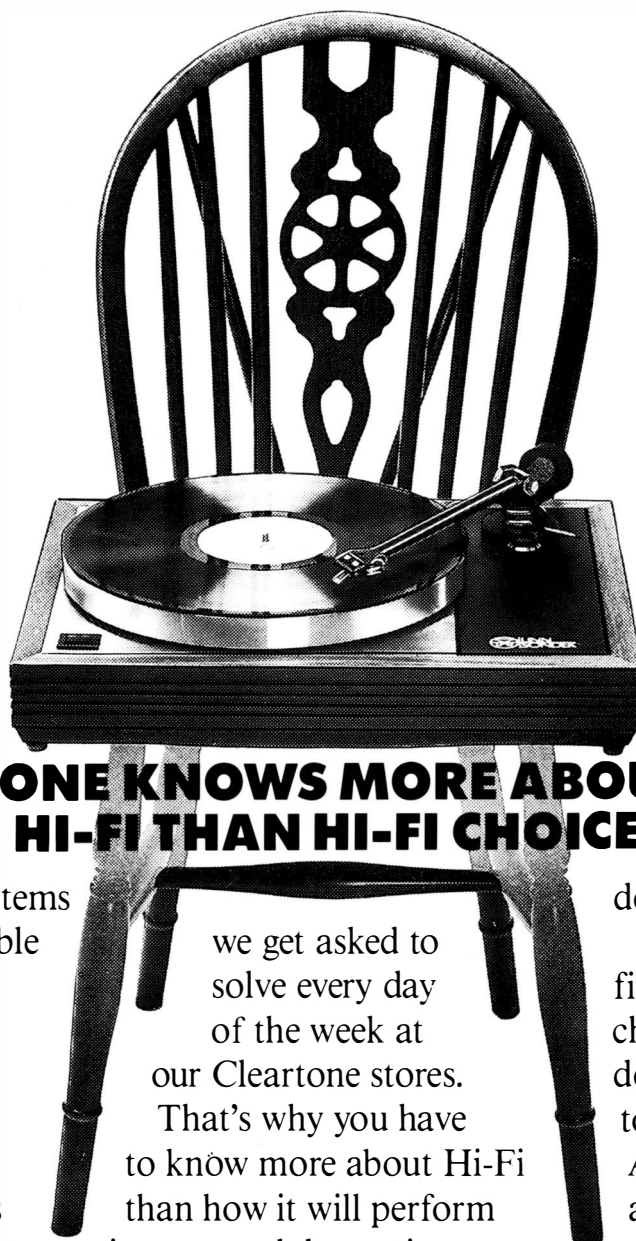
## Conclusions

Onkyo has done well to produce such a sensibly-equipped and beefy amplifier for what is a very modest price. Neither does the *A-8000* suffer any major technical weaknesses, and its protection circuitry is relatively non-invasive. As a result, the enthusiast on a tight budget could do far worse than audition this amplifier. Heartily Recommended.

## TEST RESULTS

	20Hz	1kHz	20kHz
<b>Maximum Continuous Power Output, 8ohms</b>	59.1W	64.0W	59.4W
<b>4ohms</b>	81.6W	92.1W	83.9W
<b>Dynamic Headroom (IHF)</b>		+1.10dB	(82.4W)
<b>Peak Current (5msec, 1% THD)</b>			13.9A*
<b>Output Impedance</b>	0.163ohm	0.164ohm	0.181ohm
<b>Damping Factor</b>	49.2	48.8	44.3
	<b>CD/Aux</b>	<b>mm</b>	
<b>Stereo Separation (20Hz)</b>	96.6dB	63.9dB	
<b>(1kHz)</b>	86.9dB	85.6dB	
<b>(20kHz)</b>	60.6dB	59.3dB	
<b>Channel Balance (1kHz, -20dBV)</b>	0.86dB	0.91dB	
<b>(-60dBV)</b>	0.49dB	0.66dB	
<b>Total Har. Dist. (0dBW)</b>	-86.7dB	-86.9dB	
<b>(<sup>2</sup>/3 power)</b>	-81.5dB	-83.5dB	
<b>CCIR Intermod. Dist. (0dBW)</b>	-85.9dB	-81.7dB	
<b>CCIR IM Dist. (<sup>2</sup>/3 power)</b>	-80.6dB	-76.5dB	
<b>Rise Time</b>			3.1µsecs
<b>Squarewave linearity</b>			-108.8dB
<b>Absolute Phase</b>			Non-inverting
<b>Noise (A wtd, 0dBW)</b>	-83.8dB	-77.4dB	
<b>(<sup>2</sup>/3 power)</b>	-94.9dB	-78.7dB	
<b>Residual noise (unwtd)</b>	-73.3dBV	-73.4dBV	
<b>Input Sensitivity (for 0dBW)</b>	21.5mV	333.5µV	
<b>(for full output)</b>	174.9mV	2.723mV	
<b>Disc Overload (20Hz)</b>		17.4mV	
<b>(1kHz)</b>		157.3mV	
<b>(20kHz)</b>		1485mV	
<b>(50kHz)</b>		3076mV	
<b>Tape Output/Impedance</b>		10.05V (disc)/2.61kohm	
<b>Input loading</b>		62kohm/610pF	44kohm/510pF
<b>DC offset, left/right</b>		+0.7mV/-1.5mV	
<b>Typical retail price</b>			£140





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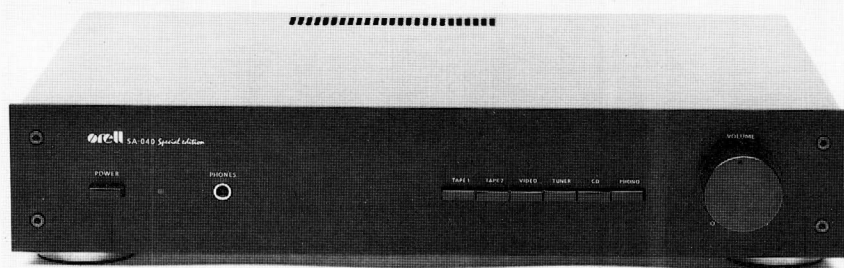
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# Orelle SA-040SE

ORELLE HI-FI, 58 THE BROADWAY, MILL HILL, LONDON NW7 3TE.  
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Based on the original Graham Nalty design, this latest version of the SA-040 integrated amplifier from Orelle (which has added an 'e' to its name to stop people calling the Company 'Oral!') features a host of improved internal components to 'audiophile grade' types. The basic topology of SA-040 amplifier has not really changed though the black alloy fascia now looks a little 'cleaner' with its new alloy volume control and row of input select buttons.

An extra line input has been included in this new 'SE' version at the expense of the CD-direct facility, while the proprietary 20x MC headamp is still switched at the rear of the case. The general construction of the amplifier is tidy enough but Orelle does not solder its spade connections and runs long lengths of circuit track to the input selectors. The silver-plated switches are clearly not being optimised.

Still, the amp does now benefit from a new dual-mono power supply together with audiophile 'tweaks' such as precision Holco resistors in the disc feedback network in addition to fancy LCR and Audiocap polypropylene capacitors. A similar Darlington power amp is employed though Orelle has reduced the amount of heatsinking over their original model, despite this version offering a higher power output.

## Lab Report

This SE version of the SA-040 did offer some extra 17W over its predecessor though its dynamic headroom remains pretty much the same at just +0.8dB. Peak current is limited by severe waveform distortion, offering just 3.6A @ 1 per cent THD and 4.1A @ 5 per cent THD. Indeed it is non-linearities of one form or another that dominate the performance. The RF IMD plot shows it is clearly very sensitive to RF noise in the 75-250MHz region - not good news as

this neatly straddles the busy FM radio allocation.

Under closed-loop conditions THD falls to just 0.0089-0.028 per cent via the CD input but deteriorates markedly through either disc stage. Orelle has bolstered the HF headroom of both MM and MC disc inputs but irregularities still persist. For example at 1kHz the overload margins for 1 per cent THD are +26.1dB and +21dB while for true clipping they are +30.8dB and +26.9dB (MM/MC) respectively.

## Sound Quality

An immediate reaction of our panel was to criticise the amplifier's disc input which sounded warm but also rather small-scale and strained. Vocals were not wholly articulate but seemed oddly 'pinched' according to one panelist, all listeners agreeing that it lacked the comparative freedom and fluidity enjoyed by the line stage.

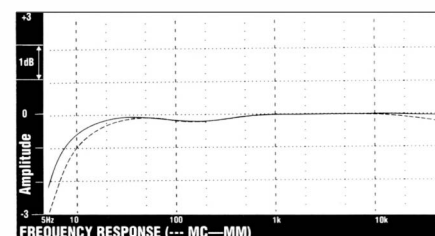
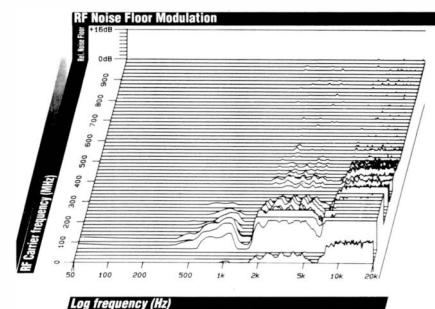
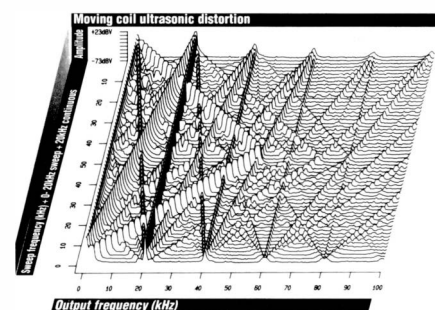
By contrast the CD input proved both natural and very easy-on-the-ear, possessing a comfortable overall balance if one that was a touch leaden in the bass. Our listeners were lulled but not excited by its sound which was relaxing rather than outwardly stimulating. The SA-040SE possesses a warm, subtle character not dissimilar to many valve amplifiers. In a system already on the lush or sweet side of neutral the SA-040SE could easily sound too reticent for its own good.

## Conclusions

It is difficult, in subjective terms at least, to reconcile the difference in performance between the CD and disc inputs. The former would certainly have a tempering influence on bright or aggressive-sounding systems, consequently the SA-040SE is clearly well worth auditioning by enthusiasts looking to assemble a relaxed, easy-on-the-ear system.

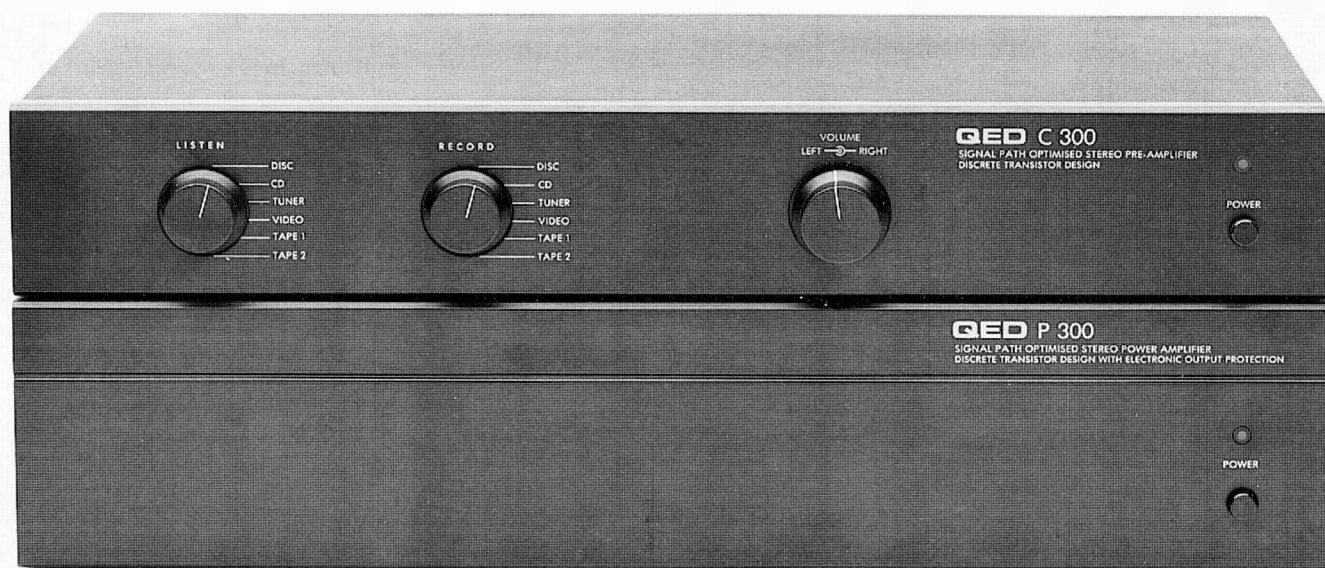
## TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output, 8ohms	64.6W	63.9W	62.5W
4ohms	98.5W	103.6W	98.5W
Dynamic Headroom (IHF)		+0.83dB	(77.3W)
Peak Current (5msec, 1% THD)			3.6A*
Output Impedance	0.028ohm	0.028ohm	0.028ohm
Damping Factor	281.4	282.5	284.5
Stereo Separation (20Hz)	88.3dB	73.2dB	49.6dB
(1kHz)	82.3dB	79.5dB	59.6dB
(20kHz)	51.1dB	49.2dB	47.3dB
Channel Balance (1kHz,			
-20dBV)	0.61dB	0.62dB	0.63dB
(-60dBV)	1.41dB	0.75dB	0.66dB
Total Har. Dist. (0dBW)	-81.3dB	-49.3dB	-44.4dB
(2/3 power)	-71.1dB	-48.7dB	-44.1dB
CCIR Intermod. Dist. (0dBW)	-80.3dB	-28.8dB	-21.2dB
CCIR IM Dist. (2/3 power)	-71.8dB	-28.3dB	-20.9dB
Rise Time			7.1µsecs
Squarewave linearity			-85.0dB
Absolute Phase			Non-inverting
Noise (A wtd, 0dBW)	-79.7dB	-76.4dB	-71.2dB
(2/3 power)	-93.3dB	-79.6dB	-72.1dB
Residual noise (unwtd)	-68.8dBV	-68.2dBV	-68.1dBV
Input Sensitivity (for 0dBW)	25.55mV	591.5µV	40.05µV
(for full output)	207.0mV	4.467mV	311.0µV
Disc Overload (20Hz)		14.35mV	997.7µV
(1kHz)		100.5mV	5.610mV
(20kHz)		323.5mV	18.18mV
(50kHz)		333.5mV	19.85mV
Tape Output/Impedance		4.310V (disc)/2.33kohm	
Input loading	48kohm/105pF	49kohm/150pF	100ohm/6.1nF
DC offset, left/right			-6.9mV/-14.5mV
Typical retail price			£399



# QED C300/P300

QED AUDIO PRODUCTS LTD., UNIT 12, SHIELD ROAD, ASHFORD IND.  
EST., MIDDX TW15 1AU. TEL: (07842) 46236.



Central to QED's product design has been a policy towards quick, flexible and cost-effective upgrading, a route now extended with the addition of its new C300/P300 pre/power combination. This is a versatile system, for not only is the power amplifier equipped with two sets of recessed 4mm sockets for bi-wiring, it is also possible to combine the left and right inputs converting the P300 into a dual-mono amplifier. Two P300s would then be required for true bi-amp operation of loudspeakers equipped with split crossovers.

Options are also available. For instance a stereo P300 power amp may be driven via the 'Pre-out' terminals of QED's established A240II and A270 integrated amplifiers. High and low input sensitivity options are provided on the P300 power amp to ensure that the power level of both A240II, A270 and P300 are all accurately balanced!

Independent input selection and record-out switching is provided for disc and five line level sources, while a friction-locked dual-concentric volume control completes the package. QED has omitted a headphone socket on this occasion, while certain improvements, such as the use of a conductive plastic volume potentiometer distinguishes the basic design of the C300 from the A240.

Perhaps of greater significance is the inclusion of QED's long awaited *Premium Analogue* MM/MC disc board, a move predicted in an earlier issue of *Choice*. Fortunately owners of A240 or

A270 integrated amplifiers equipped with the older SA board may upgrade to PA status in a generous part-exchange scheme. Once again, upgradability is the key.

The PA add-on disc board is still fed from a single-rail power supply, but now features LM317LZ regulators for both the MM and MC input buffers as well as the part-active part-passive RIAA eq stage. Low noise Hitachi transistors are now used throughout the circuit (they were previously only used in the MC headamp) while the RIAA network is biased via an independent constant current source to minimise local variations in the power supply. Similar active biasing techniques are now employed in the line stage which is otherwise identical to that found in the A240II. Tweak components like polypropylene and metallised polyester coupling capacitors are sprinkled through the disc network.

QED's power amplifier has been developed from the A270 integrated model and, logically enough, shares the same PCB. The dual-rail power supply is a fairly chunky affair and features improved decoupling techniques over the basic A270 design. Add to this an extended bandwidth (-3dB @ 80kHz), improved slew-rate limits and a more linear differential input stage, an increased overall gain of 40dB and a new SGS Darlington output stage and the P300 certainly begins to look more refined than either of QED Audio's inte-

grated amplifiers.

## Lab Report

A characteristic feature of QED's earlier SA disc board centred around the premature slew-limiting of the MC headamp – a feature not entirely ameliorated with the PA specified circuit. As a result THD deteriorates from 0.038 per cent to 0.085 per cent to 0.33 per cent from CD through MM and then MC inputs (all at 20kHz). CCIR follows a similar trend, emerging at 0.64 per cent via the MC stage.

The output impedance of the preamp is rather high at 3.4k ohm due to a collector load resistor in the line-out stage, though separation, phase, channel balance and A-wtd noise are all fine. Unfortunately the P300 power amp is not so lucky, the proximity of the rectifier to the mains transformer giving rise to strong hum products that compromise the -76.3dB A-wtd noise figure (ref 1W).

Power output falls at low frequencies into lower impedances but a 97W mid-band rating into 4 ohm together with a healthy 17A peak current should stand it in good stead. Output impedance and separation figures are good too. THD hovers around the 0.18 per cent mark at medium power levels though, as the 3D plot shows, IMD increases with frequency and decreasing load impedance. RF sensitivity also needs to be redressed, the P300 showing sensitivity to noise in the 200, 575 and 720MHz regions.



## Sound Quality

Auditioned immediately after a long series of integrated amplifiers our listeners were genuinely struck by the increase in authority, separation and control offered by this unassuming pre/power combination. Used in its optimum dual-mono mode (with two P300s), most of the subtle twists and turns in the listening programme were faithfully revealed even though, in absolute terms, there was a loss of refinement.

Via the CD input, for instance, its presentation of subtle treble sounds was not quite as sweet or pure as possible, tending to a slight coarseness or excessiveness at very high frequencies. By contrast the bass was taught and dry, not fullsome or grumbling but perfectly able to follow-through the attack of bass transients. Indeed, the power amp gave the impression of being far beefier than its modest rating would suggest.

Spatially, too, the combination performed fairly well, portraying instruments with a more realistic sense of scope and proportion than was usual with many of the integrated amps. Nevertheless there was a certain lack of finesse about its sound reproduction, a mild-mannered crudeness particularly apparent with well-recorded vocals which lacked the breathing, open quality available from our CD source.

The disc input was marginally sweeter but was also possessed of a certain signature, a subtle coloration that made even the most diverse of recordings sound a little 'samey'. This feature was highlighted by the MC input, despite it sounding very acceptable in general terms.

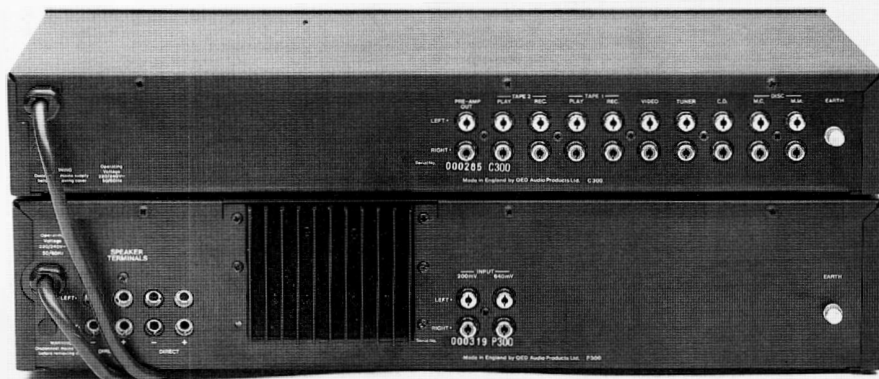
## Conclusions

From the consumer's viewpoint the C300/P300 represents a very cost-effective demonstration of the merits of separates vs integrated amplification. Compared to many of the integrated amps tested this month this pre/power combo certainly offered a worthwhile jump in subjective quality.

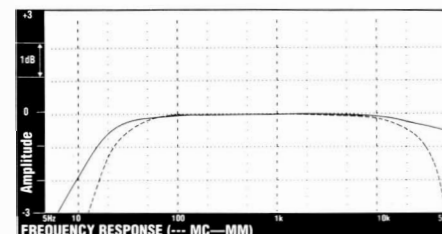
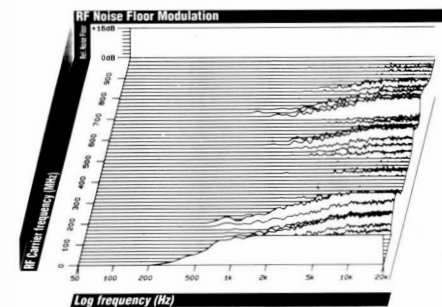
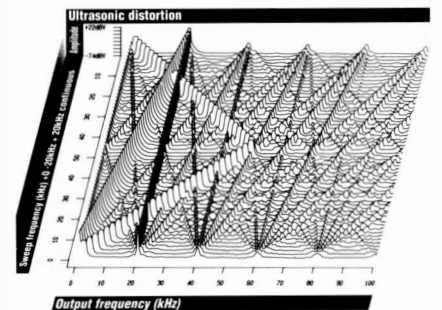
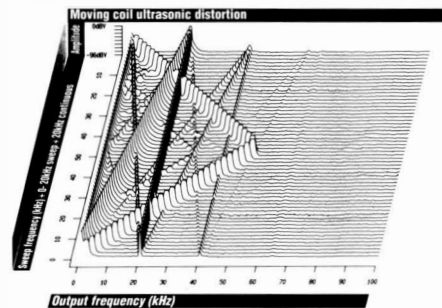
The versatility of this combination, a big bonus for those enthusiasts who already own QED equipment, goes a long way in redressing our mild subjective criticisms. With value uppermost in our minds, the C300/P300 must surely warrant a very positive *Choice* recommendation.

## TEST RESULTS

	Aux/CD	MM	MC
Stereo Separation (20Hz)	92.8dB	88.5dB	76.5dB
	(1kHz) 75.4dB	70.4dB	72.8dB
	(20kHz) 50.4dB	51.9dB	51.2dB
Channel Balance (1kHz, 0dBV)	0.02dB	0.02dB	0.02dB
	-20dBV) 0.07dB	0.04dB	0.02dB
	(-60dBV) 0.11dB	0.07dB	0.04dB
Total Har. Dist. (0dBV, 1kHz)	-85.7dB	-76.3dB	-63.3dB
	(20kHz) -68.5dB	-61.4dB	-49.7dB
CCIR Intermod. Dist. (1:1)	-81.7dB	-51.7dB	-37.8dB
Squarewave linearity			-103.7dB
Absolute Phase			Inverting
Additional Phase shift (20Hz)	0°0'	+11°0'	+7°0'
	(1kHz) 0°0'	-50°30'	-46°30'
	(20kHz) -7°0'	-90°0'	-90°0'
Noise (A wtd, 20Hz-20kHz)	-104.8dB	-83.6dB	-81.1dB
Residual noise (unwtd)	-106.7dBV	-106.0dBV	-106.0dBV
Input Sensitivity (for 0dBW)	605.7mV	10.95mV	501.2µV
Disc Overload (20Hz)	26.55mV	1.313mV	
	(1kHz)	239.7mV	10.87mV
	(20kHz)	1170mV	34.55mV
	(50kHz)	1234mV	34.65mV
Input loading	13kohm/20pF	67kohm/260pF	674ohm/10nF
Preamp. Output (max)/Impedance	3.955V (disc)/3.39kohm		
Tape Output (max)/Impedance	8.395V (disc)/4.85kohm		
DC offset, left/right		+2.1mV/-4.6mV	
Typical retail price			£299



Power amplifier	20Hz	1kHz	20kHz
Maximum Continuous Power Output, 8ohms	51.8W	58.0W	57.8W
4ohms	77.3W	96.8W	95.9W
Dynamic Headroom (IHF)	+0.85dB (70.5W)		
Peak Current (5msec, 1% THD)	17.1A		
Output Impedance	0.019ohm	0.049ohm	0.038ohm
Damping Factor	429.9	164.9	211.9
Stereo Separation (0dBW)	101.5dB	96.9dB	74.2dB
Total Harm. Dist. (0dBW)	-61.7dB	-67.9dB	-57.6dB
	( <sup>2</sup> / <sub>3</sub> power)	-56.8dB	-59.3dB
CCIR Intermodulation Distortion (0dBW)	-75.0dB		
CCIR IM Distortion ( <sup>2</sup> / <sub>3</sub> power)	-83.7dB		
Rise Time (@ 10kHz)	5µsecs		
Squarewave linearity	-72.9dB		
Absolute Phase	Non-inverting		
Noise (A wtd, 20Hz-20kHz) 0dBW	-76.3dB		
	( <sup>2</sup> / <sub>3</sub> power)	-90.4dB	
Residual noise (unwtd)	-56.9dBV		
Input Sensitivity (for 0dBW)	29.15mV (146.5mV)		
	(for full output)	226.5mV (1124mV)	
Input loading	75kohm/80pF (224kohm/20pF)		
DC offset, left/right	+14.4mV/-13.1mV		
Typical retail price	£299		



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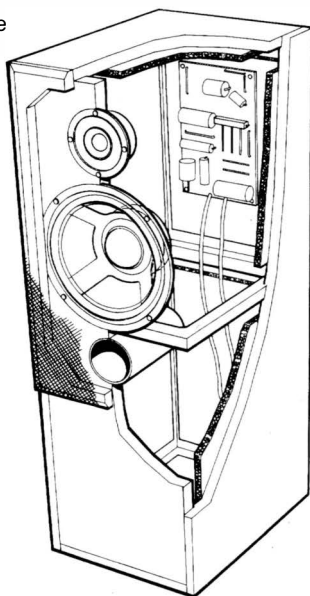


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# Rotel RA-820BX4

**Recommended**

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In common with the RA-840BX4 amplifier reviewed in our last amplifiers issue, the RA-820 series has also metamorphosed into BX4 form. The amp features a solid alloy fascia and renounces bass/treble controls in favour of simple input select, tape monitor and mono/stereo mode facilities.

A friction-locked dual-concentric volume control is still employed though both the value (now 20kohm) and law of the potentiometer have been changed to give it a more conventional operating range. This is particularly important as there is no active line stage, all CD, tape, tuner and Aux sources being routed directly to the high-gain power amp via the volume control. The output section is still based around chunky Sanyo power transistors but Rotel has now included separate supply regulation for both high and low-level sections.

Paralleling the RA-840BX4, the printed circuit board substrate in the '820BX4 has been changed for the better and the tracks have been relaid in an entirely symmetrical pattern. This technique certainly tends to improve stereo imagery and transparency, just as reducing the value of the reservoir electrolytics has 'quickened' the pace of the amp. The symmetrical MM/MC disc input still utilises four Signetics NE5534AN op-amps though function-polymer caps now couple the disc buffer and shunt-feedback RIAA equalisation circuits.

Since we mentioned these 'Apycaps' in the March 1990 issue, it appears that no less than 20 UK hi-fi manufacturers have sought to contact the producers in Japan. A tribute to Rotel's pioneering spirit, if nothing else ...

## Lab Report

Close technical ties exist between this and the RA-840BX4; just look at the 'fingerprint' similarity in the 3D distortion plot despite it being run (in this

instance) at a level that reflects its lower 65W/4ohm power output.

Once again the line input (ie the power amp) is phase-inverting, so experimenting with speaker phasing could prove useful. Furthermore the THD observed during the peak current test never fell below 1.3 per cent, and made a sudden leap to 2 per cent at the quoted 15.5A – this is another quirk of the BX4-series amplifiers! The amp's RF sensitivity could also stand improvement, currently demodulating noise at 175, 280 and 450MHz (see RF IMD plot).

## Sound Quality

In common with many other Rotel amplifiers the RA-820BX4 was possessed of an almost creamy smoothness. The spatial information made available by our PDM CD source was, largely, utilised by the amp's CD input though it was not as impressive as the company's RA-820AX amp in this respect.

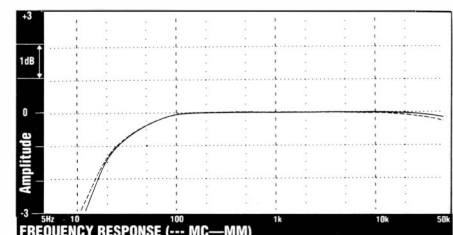
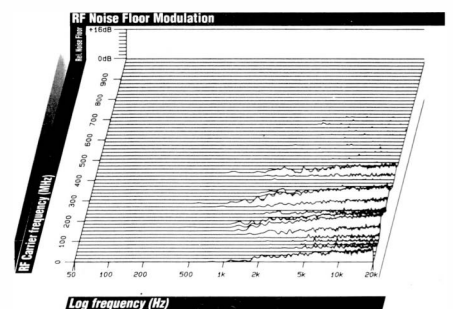
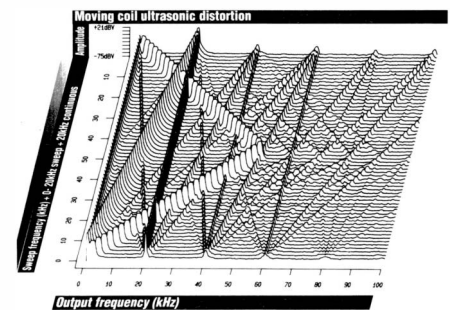
One listener thought this was just about the best amp of those he had heard in our tests, commenting on its lack of 'sharp edges', excellent sense of integration and thoroughly relaxing presentation. Both CD and MM inputs shared this beguiling quality which placed no particular emphasis on any one part of the musical spectrum, revealing subtle timbral and ambient nuances with a refinement that was both gentle as well as lucid.

## Conclusions

In many respects this RA-820BX4 provides the costlier '840BX4 with food for thought, yet it just fails to grasp the 'magic' of either the cheaper RA-820AX (reviewed in our March 1990 issue) or indeed the Mission *Cyrus One* – particularly via CD. It misses a *Choice Best Buy* vote by the narrowest of margins, but its delightfully musical quality guarantees the heartiest of recommendations.

## TEST RESULTS

	20Hz	1kHz	20kHz
<b>Maximum Continuous Power Output, 8ohms</b>	37.1W	39.4W	38.1W
<b>4ohms</b>	57.6W	64.9W	60.5W
<b>Dynamic Headroom (IHF)</b>	+0.87dB (48.2W)		
<b>Peak Current (5msec, 1% THD)</b>	15.5A*		
<b>Output Impedance</b>	0.067 ohm	0.076 ohm	0.073 ohm
<b>Damping Factor</b>	119.3	104.8	108.9
	<b>CD/Aux</b>	<b>mc</b>	
<b>Stereo Separation (20Hz)</b>	106.4dB	92.9dB	72.7dB
<b>(1kHz)</b>	80.9dB	85.8dB	72.5dB
<b>(20kHz)</b>	56.2dB	59.1dB	58.7dB
<b>Channel Balance (1kHz,</b>			
<b>-20dBV)</b>	0.18dB	0.07dB	0.02dB
<b>(-60dBV)</b>	5.19dB	3.95dB	3.51dB
<b>Total Har. Dist. (0dBW)</b>	-76.3dB	-76.5dB	-76.9dB
<b>(<sup>2</sup>/3 power)</b>	-72.4dB	-72.3dB	-71.9dB
<b>CCIR Intermod. Dist. (0dBW)</b>	-76.4dB	-72.4dB	-71.1dB
<b>CCIR IM Dist. (<sup>2</sup>/3 power)</b>	-73.7dB	-71.2dB	-70.5dB
<b>Rise Time</b>	2.1 μsecs		
<b>Squarewave linearity</b>	-97.6dB		
<b>Absolute Phase</b>	Inverting (line only)		
<b>Noise (A wtd, 0dBW)</b>	-80.2dB	-79.5dB	-67.0dB
<b>(<sup>2</sup>/3 power)</b>	-92.6dB	-84.7dB	-67.5dB
<b>Residual noise (unwtd)</b>	-66.7dBV	-66.5dBV	-66.6dBV
<b>Input Sensitivity (for 0dBW)</b>	42.45mV	582.5 μV	61.25 μV
<b>(for full output)</b>	270.2mV	3.582mV	385.0 μV
<b>Disc Overload (20Hz)</b>	19.05mV	1.979mV	
<b>(1kHz)</b>	154.0mV	16.00mV	
<b>(20kHz)</b>	1456mV	150.9mV	
<b>(50kHz)</b>	1355mV	144.5mV	
<b>Tape Output/Impedance</b>	11.38V (disc)/1.14kohm		
<b>Input loading</b>	19.8kohm/90pF	47kohm/180pF	178ohm/1.2nF
<b>DC offset, left/right</b>	+12.5mV/+11.9mV		
<b>Typical retail price</b>	£190		



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# Sansui AU-X911DG

**Recommended**

EJAM LTD., 73-75 GROVE ROAD, SOUTH WOODFORD, LONDON  
E18 2JY. TEL: (081) 530 6425.



This hulking brute of an amplifier currently resides at the top of Sansui's range, offering a wealth of facilities including on-board D-to-A conversion. Sansui has opted for an early MASH/PWM DAC manufactured by NTT/Technics, a 'bitstream' derivative that it markets under the name 1-bit LCDS (Linear and Direct D-to-A Conversion).

The luxuriously appointed fascia is split into two levels, the upper level finished in a glossy piano black and equipped with a motorised volume control together with input selection for four digital sources (three coaxial and one optical), three line sources and both MM and MC phono cartridges. Full remote-control operation is possible as a result of the CMOS logic employed for input switching.

The lower portion of the fascia is decked out with tone and balance controls, a loudness contour and independent record-out selection for up to three tape machines. Both 'source' and 'digital direct' facilities enable much of this peripheral circuitry to be bypassed.

Inside, the amp's differential input right through to the complementary output stage is fully balanced, conferring a high common-mode rejection ratio. In practice this means the AU-X911DG enjoys considerable isolation from any internally derived noise, whether from the huge power supply or RF noise produced by the digital circuitry.

## Lab Report

There is little to report here, for the amplifier appears reasonably load tolerant, enjoys a very low A-wtd noise of -106dB via CD and -85dB via MC, offers sensible input sensitivities (2.8mV for MM/0.2mV for MC) and plenty of headroom (+32.9dB and +29.2dB respectively). THD lies in the region of 0.0017-0.0056 per cent while IMD, as evidenced

by the 3D plot, climbs a little higher. Some 'patches' of intermodulation distortion are revealed, implying an unusual frequency dependent non-linearity.

## Sound Quality

Detailed listening revealed a disparity between the sound of the AU-X911DG when auditioned via its conventional analogue (CD) input and its alternative PWM digital input. Indeed, perhaps as a result of its balanced operating mode, the amplifier actually performed at its best with the on-board DAC in service. Fed from the digital output of our Arcam D170 transport this amp provided a very well balanced, inherently neutral and emotively charged sound.

The natural timbres of strings were preserved alongside the raw edginess of brass instruments, for example, while strong bass notes enjoyed a fine sense of depth, weight and impact. Moreover, the quiet and very transparent sound-stage increased in both scope and stature with greater volume, swelling to fully occupy the room rather than becoming objectionably forward.

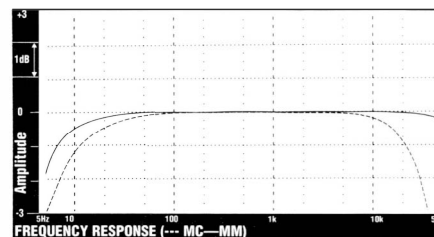
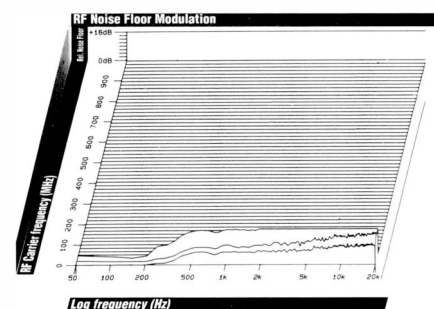
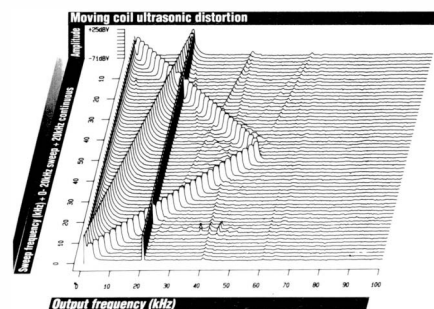
By contrast, the amp tended to lose its grip and sense of integration when used via its analogue inputs. Our listeners found it necessary to concentrate that bit harder on the threads of the music, a requirement that will ultimately lead to fatigue over extended periods.

## Conclusions

Sansui has certainly packed an awful lot of technology into a very luxurious package here. In material terms, at least, it more than justifies the price. Subjectively, however, its performance was less cohesive - fabulous via the digital input, but a little messy in its handling of conventional analogue sources. As a result I am bound to qualify its recommendation, encouraging all power-hungry 'digiphiles' to go have a listen.

## TEST RESULTS

	20Hz	1kHz	20kHz
<b>Maximum Continuous Power Output, 8ohms</b>			
40hms	111.0W	111.9W	109.9W
	161.0W	164.8W	158.7W
<b>Dynamic Headroom (IHF)</b>		+1.16dB	(146.2W)
<b>Peak Current (5msec, 1% THD)</b>			19.2A
<b>Output Impedance</b>	0.066ohm	0.062ohm	0.082ohm
<b>Damping Factor</b>	120.4	129.6	97.6
	<b>CD/Aux</b>	<b>mm</b>	<b>mc</b>
<b>Stereo Separation (20Hz)</b>	99.2dB	77.9dB	63.6dB
(1kHz)	79.7dB	75.0dB	69.0dB
(20kHz)	53.9dB	49.8dB	45.3dB
<b>Channel Balance (1kHz, -20dBV)</b>	0.24dB	0.22dB	0.21dB
(-60dBV)	4.95dB	5.32dB	5.44dB
<b>Total Har. Dist. (0dBW)</b>	-95.4dB	-88.6dB	-87.1dB
( <sup>2</sup> / <sub>3</sub> power)	-89.9dB	-85.2dB	-84.8dB
<b>CCIR Intermod. Dist. (0dBW)</b>	-82.9dB	-73.4dB	-72.7dB
<b>CCIR IM Dist. (<sup>2</sup>/<sub>3</sub> power)</b>	-78.0dB	-68.1dB	-68.3dB
<b>Rise Time</b>			5.5µsecs
<b>Squarewave linearity</b>			-102.5dB
<b>Absolute Phase</b>			Non-inverting
<b>Noise (A wtd, 0dBW)</b>	-92.4dB	-87.7dB	-83.8dB
( <sup>2</sup> / <sub>3</sub> power)	-105.5dB	-88.7dB	-84.5dB
<b>Residual noise (unwtd)</b>	-84.5dBV	-84.2dBV	-84.1dBV
<b>Input Sensitivity (for 0dBW)</b>	15.75mV	290.9µV	19.48µV
(for full output)	168.4mV	2.838mV	196.8µV
<b>Disc Overload (20Hz)</b>		24.72mV	1.611mV
(1kHz)		221.6mV	14.40mV
(20kHz)		1509mV	95.85mV
(50kHz)		1945mV	97.56mV
<b>Tape Output/Impedance</b>		12.52V (disc)/941ohm	
<b>Input loading</b>	13.5kohm/320pF	47kohm/160pF	85ohm
<b>DC offset, left/right</b>			-0.2mV/+0.1mV
<b>Typical retail price</b>			£480



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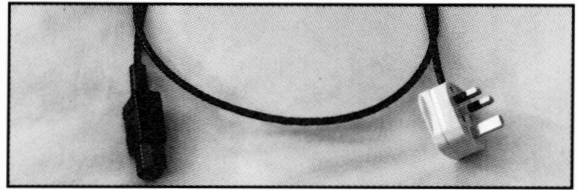
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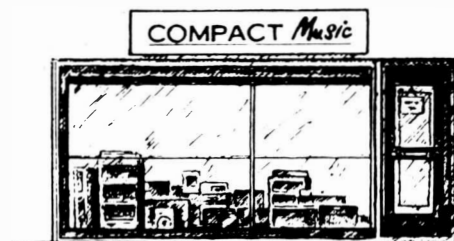
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# Sony TA-F410R

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At first sight the TA-F410R looks just like any other mass-produced integrated amplifier. Its feature count includes independent controls for input and record-out selection, catering for two tape decks, three line sources and a single MM phono cartridge. Conventional balance and bass/treble tone controls are also provided, all defeatable with Sony's 'source direct' facility in operation. There are even two sets of decent 4mm binding posts.

However, the solid alloy fascia of the TA-F410R also conceals an infra-red eye, enabling adjustment of volume and input selection via an RM-S310 system remote control. A sync port on the rear of the amp links it with other Sony separates for overall system control. This also explains why the input selection is achieved via a row of logic-controlled keys rather than the mechanical control provided for record-out selection.

Inside, the TA-F410R is graced with audio grade power supply capacitors and, though integrated circuits are used for disc equalisation and driver circuits, the tone controls are wholly passive and the output stage discrete, composed of complementary Sanken transistors.

## Lab Report

Safety plays an important role in the design of the TA-F410R, so much so that its output into 4 ohm loads actually falls some -1dB below the output into 8 ohm at just 68W. Nevertheless the protection systems do not entirely smother the performance of the amp, their finite operating time allowing through a peak current of 9.2A over a 5msec period into 1 ohm, equivalent to nearly 85W.

Stereo separation deteriorated at high frequencies while the output impedance was universally high, both casualties of the speaker selection facility. This said the disc response was sensibly tied to a -3dB point of 10Hz while channel bal-

ance, noise and input sensitivity figures were all beyond reproach.

The 3D plot highlights a variety of mild 2nd to 4th-order summation IM routes while the CD input (slugged with a huge 1.7nF parallel capacitance) appears to employ the brute force approach to RF filtering! Interestingly, the other line inputs are not so concertedly filtered and so sound rather different as a result.

## Sound Quality

The overall balance of this amplifier was thought to be a little on the lean and hard side of neutral, causing our saxophone CD to grate after a time even though bass notes enjoyed a good sense of speed and focus.

There was some considerable disagreement among our panelists auditioning the '410R. One listener was quite taken with the amp's vocal reproduction, which he thought to be both articulate, focused and believable. Others felt the sound was rather ragged at the frequency extremes, lacking the 'fluidity of PDM' from our CD source and so failing to capture their attention in the way of superior products. In my opinion this latter reaction was the more realistic, particularly when later auditioning the amp with a wider selection of music.

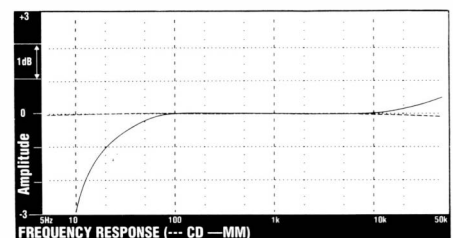
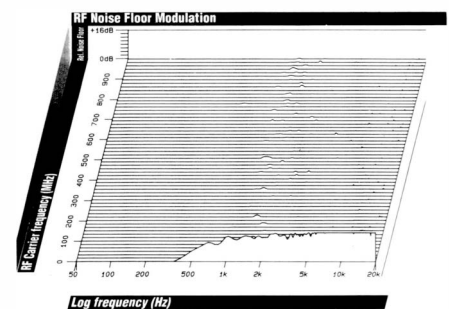
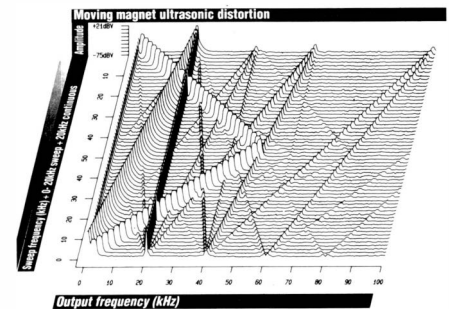
The disc input elicited a similar disparity in feelings between the panel members though all agreed, in general terms, that the MM stage was less crystalline, dynamic or 'full' than the line (CD) input.

## Conclusions

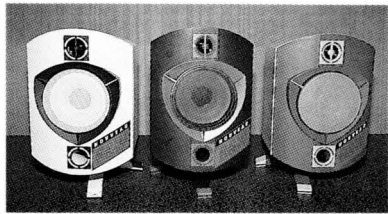
It seems churlish to criticise what is essentially a feature-orientated product. Indeed, bearing in mind its infra-red remote control flexibility, reasonably low cost and broadly acceptable sound quality, many listeners will find it well worth consideration.

## TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output, 8ohms	85.1W	84.2W	77.1W
4ohms	64.4W*	67.6W*	69.5W*
Dynamic Headroom (IHF)		+1.20dB (110.9W)	
Peak Current (5msec, 1% THD)			9.2A
Output Impedance	0.237ohm	0.244ohm	0.280ohm
Damping Factor	33.8	32.8	28.6
	CD/Aux	mm	
Stereo Separation (20Hz)	86.6dB	77.9dB	
(1kHz)	64.4dB	65.1dB	
(20kHz)	40.3dB	40.4dB	
Channel Balance (1kHz, -20dBV)	0.88dB	0.98dB	
(-60dBV)	0.21dB	0.26dB	
Total Har. Dist. (0dBV)	-87.5dB	-83.9dB	
(2/3 power)	-77.3dB	-78.1dB	
CCIR Interm. Dist. (0dBV)	-87.2dB	-81.5dB	
CCIR IM Dist. (2/3 power)	-83.0dB	-78.4dB	
Rise Time			3.1µsecs
Squarewave linearity			-75.7dB
Absolute Phase			Non-inverting
Noise (A wtd, 0dBV)	-79.9dB	-75.3dB	
(2/3 power)	-92.9dB	-76.9dB	
Residual noise (unwtd)	-70.9dBV	-71.1dBV	
Input Sensitivity (for 0dBV)	18.79mV	256.5µV	
(for full output)	172.5mV	2.329mV	
Disc Overload (20Hz)		7.439mV	
(1kHz)		66.75mV	
(20kHz)		588.2mV	
(50kHz)		1255mV	
Tape Output/Impedance		4.833V (disc)/1.27kohm	
Input loading		34kohm/1.7nF	50kohm/235pF
DC offset, left/right			-0.5mV/-0.6mV
Typical retail price			£170



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# Teac AX-400

TEAC (UK) LTD., 5 MARLIN HOUSE, THE CROXLEY CENTRE, WATFORD, HERTS WD1 8YA. TEL: (0923) 225235.



Perhaps better known in the UK for its cassette decks and, more recently, CD players, Teac also markets a small range of amplifiers. The AX-400 is a new entry-level model which, superficially at least, is built to a higher standard than many of Teac's previous designs. Still, despite the tasteful brushed alloy fascia and chunky alloy heatsinking, the general 'feel' of the amp was diminished by a wobbly volume control.

The cost of the amplifier has been minimised by resorting to ICs wherever possible – including the disc equalisation circuits, tone controls and logic-based input selection. A row of buttons on the fascia distinguish between tape, tuner, CD and phono sources while a more notable feature is a microphone input with dedicated attenuator.

Teac has included the mandatory 'CD-direct' switch. Oddly enough, however, while this bypasses the input selector, balance and loudness facilities, the bass and treble tone-control circuitry remains in circuit until the tone-defeat option is also exercised.

Teac has opted for a discrete power amplifier, which is a bonus even if the speaker select wiring does wend its way around the mains transformer!

## Lab Report

With bias levels as low as 7mV (across 0.44ohm) the closed-loop linearity of the integral power amp is assured with judicious use of feedback, so much so that even at very low signal levels (where crossover artefacts would otherwise dominate) THD hovers around 0.002 per cent.

There is a marginal increase in THD and IMD with frequency and level but the amp is more sensitive to impedance. Specifically Teac has incorporated some very stringent VI limiting circuitry which allows some 59W into 8ohm but actually causes a reduction of 1dB to

47W into 4ohm. The maximum current delivered into 1ohm is just 2.6A.

The MM disc input sensitivity is about average as is the +28.7dB headroom, though the disc response itself is a little odd showing a +0.4dB bump at 110Hz and an extended subsonic output that is only -1dB down at 5Hz. Disc and line input loading capacitances are rather high, this a reflection of Teac's primitive – if effective – RF filtering.

## Sound Quality

With tone controls in circuit there was an undeniable shift in imagery towards the left of the soundstage, though this skewing effect abated once the tone controls were properly defeated. In this optimum 'direct' mode the AX-400 sounded pleasant enough, certainly comfortably detailed and mellow in tone.

This said, there was some sibilance added to strong female vocals while all our listeners felt the 'PDM sound' from our CD source seemed to elude the amplifier. Music was conspicuously safe and undemanding but it lacked any natural breathing quality or 'life'. There was also some concern over the amplifier's ability to convey a solid sense of rhythm, for a hint of leanness in the bass tended to compromise the solid foundation of the music.

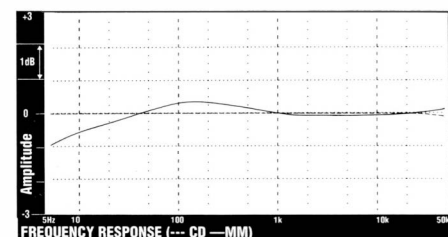
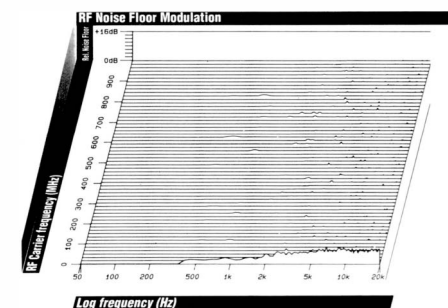
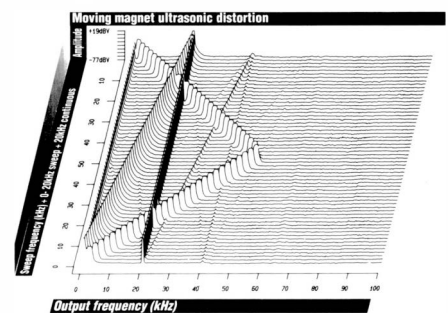
Teac's integrated disc stage followed a similar pattern, though displaying a further loss of detail together with a coarser overall balance. Its performance was not poor by any standards, just a little bland and lacking in refinement.

## Conclusions

Offering a matter-of-fact and inoffensive sound rather than one that is immediately beguiling, the performance of the AX-400 is certainly creditable for the price. If you're shopping for a low cost amplifier it's well worth considering.

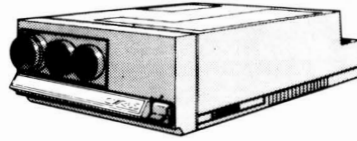
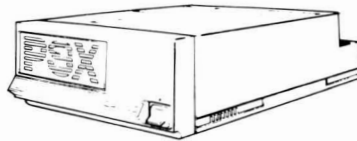
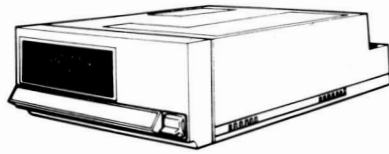
## TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output, 8ohms	52.3W	59.1W	56.8W
4ohms	40.0W	46.9W	46.8W
Dynamic Headroom (IHF)		+1.00dB	(74.4W)
Peak Current (5msec, 1% THD)			2.6A*
Output Impedance	0.326ohm	0.332ohm	0.330ohm
Damping Factor	24.5	24.1	24.3
Stereo Separation (20Hz)	84.9dB	67.2dB	
(1kHz)	70.5dB	71.7dB	
(20kHz)	44.5dB	44.8dB	
Channel Balance (1kHz, -20dBV)	0.91dB	0.88dB	
(-60dBV)	3.64dB	3.46dB	
Total Har. Dist. (0dBW)	-91.6dB	-94.4dB	
( <sup>2</sup> / <sub>3</sub> power)	-86.1dB	-87.6dB	
CCIR Intermod. Dist. (0dBW)	-85.3dB	-84.1dB	
CCIR IM Dist. ( <sup>2</sup> / <sub>3</sub> power)	-82.9dB	-81.3dB	
Rise Time			5.1µsecs
Squarewave linearity			-100.0dB
Absolute Phase			Non-inverting
Noise (A wtd, 0dBW)	-78.8dB	-74.5dB	
( <sup>2</sup> / <sub>3</sub> power)	-93.5dB	-76.7dB	
Residual noise (unwtd)	-71.1dBV	-70.7dBV	
Input Sensitivity (for 0dBW)	23.45mV	378.7µV	
(for full output)	183.5mV	3.015mV	
Disc Overload (20Hz)		15.21mV	
(1kHz)		136.9mV	
(20kHz)		1314mV	
(50kHz)		2723mV	
Tape Output/Impedance		8.335V (disc)/1.46kohm	
Input loading		46kohm/740pF 46kohm/510pF	
DC offset, left/right		-29.5mV/-3.9mV	
Typical retail price			£115



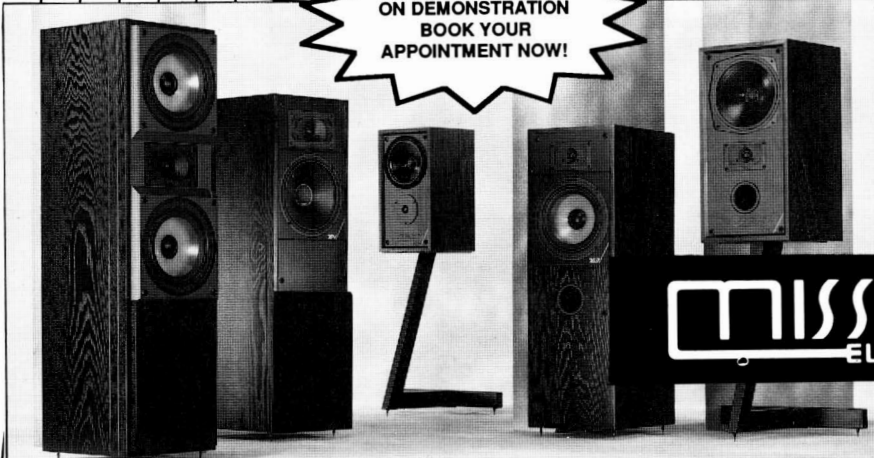
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Rotel RA 840BX4	399.95	409.95	419.95	439.95	449.95	479.95	519.95
Rotel RA 870BX	449.95	469.95	489.95	499.95	519.95	539.95	569.95
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E & O E

# Technics SU-810

PANASONIC UK LTD., PANASONIC HOUSE, WILLOUGHBY ROAD, BRACKNELL, BERKS. TEL: (0344) 862444.



Cheap, cheerful but certainly not tacky, Technics' new *SU-810* integrated amplifier represents a careful blend of compromises. For a start the company has not skimped on the bronze-coloured fascia which is struck from an alloy sheet. Neither has it skimped on facilities, peppering the '810 with knobs for bass, treble and balance, loudness contouring, switching for two tape decks and outputs for two speaker pairs.

The wiring from power amp to selectors to the binding posts is rather convoluted. Furthermore, in an effort to cut costs Technics has eschewed the use of discrete transistors in favour of an integrated stereo power amplifier block (SVI3203) which is bolted to an internal heatsink. What this high powered IC has to do with the 'New Class A' logo on the fascia is anyone's guess.

A conventional rotary control selects between CD, tuner, aux and phono (MM only) sources - cost-effective but inferior to localised input-switching. In fact the interior of this amplifier is rather spartan, and I was disappointed to find what was either a repair or modification to one channel of the MM disc input, which seems to be the cause of problems which arose later.

## Lab Report

Unlike many mass-produced budget amplifiers, Technics' *SU-810* is not cut short in its tracks by over-enthusiastic protection circuits. As a result it will sustain some 90W into 4 ohm loads with a maximum current delivery of 11.3A. Distortion is usefully low when the amplifier is driving a 'comfortable' 8 ohm load and this is reflected in the 0.0009 and 0.0018 per cent figures obtained for CD and MM respectively.

However, the Ultrasonic 3D plot shows the right hand disc input to be deteriorating, suffering a multitude of difference intermodulation routes that

persist right into the audio band. Very high-order distortions like  $2F_{20k} - yF_{0-20k}$  ( $y=2,3,4$ ) will certainly compromise the subjective rating of the amp. In the event, this disc stage failed during the listening tests.

This aside the *SU-810* measured up pretty well, its concerted RF filtering echoed in an uneventful RF IMD plot while the disc response (-3dB @ 8Hz) and headroom (+31.9dB) proved satisfactory. The input sensitivities are fine too, though a broad distribution of white noise products tended to compromise the A-wtd noise figure for the MM disc input.

## Sound Quality

Via the CD input, and with tone controls defeated, our listeners were impressed by the lively, dynamic and generally taut sound of this amplifier. There was a loss of real bass impact and extension but this did little to detract from the rhythm or tempo of the music which was kept firmly on track by a tidy sounding upper bass. Indeed the amplifier was complimented for its pleasing tonal integration; there was an undeniable loss of fine detail but any 'veiling' of the sound was evenly spread from bass to far treble.

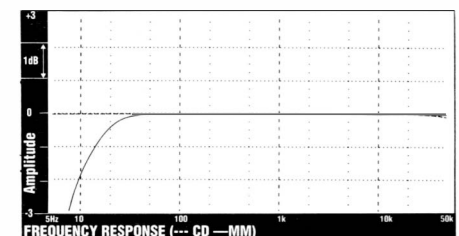
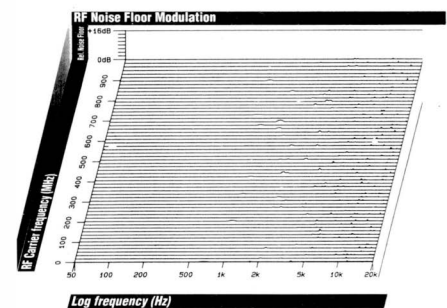
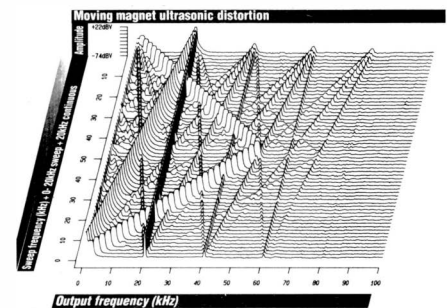
Female vocals were reproduced with surprising pose and articulation by the *SU-810*, not too forward and neither harsh nor unnaturally sibilant. Just a slight loss in the sense of ambience and subtle decay betrayed its humble aspirations. Unfortunately we were unable to evaluate the disc input.

## Conclusions

What began in a most positive light was dulled by the failure of the disc input. Barring this the *SU-810* would have warranted a hearty recommendation, so clearly it is worth investigating for yourselves.

## TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output, 8ohms	58.7W	65.7W	65.4W
4ohms	85.6W	90.3W	98.0W
Dynamic Headroom (IHF)		+1.09dB (84.5W)	
Peak Current (5msec, 1% THD)			11.3A
Output Impedance	0.133ohm	0.123ohm	0.131ohm
Damping Factor	60.0	64.9	60.9
	CD/Aux	mm	
Stereo Separation (20Hz)	69.4dB	64.3dB	
(1kHz)	66.9dB	65.1dB	
(20kHz)	49.4dB	48.1dB	
Channel Balance (1kHz, -20dBV)	0.67dB	0.73dB	
(-60dBV)	0.36dB	0.55dB	
Total Har. Dist. (0dBW)	-96.7dB	-92.5dB	
( $\sqrt[2]{3}$ power)	-100.1dB	-94.9dB	
CCIR Intermod. Dist. (0dBW)	-84.0dB	-82.4dB	
CCIR IM Dist. ( $\sqrt[2]{3}$ power)	-94.8dB	-88.7dB	
Rise Time			4.5µsec
Squarewave linearity			-109.3dB
Absolute Phase			Non-inverting
Noise (A wtd, 0dBW)	-82.4dB	-75.6dB	
( $\sqrt[2]{3}$ power)	-94.8dB	-77.3dB	
Residual noise (unwtd)	-60.1dBV	-60.1dBV	
Input Sensitivity (for 0dBW)	23.3mV	418.6µV	
(for full output)	191.8mV	3.497mV	
Disc Overload (20Hz)		21.79mV	
(1kHz)		195.9mV	
(20kHz)		1834mV	
(50kHz)		3305mV	
Tape Output/Impedance		10.74V (disc)/1.42kohm	
Input loading		93kohm/230pF 29kohm/375pF	
DC offset, left/right			0.0mV/0.5mV
Typical retail price			£130



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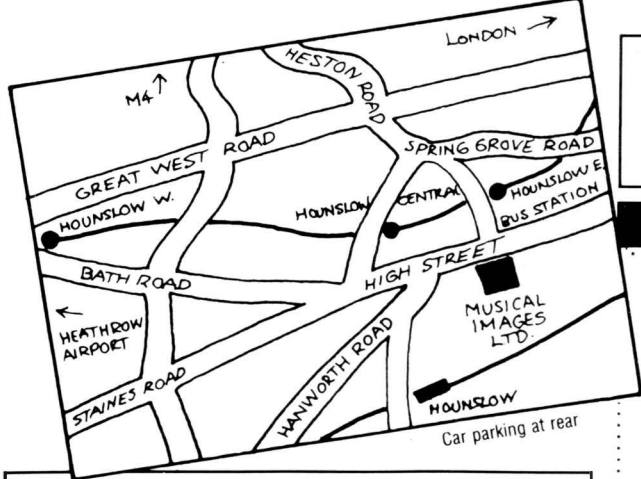
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# Conclusions, Best Buys and Recommendations

*Paul Miller sums up this month's group of amplifiers, highlighting the star performers.*

This month's batch of amplifier reviews turned up more than its fair share of surprises – and one or two hiccups. Eagle-eyed readers may have spotted an Inca Tech *Quattro* amplifier in the photograph on the contents page; this was scheduled for review but unfortunately expired during our tests! The Technics *SU-810* stopped working on its phono input, and the Heybrook *C3/P3* combination was so disappointing on the listening tests that we suspect this too was a rogue sample.

On a more positive note, 'budget' amplifiers like the **Teac A-X400** and remote-control **Sony TA-F410R** put in creditable performances, though neither are particularly fond of driving 'difficult' loudspeakers. If each amplifier was given its 'head' instead of being sat-upon by over-zealous protection circuitry, the subjective results might have been even more favourable.

The **Sansui AU-X911DG** gave mixed results. This is a beautifully constructed and finished product but one that really only gives of its best when used with its built-in MASH/PWM DAC. In 'digital' mode the slightly messy and unbalanced performance of the analogue inputs is traded for an altogether more coherent, fluid and engrossing sound.

On the other hand, **Kelvin Labs** has shown that digital and analogue do mix in the form of its latest **Digital Integrated** which affords a remarkable blend of flexibility and performance. With a very passable MM disc input and single-ended PDM DAC on board, its musical sound is detailed and packed with conviction. Its Class A rating may have

diminished in favour of a higher overall power output than earlier *Integrated* models but this has had no influence on our enthusiasm for the amplifier.

Two other costly, if significantly larger integrated amplifiers that caught our ears are the **Marantz PM-80** and **Harman/Kardon HK6800**. Each has its foibles, but they offer a similarly reserved and quietly confident sound, one that gives the impression of an underlying solidity and purposefulness.

Talking of which the new **Chord SPM-900** power amplifier is a force to be reckoned with. It is not the most linear amplifier ever created but certainly a very efficient and sophisticated one. Neither is it, strictly speaking, tonally 'pure' though its inherent smoothness, refinement and lack of fatigue carry it through to a *Choice* recommendation.

Qualifications must also hang over our recommendations of the **Magnum MP150/MF150** and **Nikko Beta 400/Alpha 800** pre/power combinations. The former, for instance, gives of its best via CD where its good sense of pace and drive contrasts with the slightly claustrophobic character of the disc input. Neither is the Nikko entirely transparent or subtle in its approach, but it does offer oodles of excitement and power at a very fair price.

**QED's** new **C300/P300** separates combo represents a saving of about £100 on the **Magnum**, which already offers good value. **QED** certainly pays service to the ideals of splitting a good integrated amplifier into isolated pre and power

sections. Its warm, comfortably detailed and powerful sound is a worthy route for future upgrades. Those who already own **QED** equipment of one sort or another would seem to be a fortunate, if captured audience!

Returning to where the real action is and where value – with minimum sacrifice in quality – is paramount, we were bowled over by the light and free-spirited sound of the new **Onkyo A-8000**, just as we were captivated by the luxuriant composure of Rotel's classic **RA-820**, now in **BX4** guise.

*'This month's batch of amplifier reviews turned up more than its fair share of surprises.'*

In the race for a Best Buy rating both these amps were pipped at the post by two other, similarly priced, contenders. **Onkyo's** amp just failed to catch the hint of extra warmth and alacrity offered by the **NAD 3020i**. This latest version of the classic **3020** is as competitive as ever; it sounds fresh and buoyant but still sharply focused and delightfully detailed – a superb all-rounder.

Rotel's **RA-820BX4** ran a very close second to the **Mission Cyrus One**. The former was arguably the more consistent and even-handed of the two, it was certainly the more persuasive via disc, yet it just failed to

match the effortless, security and confidence that poured from the **Cyrus One** via CD. Here the **Cyrus** did truly sing, embodying a rare sense of balance between the precise resolution of recordings and the emotional content of the music.

We have to admit to some disappointment with the current version of the **Musical Fidelity A1**. It doesn't sound as sweet and charming as the original version which was a firm *Choice* favourite, and although still a good amplifier for the price, it isn't quite as competitive as it once was in sound-per-pound terms.

The **Orelle SA-040SE** and **Linx Nebula** didn't emerge as firm favourites with the listening panel in our test system, and it's probably fair to say that specialist UK firms can never *really* compete on price with large-scale manufacturers – but as our reviews hopefully indicate, both models are well worth auditioning if you're looking for something a little out of the ordinary. Editor Bamford is currently enjoying superb sounds at home with a **Linx** pre-power combo (watch this space), so perhaps the **Nebula** integrated is a model which matures with time over extended listening periods. Certainly it has much style.

To conclude, I should like to thank those companies who submitted amplifiers for inclusion in this gruelling test, and gratefully acknowledge the help provided by Jason Kennedy (HFC), Eric Kingdon (Sony), Mike Martindale (Arcam), Tony Mills (Rotel), Guy Sargeant (Audio by Design) and Gordon Taylor (Linx Audio) during the blind listening tests.

# Tech Talk

*Paul Miller explains the test procedures used in the amplifier reviews.  
Be warned, this is technical talk with a capital T!*

In keeping with the *Choice* tradition, each amplifier was auditioned under blind conditions. Both CD and vinyl sources were used, with a range of software chosen for its ability to reveal different aspects of an amplifier's performance.

The ancillary equipment included a Pink Triangle *PT TOO/SME Series V/vdH MC-Two* as the analogue front-end. The digital source comprised an Arcam *Delta 170* CD transport feeding a custom battery-powered PDM converter via a high speed (Hewlett Packard) optical link. A latest spec Deltec *PDM One* converter (with proprietary RF mains filter) was used for the group listening sessions.

In my opinion PDM-based systems are capable of retrieving far more detail in a far more musical fashion than most conventional multi-bit converters. During the listening tests it was most instructive to hear just how much of the PDM decoder's qualities were retained.

Once again, Magneplanar *MG2.5R* loudspeakers were used with long lengths of *Black Sixteen* cable. (Manufacturer's own-brand cables were used if so instructed.)

The listening programme included excerpts from: Gabrieli Consort & Players, *A Venetian Coronation* (Virgin CD); Schonherz and Scott, *One Night in Vienna* (Windham Hill CD); Tanita Tikaram, *Ancient Heart* (WEA CD); Radka Toneff, *Fairytales* (Odin CD); Suzanne Vega, *Days of Open Hand* (A&M CD); Lars Erstrand (Opus 3 vinyl disc); Haydn, *String Quartet Op64 No6* (Opus 3 vinyl disc); Peter Gabriel, *So* (Virgin vinyl disc) and Jan Garbarek, *Legend of the Seven Dreams* (ECM vinyl disc).

## Measurement programme

The test programme includes both standard IHF A202 measurements plus some more advanced and elaborate techniques available with the

IEEE-controlled digital test equipment currently used in my laboratory.

### Power Output and Dynamic Headroom:

Quoted in good old fashioned Watts this refers to the maximum output of the amplifier into 8 and 4ohm loads (one channel driven to 1 per cent THD). The IHF-A-202 dynamic headroom test employs a gated 1kHz signal, 20 cycles on/480 cycles off, and refers to a maximum of one per cent THD into 8ohms relative to the continuous rating into that same load.

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

### Separation, THD, IMD, noise and sensitivity and phase shifts:

All input sensitivities are measured with respect to an output of 0dBW (=1W) and full power at 1kHz for the integrated and power amplifiers, or 1V = 0dBV out (6dB higher than IHF) in the case of the preamplifiers. Noise is measured with respect to the IHF input levels of 500 $\mu$ V (MC), 5mV (MM) and 0.5V (line), input shorted, A-wtd and assessed as the true rms figure of 20 3rd-octave averages.

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

(line).

Any phase shift between the input and output of the amplifier (due to the effect of circuit poles and zeros) is now recorded relative to the absolute phase of the amplifier. Remember, a 180 degree phase shift is not the same as a total phase inversion.

### Broad-Band Radio Frequency Intermodulation Test:

In general terms this test reveals just how sensitive an amplifier is to spurious Radio Frequency noise, whether introduced directly or indirectly.

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

A precision RF signal generator produces an RF carrier signal at 20mV<sub>p-p</sub>, modulated to 100 per cent using an external pseudo-random noise source. The resulting non-correlated AM/RF signal is then ramped between 1MHz and 1GHz (1,000MHz – now covering TV and satellite baseband transmissions) by controlling the generator through an IEEE interface BUS, using a

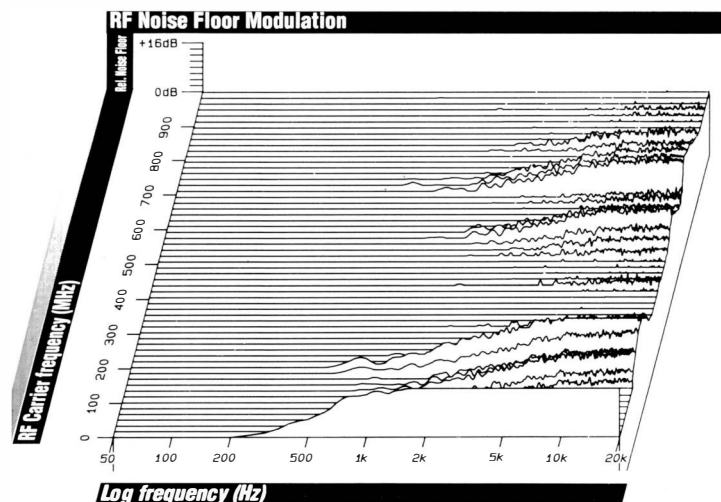
dedicated program developed in this laboratory.

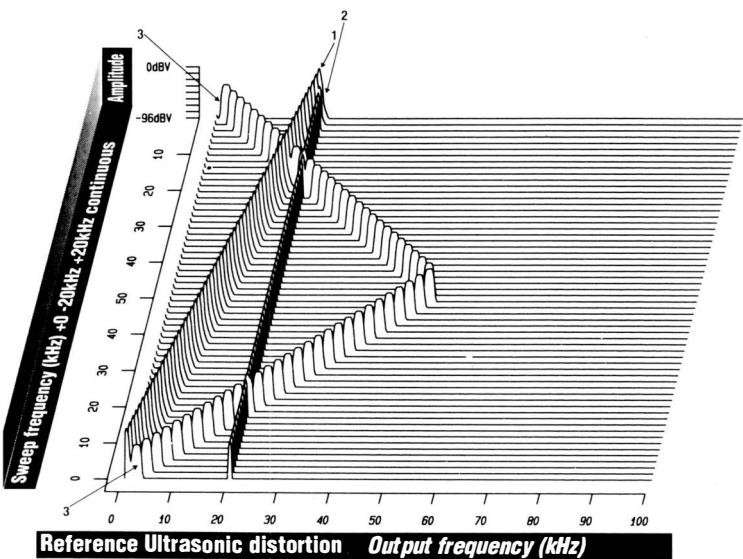
Once connected to the amplifier (via the line or CD-direct input) any subsequent demodulation/intermodulation between the sweeping carrier and its pseudo-random sidebands results in non-correlated noise appearing at audio frequencies at the output of the amplifier.

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

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

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





scaled in steps of 2dB over a maximum range of +16dB.

Clearly, any demodulated RF noise that causes a change in the noise floor greater than 16dB will give rise to a plateau effect on the plot. This situation is seen on the accompanying example plot which demonstrates an amplifier's undue sensitivity to RF noise centred on bands at 140, 200, 575, 730 and 850 MHz. If an amplifier was singularly insensitive to RF noise (NB: a Good Thing), this plot of relative change would appear as a series of straight, unperturbed lines.

**Ultrasonic Distortion Test:**

Revised some 6 months ago, this is a particularly revealing test that highlights the interaction of high and moderate-level signals in the context of harmonic and intermodulation distortions (referred to as 'routes' in the text) caused by such mechanisms as slew-limiting or the progressive reduction of feedback, the latter revealing an increase in open-loop non-linearity. It is not a knitting pattern, as one irreverent member of *Choice* would have you believe!

Three driving signals are employed, the 0-20kHz sweep (1 =  $F_{0-20k}$ ) and continuous 20kHz tone (2 =  $F_{20k}$ ) raising the amplifier to its voltage output into a 40hm load while the 0-50kHz reversed sweep (3 =  $F_{0-50k-0}$ ) tracks at a level some -24dB below this.

For integrated amps a pre-equalised composite signal was used for either the MC or MM inputs (ref. 20mV and 2mV at 1kHz respectively). Strictly speaking an amplifier should be treated as a voltage source so each plot is

individually calibrated in dBV (0dBV = 1V at 4ohms).

These sweeps were chosen to represent the kind of HF and ultrasonic signals likely to be handled by an amplifier in normal use. The ultrasonic spurious generated by CD players is a well known example, but it is less widely appreciated that the 20-50kHz band noise from a vinyl disc or FM tuner can persist at levels only 10-20dB lower than peak signals in the audio band. (This is one reason why I place such store in disc overload margins, which generally fall relative to the excess gain required with increasing frequency, and why measurements are now taken as high as 50kHz.)

That aside, certain of these ultrasonic distortions will introduce IM products within the audio band of the amplifier - a point of

particular interest with vinyl disc stages, since the IM routes will actually increase in level with decreasing frequency as a function of the RIAA characteristic.

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

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

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

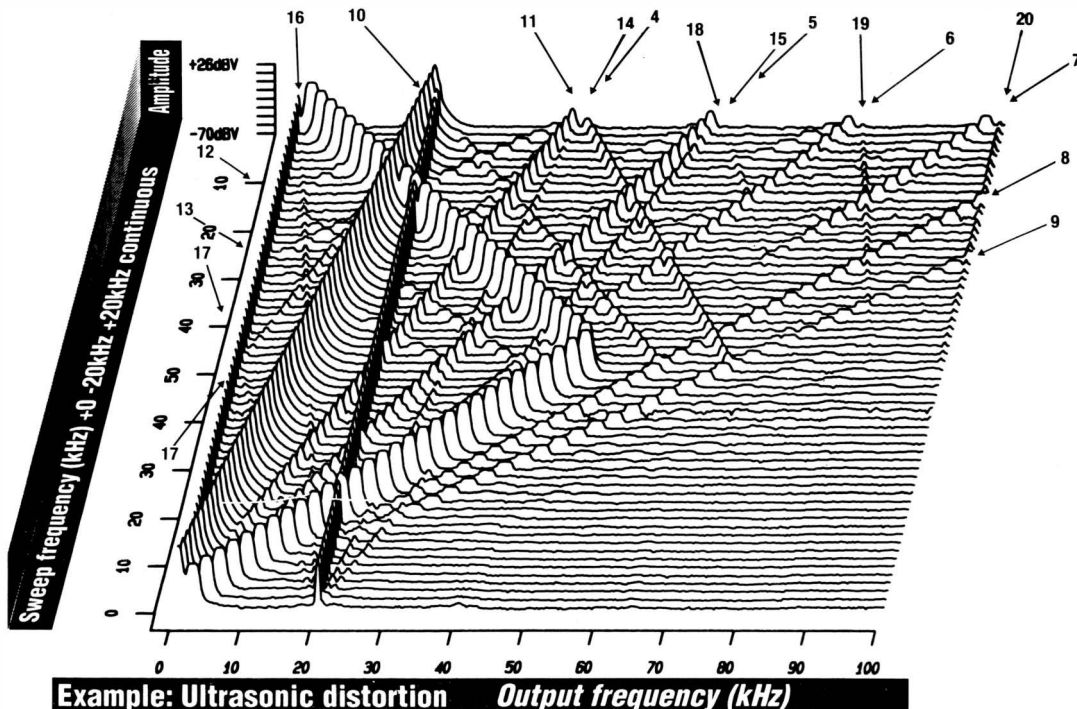
Of course there are the interactions between (3) and (1) and (2) to consider. Three summation IM routes are clearly visible:  $F_{0-50k-0} + F_{0-20k}$  (24),  $F_{0-50k-0} + F_{20k}$  (25) and

$$F_{0-50k-0} + F_{0-20k} + F_{20k} \text{ (26)!}$$

In general the presence of 2nd-order in-band IMD products seems to encourage a warmer though softer and richer sound quality, particularly if these distortions arise in the disc stage. The equivalent 3rd and higher-order IMD mechanisms seem to introduce a harder and less beguiling character.

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

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



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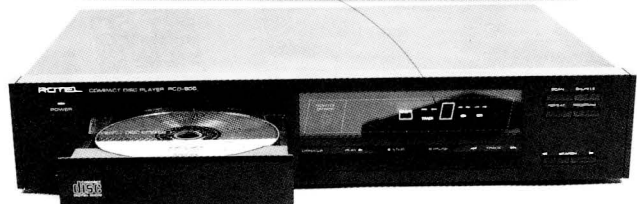
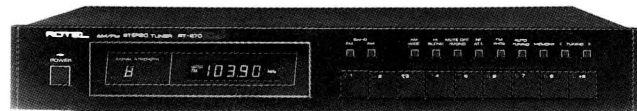
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Richard Black examines the complex task assigned to the cartridge and outlines our review procedure.

# Choosing and Using . . . Cartridges

To the cartridge is entrusted the job of converting the mechanical signal in the record groove to an electrical signal that can be amplified and used to drive the loudspeakers. This is far from easy, for the signal has a frequency range from only a few Hz to well above 20kHz and a dynamic range from single molecules to a tenth of a millimetre.

Almost all modern cartridges share the basic operating principle of scanning the groove with a diamond stylus attached to an electrical generator, using the same principles that generate electricity for the National Grid. To achieve faithful reproduction, the stylus must follow the groove accurately and the generator must be very linear in converting the motion to an electrical signal.

The difficulties of following the record groove, especially at high frequencies, have given rise to the large number of stylus profiles currently used. Early cartridges mostly had simple conical (spherical) styli, and the first improvement on this was the elliptical stylus, which with its smaller depth achieved better high-frequency performance than the spherical type. Now, it is common to find various 'line contact' styli such as the van den Hul, Gyger and micro ridge types, all of which are capable of working to very high frequencies indeed.

An additional problem is that at a certain frequency the mass of the stylus-plus-cantilever (or other stylus support) and the springiness of the vinyl from which the record is made will resonate, making accurate groove tracing impossible and effectively defining an upper limit on the cartridge's mechanical frequency response. This 'tip resonance' should occur well above the audio band, say at least as

high as 50kHz, which requires a very light stylus assembly, ideally less than 0.3mg (as low as 0.07mg has been achieved, but 0.3mg is by most standards a good figure). This in turn places constraints on the structural integrity of the cantilever, which should nevertheless be as stiff as possible so as to ensure minimum bending and inherent signal loss. Hence the use of such exotic cantilever materials as boron, beryllium and precious stones.

Of course, the cantilever must be attached to the cartridge body by a springy suspension, and this adds more problems. For one thing, this springiness adds another resonance, with the mass of the arm and the cartridge body, this time at a low frequency. It is usually necessary to tune the resonance by careful matching of arm and cartridge to ensure that it is neither too high (where it would intrude directly on the music signal) nor too low (where it could be triggered by record warps and cause all sorts of intermodulation effects).

## Damping . . .

Ideally, arm resonance should be damped at the front or back of the arm; the small amount of damping within the cantilever suspension is quite inadequate to have much effect on it. Where there is no provision for this, however, the general rule is: low compliance (ie stiff suspension) – high mass arm/cartridge and vice versa.

Another important area of cartridge performance, which is also affected by compliance, is tracking of high signal levels. The suspension provides a restoring force to the stylus, ensuring that it stays in the groove, but if the modulation

is too severe the stylus may try to move outside the range of the suspension when it will lose contact with the groove. This is termed 'mistracking' and sounds like tearing paper – horrible! Mistracking can be overcome to a large extent by increasing the tracking force on the cartridge, and there is an approximate inverse relationship between compliance and required tracking force. Not only does mistracking sound bad, it also damages the record very rapidly and must be avoided – so don't be tempted to reduce tracking force too far, you'll do more harm than good.

As for the generator, this must as already mentioned be very linear, capable of coping with both high levels and high frequencies. Two types of generator are commonly used: the moving coil (MC) and the fixed coil, the latter more generally called a moving magnet (MM). In MM cartridges a magnet at the rear of the cantilever moves and induces an electric current in a stationary set of coils, while in MC cartridges the magnet is fixed and the coils move. Advantages of MCs include lower effective mass and better high frequency response, but the stylus assembly must be fixed to the cartridge – so when the stylus wears out the cartridge must be returned to the manufacturer for re-tipping.

The voltage output of an MC cartridge is usually low (except for special 'high output' types) and requires a high gain amplifier (a preamplifier or MC phono stage) or step-up transformer. There is a popular misconception that moving coil cartridges are noisier than moving magnet types; in fact the reverse is true but the superior noise performance is only realised with a particularly quiet amplifier or

a transformer.

Moving-magnet cartridges (like most of the models tested this month) are particularly sensitive to the electrical loading placed on them by the amplifier input, using this in conjunction with their high internal inductance to filter out the results of their tip resonance, usually below 30kHz. Normal loading is about 47kohm in parallel with 250pF, but it is worth experimenting with this if possible for optimum treble response. Unfortunately, this method is a little crude and can only optimise amplitude response, not phase, but in these reviews we have quoted a loading which results in optimally flat response – usually within 1dB to 20kHz.

Finally, the cartridge body must be as non-resonant as possible, since if it resonates the generator within the body is sure to pick this up and the result will colour the output signal. A cartridge may not seem to have much room for resonance, but on a scale of single atoms (about the ultimate resolution of a good cartridge) you can't be too careful!

## The tests

Listening and measurements were carried out on a Pink Triangle *PT TOO* with SME 309 arm, with a *Rock/Excalibur* also used for listening. Alignment was carried out by a mixture of listening and lab testing. An important part of the listening tests was comparison of a record with a copy of the master tape used to make the record, which is a useful way of ironing out at least some of the inconsistencies arising from using records 'sight unseen', as it were.

For a detailed explanation of the test measurements, and what all the numbers mean, interested readers should refer to last month's issue of *Choice*.

# Arcam PMX10

A&R CAMBRIDGE LTD., DENNY END IND. CENTRE, WATERBEACH, CAMBRIDGE CB5 9PB. TEL: (0223) 861550.

This low-output moving coil cartridge is based on a Goldring generator assembly, tipped to A&R Cambridge's specification and mounted in an attractive translucent red plastic body with a solid metal top plate. The stylus uses A&R's 'Profiled' shape which is said to give 'an optimum balance between tracing accuracy, treble quality and record wear' – funny, I thought those three tended to go hand in hand!

## On Test

Illustrating the major reason why most of the world's top cartridges are moving-coils, the *PMX10*'s response extends within 5dB to over 50kHz, with a small lift around 20kHz which may add the smallest degree of brightness in some systems. At 48kHz, the tip resonance is quite good for a cheapish MC, and of other measurements only the distortion shows anything at all amiss.

With any type of music, the *PMX10* sounds very positive, with good definition and resolution. At high levels and with dense orchestral textures, it can

sometimes become a little harsh and bright, but the sound is never strained, even in very loud passages. As with some other similarly-priced MCs, there is perhaps some sacrifice in subtlety traded for the extra high frequency response gained over moving-magnet types, but not to the point of sounding 'raunchy'. Transients are kept quite clean, and percussion is well served with plenty of air and ambience left around it. Against master tape, the sound seems slightly shut in, and attack on notes can become a touch clangorous, but detail is always good and coloration is clearly at a low level.

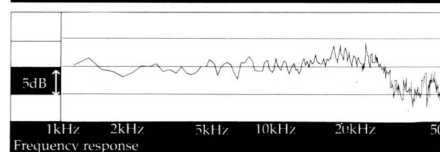
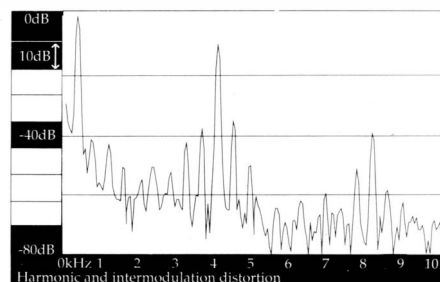
## Conclusion

The *PMX10* is in a very competitive area of the market, where top moving-magnets vie with slightly flawed MCs. Nevertheless, it makes a good impression and holds its own with most comers on grounds of detail and clarity, if perhaps not leading the pack for low (measured or subjective) distortion. Worth hearing, and Recommended.

**R**ecommended

## TEST RESULTS

Type, body mass	Moving-coil, 9.1g
Stylus type	Profiled, 7µm x 50µm
Compliance, vert/lat	11/17 mm/N
Tracking force recommended/test	1.6-2.2/1.8g
Tracking ability, L/R	>80/>80µm
LF res., vert/lat	11Hz @ 11dB/9Hz @ 11dB
Output at 5cm/s	0.3mV
Channel balance	0.2dB
Separation at 1kHz	29dB
Separation broadband	Better than 22dB
Impedance	4ohm + 2.9µH
Tip resonance, damping	48kHz, moderate
Typical retail price	£100



# Glanz MFG-310LX

PRESENCE AUDIO LTD., THE OLD POST HOUSE, PLUMMERS PLAIN, HORSHAM, W. SUSSEX RH13 6NU. TEL: (0403) 891777.

The '310 is the middle model of a range of three 'Moving Flux' cartridges distributed in Britain by Presence Audio. Moving Flux seems to be an ingenious variation on the theme of moving magnet cartridges; at any rate, the result is a device with normal MM output level and a detachable stylus. Despite the distinctive outward appearance, the cartridge has a very normal-looking metal body and stylus assembly beneath the lightweight plastic mounting bracket. The stylus is a line contact type and the aluminium cantilever is tapered.

## On Test

Into a normal load, the '310 exhibits a rising extreme treble response. This is tamed by the application of an unusually low load resistance, complementing the low inductance of the cartridge's windings. The effective tip resonance is quite high though not very well damped. Distortion seems strikingly low, and with the high compliance of the suspension, tracking is no problem. Crosstalk is a little weak, though.

The very first impression of the '310 was of a slight accentuation of surface noise on an elderly record. However, this drawback was soon overlooked in the light of the remarkable clarity, detail and treble extension of the cartridge. On any programme, there is a considerable feeling of naturalness and sweetness, with complete security on transients and consequent leading edge detail. The only criticisms seems to come down to resonance problems in the plastic mounting bracket; this is the most likely cause of the excess surface noise and also of some slight coloration and veiling. Ambience is not always fully preserved. These points are, however, quite minor.

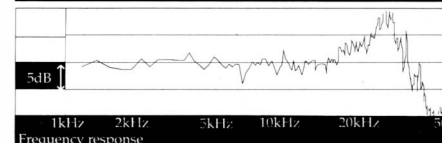
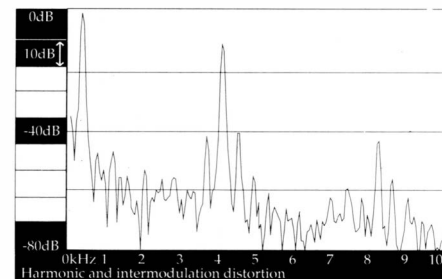
## Conclusion

Coloration notwithstanding, at this price this cartridge is sufficiently clear and detailed to warrant the highest accolade. One thing: supposing someone took it and did what Stilton does for Nagaokas? It could be quite a stunner. Still, a Best Buy even as it stands.

**B**est Buy

## TEST RESULTS

Type, body mass	Moving-flux, 5.9g
Stylus type	Line contact
Compliance, vert/lat	14/33 mm/N
Tracking force recommended/test	1.25-1.75g/1.5g
Tracking ability, L/R	>80/>80µm
LF res., vert/lat	11Hz @ 8dB/7Hz @ 11dB
Output at 5cm/s	3.4mV
Channel balance	0.0dB
Separation at 1kHz	23dB
Separation broadband	Better than 15dB
Impedance	670ohm + 120mH
Load for flattest response	18kohm in parallel with 500pF
Tip resonance, amplitude	26.5kHz, 11dB
Typical retail price	£50



# Glanz MFG-610LX

**Recommended**

PRESENCE AUDIO LTD., THE OLD POST HOUSE, PLUMMERS PLAIN, HORSHAM, W. SUSSEX RH13 6NU. TEL: (0403) 891777.

As the top model in Glanz's Moving Flux range of cartridges, the '610 has a line contact stone and a tubular boron cantilever – quite an esoteric feature at the price. Otherwise construction is very similar to the cheaper '310; however, it seems that different generator assemblies are used, since the coils' electrical characteristics are different.

## On Test

Even more than with the '310, high treble response rises, to a maximum at around 28kHz. Again, lowish impedance loading drags this back into line, with distinctly audible effect (and an unimportant 1dB loss in output). The mechanical response shows a well damped effective tip resonance, indicating a low moving mass which in turn implies good high frequency tracking ability. Low frequency tracking is also good, given the high compliance – the manufacturer's data indicates a figure of 45mm/N which is rather short of the 65mm/N indicated by our tests; sample deviation here? Arm damping is benefi-

cial, although intrinsic damping is clearly quite good. Channel separation and balance could be better.

As with the '310, the MFG-610LX seems to suffer from very high frequency body resonance which adds a slight veil and accentuates surface noise a little. Otherwise, it is in the top flight of its class. The sound is clean and clear, with smooth treble extension and good transient response. Bass has good definition and weight and (belying test results) stereo is firm and precise. Coloration sometimes starts to show on solo instruments such as sax or guitar, and violin can sound a mite edgy, but there is an effortlessness in the '610's handling of heavy modulation and dense textures which makes it very revealing and pleasing to listen to.

## Conclusion

The only thing that separates this cartridge from the very highest praise is the existence of the '310 at just over half the price. Even so, very good value – Recommended.

# Goldring 1012

**Recommended**

GOLDRING LTD., 8 GREYFRIARS ROAD, BURY ST. EDMUNDS, SUFFOLK IP32 7DX. TEL: (0284) 701101.

This is the cheapest of Goldring's current 1000 series family, descended from the old 1010 from which it differs principally in the matter of the stylus; a Gyger III profile replaces the 1010's elliptical tip. The distinctively shaped plastic (Pocan) body is retained, but Goldring claims improved tolerances and consistency on the current version.

## On Test

In common with its siblings, the 1012 shows a treble lift when operated with a normal MM load, but lowering the load resistance to 33k flattens this almost completely. Funnily enough, the tip resonance is higher than in the dearer 1000 series cartridges (presumably due to the different stylus profile), although not so well damped. Distortion, tracking and crosstalk are all fine – indeed basically the same as the dearer models – and compliance is moderate, though rather asymmetric.

Given that most auditioning was carried out with the lower resistance load in place to give flat response, it was

slightly surprising to note a small addition of 'screechiness' in the upper treble. It is possible that this is due to very high frequency body resonances, but whatever the cause it turned out to be the 1012's Achilles heel. Its sound certainly has very good body to it, and bass is well extended though possibly ever so slightly woofy, but certain instruments (especially violins, solo or orchestral) suffer a loss of detail and solo guitar or piano transients are a bit dirty. Complex textures can become harsh and shrill at medium to high levels.

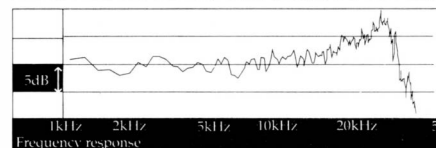
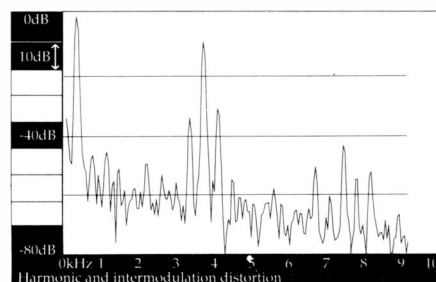
On the positive side, lower frequency sounds are well resolved, and drum kits and lower orchestral instruments come across very clearly.

## Conclusion

Any budget cartridge is entitled to have its ups and downs, and what this Goldring does well (bass and midrange, essentially) it does very well. A question of taste, then, but certainly Recommended for audition.

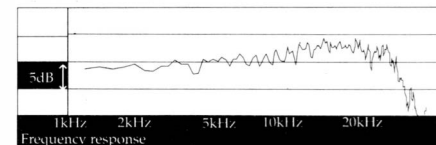
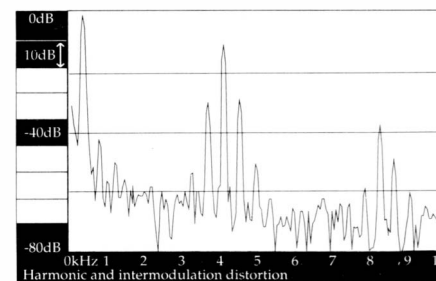
## TEST RESULTS

Type, body mass	Moving-flux, 5.9g
Stylus type	Line contact
Compliance, vert/lat	26/65 mm/N
Tracking force recommended/test	1.25-1.75/1.4g
Tracking ability, L/R	>80/>80µm
LF res., vert/lat	8Hz @ 8dB/5Hz @ 9dB
Output at 5cm/s	3.1mV
Channel balance	1.3dB
Separation at 1kHz	28dB
Separation broadband	Better than 15dB
Impedance	1600ohm + 110mH
Load for flattest response	18kohm in parallel with 200pF
Tip resonance, amplitude	29kHz, 7dB
Typical retail price	£90



## TEST RESULTS

Type, body mass	Moving-magnet, 6.3g
Stylus type	Gyger III
Compliance, vert/lat	11/20 mm/N
Tracking force recommended/test	1.5-2.5/1.75g
Tracking ability, L/R	>80/>80µm
LF res., vert/lat	12Hz @ 10dB/9Hz @ 13dB
Output at 5cm/s	3.9mV
Channel balance	0.8dB
Separation at 1kHz	28dB
Separation broadband	Better than 17dB
Impedance	700ohm + 490mH
Load for flattest response	33kohm in parallel with 270pF
Tip resonance, amplitude	26.5kHz, 12dB
Typical retail price	£40



# Goldring 1022

GOLDRING LTD., 8 GREYFRIARS ROAD, BURY ST. EDMUNDS, SUFFOLK IP32 7DX. TEL: (0284) 701101.

The spread of 'exotic' stylus profiles in the last ten years is hardly better illustrated than by Goldring's 1000 series: three moving magnet cartridges, each with different tips, all of the sort of quality that was until quite recently reserved mainly for expensive moving coils. This one has a Gyger II profile, attached to the family cantilever and generator assemblies.

## On Test

The 1000-series extreme treble lift is shown into 47k, again evened out by lowering the load resistance. Apparently indicating that the stylus profile really does have a smaller contact patch on the record than the Gyger III fitted to the 1012, the tip resonance falls to 24.5kHz here but its amplitude is lower too. Other measurements show no particular deviation from the norm of modern MMs – good tracking and distortion.

Comparison of this cartridge with its more and less expensive siblings sheds interesting light on the performance of

each. In common with the other two, the 1022 seems to suffer from some high frequency coloration which dirties the sound and makes transients sound a trifle clangorous at times. Unison violins in a Haydn symphony recording sounded a bit congested and harsh, while solo saxophone developed a 'quack', especially on high notes. Nevertheless, resolution of detail is pretty good, and coloration is at quite a low level which does not intrude most of the time. Bass and stereo imaging are both good points. In comparison with master tape, the sound is rather shut in and lacking the free and easy quality of the original. Interestingly, electric guitar seems to be flattered by the 1022, which could win it friends!

## Conclusion

Although this cartridge is not quite as neutral as some at the price, it is forthright and positive, and certainly never less than listenable. Careful auditioning is advised, but the 1022 seems quite worthy of Recommendation.

# Nagaoka Stilton TS10

PATH GROUP PLC, DESBOROUGH IND. PARK, DESBOROUGH PARK RD., HIGH WYCOMBE, BUCKS HP12 3BG. TEL (0494) 441736.

Stilton Audio has been known for a few years now as the company responsible for the 'solid body' modification to various Nagaoka (and other) cartridges. However, the new Nagaoka Stilton cartridges are rather different, in that the design and construction are a joint effort of Nagaoka, Stilton and distributor Path Group. Nagaoka makes the generator assembly to Path's specification, which is then attached to a Stilton body in the UK. The resulting cartridge has a familiar Nagaoka stylus assembly bolted in place on a Stilton alloy-and-resin-braced body. A grub screw at the front of the body can be used to give a secure three-point mounting in suitable headshells.

## On Test

Although the TS10's frequency response is substantially flat to 15kHz, it is tainted by the tip resonance at a low 19kHz. This and the high coil inductance imply that the onset of serious phase rotation will be well within the audio band. Distortion is good, as are channel separation and tracking.

The whole point of the Stilton Audio body design is to reduce the level of vibration within the structure and hence the level of coloration in the sound. Body resonance is a common ill of lower-priced cartridges, and typical symptoms include harshness and edginess in the upper presence regions. The TS10 is markedly free of such problems. However, it is apparent that the stylus and generator are not up to the standards of some of the competition, and groove tracing is not always secure. Extreme treble sounds a little dull and 'phasy', and the sound can become ragged at high levels. Piano or bells lose some clarity on transient attack.

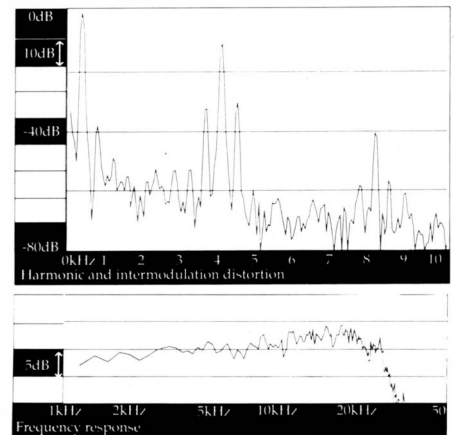
## Conclusion

This cartridge places the emphasis in the reverse of the more common order – body first, tip last. Listeners who find coloration distressing will like it, but some will find the TS10's difficulties in the high treble less appealing. Recommended, however, as rather different and certainly successful in its own terms.

**Recommended**

## TEST RESULTS

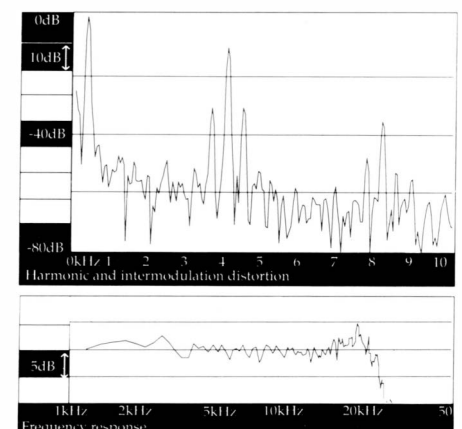
Type, body mass	Moving-magnet, 6.3g
Stylus type	Gyger II
Compliance, vert/lat	11/25 mm/N
Tracking force recommended/test	1.5-2.5g/1.75g
Tracking ability, L/R	>80/>80µm
LF res., vert/lat	12Hz @ 9dB/8Hz @ 14dB
Output at 5cm/s	4.7mV
Channel balance	0.2dB
Separation at 1kHz	29dB
Separation broadband	Better than 18dB
Impedance	770ohm + 530mH
Load for flattest response	33kohm in parallel with 250pF
Tip resonance, amplitude	24.5kHz, 11dB
Typical retail price	£60



**Recommended**

## TEST RESULTS

Type, body mass	Moving-magnet, 8.4g
Stylus type	Spherical
Compliance, vert/lat	22/29 mm/N
Tracking force recommended/test	1.5-2.0/1.8g
Tracking ability, L/R	>80/>80µm
LF res., vert/lat	8Hz @ 10dB/7Hz @ 12dB
Output at 5cm/s	4.5mV
Channel balance	0.4dB
Separation at 1kHz	30dB
Separation broadband	Better than 19dB
Impedance	600ohm + 800mH
Load for flattest response	56kohm + 300pF
Tip resonance, amplitude	19kHz, 11dB
Typical retail price	£50



# Nagaoka Stilton TS11

PATH GROUP PLC, DESBOROUGH IND. PARK, DESBOROUGH PARK RD., HIGH WYCOMBE, BUCKS HP12 3BG. TEL: (0494) 441736.

The Nagaoka Stilton range consists of three cartridges of which this is the middle model. It shares its Stilton body design with the cheaper *TS10* (and dearer *TS12*), but differs in the stylus type. It has a small, upwards-facing grub screw which can be tightened against the underside of the headshell to give three-point mounting, said to be most advantageous in less rigid arms such as those fitted to £150-odd turntables. (On many arms, including the SME 309 used in this test, the screw meets fresh air, but the solid body makes good contact with its headshell anyway.)

## On Test

Although the tip resonance of the *TS11* is higher than that of the '10, it is still low enough to be a problem in the audio band, and normal response is sharply curtailed above 22kHz. As usual, the amplitude response can be equalised very nearly flat by suitable choice of loading, but this method invariably degrades the phase response as the amplitude improves, with audi-

ble effects on music's top harmonics. Otherwise, the *TS11* measures well.

Comments on the *TS11*'s sound varied slightly according to programme. Orchestral music sounds rather dull, while at the same time suffering from some harshness in the presence region. On the other hand, rock'n'roll sounds quite lively with good definition on guitar and drums but less good on cymbals. Comparison with master tape showed up problems with extreme treble in lost detail and a 'closed-in' sound on piano, leading to a feeling of compressed dynamics. Low and middle frequencies, however, are well handled, and it is possible that the treble response will go well with loudspeakers which are a little bright and forward.

## Conclusion

Notwithstanding its slight improvement in clarity over the *TS10*, this cartridge does seem to have become a little expensive given its limitations. But if you find the '10 captivating, this one may appeal strongly.

# Ortofon 510

ORTOFON UK, HAYDEN HOUSE, CHILTERN HILL, CHALFONT ST. PETER, BUCKS SL9 9EW. TEL: (0753) 889949.

This model is the cheapest of Ortofon's four 500-series moving magnet designs. It shares the family body and generator but makes do with an elliptical tip. The body in question is moulded in quite non-resonant black plastic, and the stylus assembly is a tight push fit (but tight – full arm force required to remove it). The hinged stylus guard is cunningly concealed – even decorative – when up.

## On Test

The *510* is characterised by a rather underdamped tip resonance at 25kHz, which cannot quite be flattened out by load matching (which is quite critical, incidentally). Nevertheless, response to 20kHz is generally pretty flat and electrical losses in the cartridge seem to be particularly low. Distortion and tracking are good.

For whatever reasons, the *510* seems to show up slightly different characteristics depending on programme material. While some Fifties rock'n'roll seemed very well served in transient speed and detail, a violin and piano record pro-

voked comments of 'twanginess' on transients. Orchestral material has good body and clarity, but some 'quacky' high presence-region coloration is in evidence and a small amount of ambience is lost.

Compared with various (more expensive) cartridges, surface noise is emphasised somewhat, which may irritate some listeners. Against master tape however, the *510* acquits itself very well; very little weight is lost and piano notes come over as less pure than the original, but the overall effect is of an impressive similarity and a good spread of capabilities.

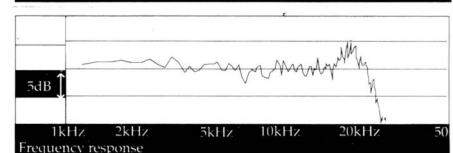
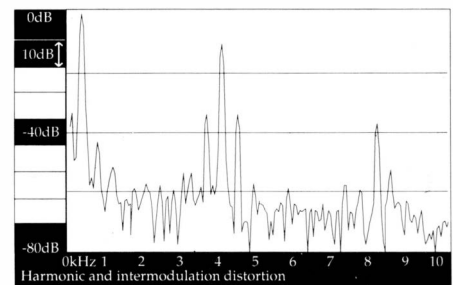
Not at all bad for a cartridge at this price.

## Conclusion

This is a very capable transducer, which achieves a standard more like that of typical £80 cartridges of a few years ago. Such has been the advance all round that it is no longer so outstanding, but a *Choice Best Buy* rating is still appropriate.

## TEST RESULTS

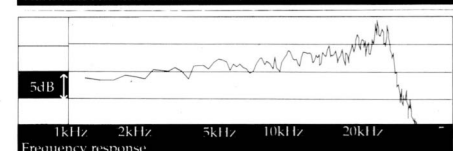
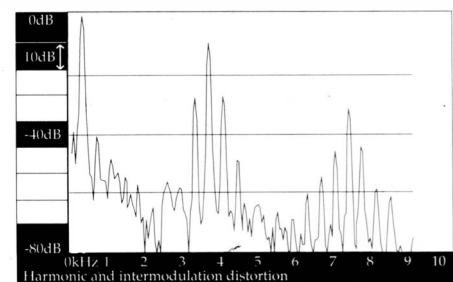
Type, body mass	Moving-magnet, 8.4g
Stylus type	Vital
Compliance, vert/lat	22/29 mm/N
Tracking force recommended/test	1.5-2.0/1.8g
Tracking ability, L/R	>80/>80µm
LF res., vert/lat	8Hz @ 8dB/7Hz @ 12dB
Output at 5cm/s	3.6mV
Channel balance	1.1dB
Separation at 1kHz	29dB
Separation broadband	Better than 20dB
Impedance	600ohm + 700mH
Load for flattest response	56kohm + 300pF
Tip resonance, amplitude	20.5kHz, 7dB
Typical retail price	£70



## Best Buy

## TEST RESULTS

Type, body mass	Moving-magnet, 5.2g
Stylus type	Elliptical
Compliance, vert/lat	26/26 mm/N
Tracking force recommended/test	1.25-1.75/1.5g
Tracking ability, L/R	>80/>80µm
LF res., vert/lat	8Hz @ 11dB/8Hz @ 12dB
Output at 5cm/s	5.2mV
Channel balance	0.4dB
Separation at 1kHz	28dB
Separation broadband	Better than 21dB
Impedance	1100ohm + 540mH
Load for flattest response	33kohm in parallel with 300pF
Tip resonance, amplitude	24.5kHz, 13dB
Typical retail price	£30



# Ortofon 530

ORTOFON UK, HAYDEN HOUSE, CHILTERN HILL, CHALFONT ST. PETER, BUCKS SL9 9EW. TEL: (0753) 889949.

As Europe's largest cartridge manufacturer, Ortofon clearly isn't taking any chances with market coverage; inspection of its price list reveals no less than four other cartridges within £10 of this one. What is more, the 530 is one of a family of four, sharing a body design but with different styli. In this case, the stylus is a fine line nude. The body seems quite rugged and can be securely mounted in the headshell.

## On Test

The 530 stylus manages a rather better treble response than that of the 510, with less of the latter's 25kHz 'blip'. Slightly lower impedance loading than normal is required to bring the gently rising response back down; however, a small rise of this type may often be preferred, offsetting losses elsewhere. The tip resonance is high for a moving-magnet design although not well damped. Distortion, tracking and channel separation are fine.

A few years ago, Ortofon cartridges (and many others) had a tendency to be

dull, against which some manufacturers reacted by making over-bright cartridges. This one, thankfully, avoids that error. Treble is certainly extended but never shrill, and although the sound lacks the absolute clarity on transients of, say, Ortofon's top moving coils, it is never actually rough or dirty. Orchestral violins, a hard test of high frequency purity, are reproduced with accurate tonal quality and although the full weight of a piano is not quite all conveyed, the sound is commendably fast and detailed. A small degree of coloration is shown up in slight quackiness on solo saxophone.

## Conclusion

It may seem like damning with faint praise, but the strongest impression the 530 makes is of an absence of any obvious flaws. No one area is immediately striking in excellence, but in general the cartridge has a good mix of qualities which make it relaxing and informative to listen to. Very likeable, in fact, and therefore Recommended.

# Shure VST V

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

A member of Shure's 'Ultra Group' of cartridges, the VST V has an encapsulated body, a Micro Ridge stylus, and a beryllium cantilever (this may be the ideal material for the job, but is difficult to work and extremely poisonous to boot). In true Shure tradition the VST V also has a Dynamic Stabilizer – a small carbon fibre brush supported on a damped hinge, which rides on the record and reduces arm resonance problems, while also discharging static electricity and picking up fluff.

## On Test

Into a normal load, the VST V shows a very flat frequency response to over 20kHz, although the mechanical response is characterised by a rather underdamped tip resonance, albeit at a high 30kHz. Tracking has always been Shure's forte, and its quoted figure of 140µm exceeds what can be cut by most record lathes (i.e. it can't easily be confirmed!); it also has good implications for long record life. The Stabilizer does its job well in the vertical direction,

damping resonance almost completely, but is less good laterally.

Subjective impressions rather laid to rest age-old memories of dull, lifeless and coloured Shures. This one drew forth comments about 'excellent transients', 'good treble extension' and 'good body and clarity to sound'. The strongest criticisms were of very slight coloration and forwardness, but in general the sound is exceptionally clean and assured. It certainly makes a case for good trackability and ensures that the most severe modulation is handled in a way that possibly no cartridge can better, or even equal. One might expect the Stabilizer to add coloration, but the opposite seems to be the case as it tidies up the bass a little.

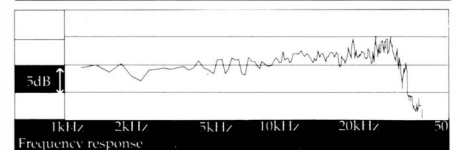
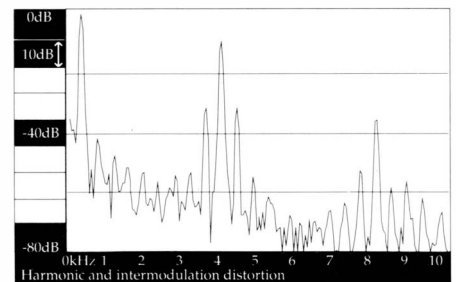
## Conclusion

This cartridge appears to prove quite conclusively that moving magnet cartridges can compete with MCs. Indeed, in terms of transient purity, the VST V is in the very top league. It is therefore unequivocally Recommended.

Recommended

## TEST RESULTS

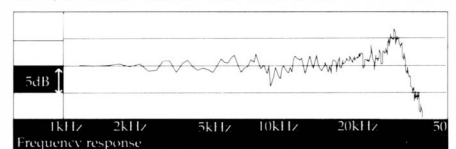
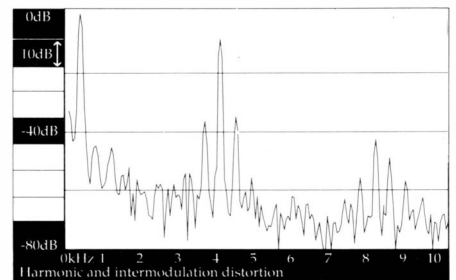
Type, body mass	Moving-magnet, 5.3g
Stylus type	Fine line
Compliance, vert/lat	22/26 mm/N
Tracking force recommended/test	1.25-1.75g/1.5g
Tracking ability, L/R	>80/>80µm
LF res., vert/lat	9Hz @ 10dB/8Hz @ 11 dB
Output at 5cm/s	3.7mV
Channel balance	1.1dB
Separation at 1kHz	28dB
Separation broadband	Better than 20dB
Impedance	1200ohm + 495mH
Load for flattest response	33kohm in parallel with 300pF
Tip resonance, amplitude	28.5kHz, 12dB
Typical retail price	£80



Recommended

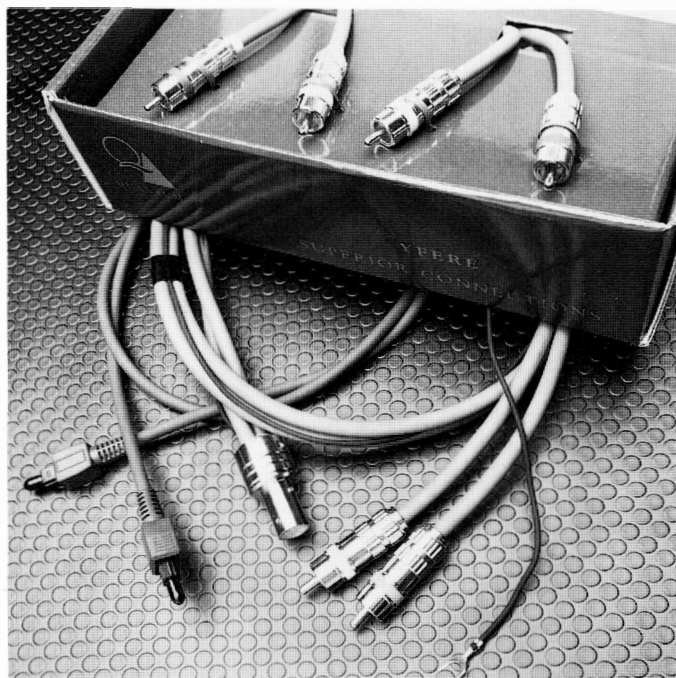
## TEST RESULTS

Type, body mass	Moving-magnet, 6.4g
Stylus type	Micro Ridge
Compliance, vert/lat	16/32 mm/N
Tracking force recommended/test	1.2.5/1.2g
Tracking ability, L/R	>80/>80µm
LF res., vert/lat	none/8Hz @ 10dB with Stabilizer
Output at 5cm/s	3.2mV
Channel balance	0.6dB
Separation at 1kHz	31dB
Separation broadband	Better than 19dB
Impedance	800ohm + 370mH
Load for flattest response	47kohm + 300pF
Tip resonance, amplitude	30kHz, 12dB
Typical retail price	£158



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BRENTWOOD MUSICAL & HI-FI CENTRE, 2 Ingrave Rd, Brentwood. (0277) 221210. Alphason, Denon, Marantz, Quad, DNM, Rock/Glastonbury, E.A.R., Exposure, Kelvin Labs, Rotel, plus many more. Dem facilities, home trial, evening appts. (high end). Home installations. System problem diagnosis. Mon-Sat 9.30-5.30 (Thurs from 10am, Sat from 9am). Credit facilities, Access, Visa, Hi-Fi Markets Chargecard. Service facilities.

LYON AUDIO, 16 Peartree Business Centre, Peartree Road, Stanway, Colchester, Essex CO3 5JN. (0206) 560259. Quad, Rogers, Mission, Denon, Cyrus, Marantz, Audiolab, Heybrook, Rotel, NAD. Dem facilities. Mon-Sat 9-6. Installations. Access, Visa, Hi-Fi Markets, Instant credit. Service dept available.

PRO MUSICA, 6 Vineyard Street, Colchester. (0206) 577519. Linn Products, Naim Audio, Rega Research, Creek, A&R Cambridge, Ion Systems, Denon, Rotel, Epos, Ruark etc. Two single speaker dem rooms. Credit facilities. Access, Visa. Appts bookable. Mon-Sat 10am-6pm.

RAYLEIGH HI-FI, 44a High Street, Rayleigh, Essex. (0268) 79762/747571. 216 Moulsham St, On-the-Parkway, Chelmsford, Essex. Southend shop opening soon. (0245) 265245. A&R, Creek, Cyrus, Denon, Epos, Ion, Linn, Mission, Naim, Quad, Rega, Roksan, Rotel, Royd, 0% finance. **BADA**

THOMSONS, 2 High Street, Great Baddow, Chelmsford, Essex. Tel (0245) 71465. JVC, Kenwood, Mitsubishi, Toshiba, Tannoy, Mordaunt-Short, Acoustic Research,

Wharfedale, Philips, Audio-Visual dealer. Home trial. Free installation. Service dept. Access, Visa, HP. Open 9-1, 2-5.30 Mon-Sat. Open 9-1 Wed.

## GLOUCESTERSHIRE

AUDIO EXCELLENCE, 58 Bristol Road, Gloucester. (0452) 30046. Audio Research, Dual, Krell, Linn, Magnep-lanar, Naim, NAD, Yamaha and lots more. Closed Mon. **BADA**

ROBBS OF GLOUCESTER, 13/15 Worcester Street, Gloucester GL1 3AJ. Sony, Technics, Aiwa, Pioneer, Denon, Bose, Celestion, Dual, Kenwood, JVC. Largest selection in Gloucestershire. Dem facilities. Home trial. In house service dept. Access, Visa. 9-5.30 6 days.

## HAMPSHIRE

HAMPSHIRE AUDIO Ltd, 2-12 Hursley Rd, Chandlers Ford. (0703) 252827/265232. Quality CD and analogue agencies. 5 dem studios. Large free car park. **BADA**

HOPKINS HI-FI, 38/40 Fratton Rd, Portsmouth PO1 5BX. (0705) 822155. Technics, Quad, Monitor Audio, Tannoy, Denon, Nad, Heybrook, Onkyo, Dual, Marantz plus others. Dem facilities, appointments necessary. Access, Visa. 9-5.30. Open to 6 Thurs. Closed Wed. Service dept.

TRU-FI SOUND & VISION, 10-12 Grosvenor Road, Al-dershott, Hants. Tel/Fax: (0252) 26390/332424. Aiwa, Audio Technica, B&W, Nakamichi, Mission, Mordaunt-Short, Nagaoka, Sony, Technics. Dem fac. Free install. Service dept. 0% finance. Access, Visa. Mon-Sat 9.30-6.

## HEREFORDSHIRE

ENGLISH AUDIO, 95 Whitecross Road, Hereford. (0432) 355081. Musical Fidelity, Pink Triangle, Heybrook, Arcam, Nakamichi, Systemdek, Denon. Cambridge Audio, Rogers and others. Dem room. Home trial. Free install. Service dept. Access, Visa. 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, Magnepplanar, Meridian, Quad, Rogers, TLD. Mon-Sat 9.30-5.30. **BADA**

AUDIO IMAGE, 15 Middle Row, Stevenage, Herts SG1 3AW. Tel: 0438 360606. Aiwa, Goodmans, Harman Kardon, JBL, JVC, Kenwood, Panasonic, Pioneer, Sony, Technics. Dem room & lounge. Home trial. Free installation. Service dept. Access, Visa. Instant credit £1500. Closed Weds. Open 9-6.

DARBYS OF ST. ALBANS, 6 Market Place, near the clock tower, St. Albans, Herts. (0727) 50961. Alphason, A&R Cambridge, Bang & Olufsen, Denon, JPW, JBL, Harman Kardon, Quad, Ruark, Sony. Home demonstrations, free delivery and installation. Sales rental service. In house credit. Lombard, Tricity. Mon-Sat 9-6.

HYPERTEC, 6 Bancroft Road, Hitchin, Herts. (0462) 452248. B&W, Denon, Dual, Marantz, Pioneer, Rotel, Tannoy, Technics, Wharfedale, Bang & Olufsen. 2 dem rooms without appt. Private dem room + evening dem by appt. Home trial. Free Install. Service dept. Access, Visa, Hypertec creditcharge. 9.30-5.30 6 days per week.

THE AUDIO FILE, 27 Hockerill St, Bishops Stortford, Herts CM23 2DH. (0279) 506576. 9.30-5.30 6 days. Dealer Of The Year 1988/89. Linn, Naim, Rega, Quad, Cyrus, Arcam, Musical Fidelity. 0% credit. **BADA**

## ISLE OF MAN

ISLAND COMPACT DISC CENTRE, Parliament Square, Ramsey. (0624) 815521. Arcam, Ariston, Audio Innovations, Celestion, E.A.R., Marantz, QED, SD Acoustics, Snell, Sugden. Mon-Sat 9-5.00. Dem and home trial facilities. Free installation. Full credit, no limit. Access, Elite. Service dept.

## KENT

JOHN MARLEY HI-FI CENTRES, 2 Station Rd West, Canterbury. (Canterbury) 69329. Also at Dover - (0304) 207562. B&W, Heybrook, Magnum, M.Y.S.T., Nakamichi, Pink Triangle, Rotel, Sansui, Technics, Quad. Dem and home trial fac. Mon-Sat 9-5.30 closed Thurs. Free install. Credit to £1,000. Access, Visa, 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). Serv-



ice Dept. **330A**  
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.  
TONBRIDGE HI-FI, 31 High Street, Tonbridge Wells, Kent TN1 1XL. (0892) 24677. If your interest is music pay us a visit + find out what we do. **330A**  
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 installation, credit to £1000. Amex, Diners, Visa, Access. Service dept.

## LANCASHIRE

MONITOR SOUND, 54 Chapel St, Chorley. (02572) 71935. A&R, Dual, Mission, Quad, Rogers, Rotel, Spendor, Thorens, Nakamichi, Yamaha, etc. 2 dem rooms. Open Mon-Sat, closed Weds. Free installation. Credit to £1,000. Access, Visa. Service dept.

## LEICESTERSHIRE

MJS HI-FI, 80 Stapleton Lane, Barwell, Leicester LE9 8HE. (0455) 46977. The Rock, Audio Innovations, Kelvin Labs, Snell, Helius, Sugden, Ruark, Concordant, Valdi, JPW. Dem and home trial facilities. Mon-Sat 9.30-7.00. Free installation and service dept. Visa, Access.  
THE LEICESTER HI-FI CO, 6 Silver Walk, St. Martins Square, Leicester LE1 5EW. (0533) 539753. 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, Hi-Fi Markets, Access, Visa, Diners, Amex. 6 days 9.30-5.30  
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.

## LINCOLNSHIRE

BOSTON HI-FI CENTRE, 65a Wide Bargate, John Adams Way, Boston, Lincs PE21 6SG. (0205) 65477. Quad, Nakamichi, Creek, Ariston, NAD, Denon, Marantz, Castle, JPW, B&W. Separate demo studio. Home trial, free installation, service department. Access, Visa, Hi-Fi Markets Chargecard. Tues-Sat 9-5.30 pm

## LONDON

A.T.LABS, 19 West End Lane, London NW6. (071) 794 7848. Mon-Sat 10-6. 2 dem rooms. Access/Visa. Sony Hi-Fi News Best Dealer '86 & '88 (National). **330A**  
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.  
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.  
DIN, 25 Melcombe Street, London NW1 6AG. Tel: (071) 224 4413. Roksan, Quad, Denon, Meridian, Mission, Celestion, Krell, Apogee, Arcam, Nakamichi. Full dem + delivery. Free install. Access, Visa, Amex, Diners.  
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. **330A**  
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. Linn, Naim, Rega etc. £300-£3,000-£13,000. **330A**  
HI-FI CONFIDENTIAL, 35/37 Marsham St., London SW1. (071) 233 0774. Open Mon-Fri 10-6, Sat 10-3. Creek, Denon, Hafler, Kelvin Lab, Musical Fidelity, Oracle, Quad, Rotel, S.D. Acoustic, S.M.E. etc. Large single speaker dem room. Limited home trial facilities. Export worldwide.  
JUST MUSIC, 52 Upper Tooting Road, London SW17 7PB. (081) 767 1233. Aiwa, Dual, Denon, Marantz, Quad, Rogers, Thorens, Musical Fidelity, Sugden, Heybrook and many more. Dem facilities. Appts can be arranged. Home trial. Free installation available. Access, Visa, Amex, Hi-Fi

Markets, Chargecard, Creditcharge, finance arranged. 10am-7pm Mon-Thurs, 10-6 Fri & Sat.  
KAMLA ELECTRONICS, 251 Tottenham Court Road, London W1. (071) 323 2747. 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.)  
NICHOLLS HI-FI, 430-434 Lee High Street, Lewisham, London SE12 8RW. (081) 852 5780. Sony, Technics, Harman, JBL, Mordaunt Short, Kenwood, Panasonic, Hafler, Sumo, B&W. Dem facilities. Home trial. Free installation. Service dept. Credit available. Visa, Access. 9.30-6 Mon-Sat, Thurs till 11 o'clock;  
ORPHEUS HOME DEMONSTRATIONS. (081) 299 0075. Alexander, Alphason, Cadence, Castle, Kiseki, Moth, Proton, Thorens, Townshend, Systemdek. Home demonstrations only. Appts. necessary. Home trial, free installation. Service dept. Three month interest free credit. Open 24 hours. All goods guaranteed two years.  
THE SOUND SHOP, 58 The Broadway, Mill Hill, London NW7. (081) 906 3364. Denon, Kenwood, JPW, Marantz, Monitor Audio, Musical Fidelity, NAD, Ruark, SD Acoustics, Tannoy etc. Home trial. Free installation. Service department. Access, Visa, Amex, Diners. Credit facilities. £1000 instant credit. 10-6 Mon-Sat.

## MIDDLESEX

A.T.LABS, 159 Chase Side, Enfield, Middx. (01) 367 3132. Mon-Sat 10-6. Two dem rooms. Carr Park. Access/Visa. Sony/Hi-Fi News Best Dealer '86 & '88. **330A**  
A.T. LABS, 173-175 Station Rd, Edgware, Middx. (01) 952 5535. Mon-Sat 10-6. 2 dem rooms. Access, Visa. Sony/Hi-Fi News Best Dealer '86 & '88 (National). **330A**  
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. **330A**  
UXBRIDGE AUDIO LTD, 278 High St, Uxbridge, Middx UB8 1LZ. (0895) 30104 (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. **330A**

## MERSEYSIDE

W.A. BRADY & SON, 401 Smithdown Rd, Liverpool L15 3JJ. (051) 733 6859. Largest choice of specialist Hi-Fi in N.W. £100-£20K. All credit cards. 3 dem rooms. Closed Monday. **330A**  
IN CONCERT HI-FI, 144 Seaview Road, Wallasey, Wirral, Merseyside. (051) 630 5055. Denon, Kenwood, QED, 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) 78029. Arcam, Linn, Naim, Denon, Spendor, Heybrook, 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.  
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. Cambridge Audio, Marantz, Creek, Trio Kenwood, Harman Kardon, Onkyo, Kef, Celestion, Bose, Wharfedale and many more. Home trial, free instal, service dept. Access, Visa, credit facs. 9.30-5.30pm.  
SOUND PRINCIPLES, 52 Queen Street, Wellingborough, Northants. (0933) 441907. Aura, Heybrook, Marantz, Mission, Nakamichi, QED, Quad, Roksan, Rotel, Spendor, Systemline, Yamaha and others. Demo room. Home demo's by appt. Appts advisable out of hours available. Free installation. Access, Visa + credit scheme available. Mon-Fri 10-6, Sat 9-5.

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

CHANNY AUDIO, Chantry Walk, 18 a Eldon Street, Tuxford, Newark, Notts NG22 0LH. (0777) 870372. Pink Triangle, Royd, JPW, Rotel, BLQ, NVA, Michell, Art Audio (valve), Kelvin Labs, Thorens, + much more. Single speaker dem room. Appts preferred. Home trial, free installation. Access, Visa + credit facilities and mail order. Mon-Fri 10am-4.30pm. Sat 9-30-5.30. Sun home dem by appt. Closed Weds.  
DEFINITIVE AUDIO. (0602) 813562. Voyd, Audio Innovations, Snell, Helius, Systemdek, Revox, Deltec, JPW, Pirate, Loewe Audio Visual plus more. Home dems throughout Notts and E. Mids. Free install. 10-7, 7 days. Tel: (0602) 813562 for further info + appt.

## WEST MIDLANDS

ALTERNATIVE AUDIO Ltd, 93-95 Hobs Moat Rd, Solihull. (021) 7420254 (sales), 0248 (service). The widest range of quality hi-fi and CD in the West Midlands. Tues-Sat 10-6. **330A**  
AUDIO CENTRE MAINWAY, Sharing Asda Car Park, High Street, Bloxwich, Walsall, W. Midlands. (0922) 473499. Linn, Ariston, Aura, Arcam, Cambridge Audio, Linn, Denon, Musical Fidelity, Rogets, etc. The midlands most exclusive Hi-Fi Centre with private listening studio. Open evenings by appointment. Home trial. Free installation. Own service department on premises. Instant 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 and free installations. 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.  
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. **330A**  
HORTON ELECTRONICS (1987) LTD, 8-9 Lower Temple St, Birmingham B2 4JD. (021) 643 0972. Aiwa, Dual, Marantz, Goodmans, JVC, Mission, Sony, Technics, Wharfedale, Sennheiser. Dem facilities. Credit to £1000. Access, Visa. 9-5.30 Mon-Sat. Service dept.  
MIDLAND RADIO SUPPLIES, Maypole Lane, Birmingham B14 4PG. (021) 430 7817. By appointment only - listen quietly and hear everything through Croft valve amplifiers and Tannoy speaker systems.  
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.

## OXFORDSHIRE

ASTLEY AUDIO LTD, 3 Marketplace, Wallingford. (0491) 39305/34349. Technics, Panasonic, Pioneer, Kenwood, Sony, Yamaha, Denon, Dual, Mission, Tannoy. Home trial, free installation. Service dept. Access, Visa, Amex, Diners. Instant credit. Tue-Fri 9-5.30, Sat 9-5. Records & CDs stocked.  
HORNS OF OXFORD LTD, 6 South Parade, Summertown, Oxford. (0865) 511241. Alphason, Ariston, B&W, Celestion, Marantz, Nakamichi, Pink Triangle, Quad, Sony, Technics. Free installation. Service dept. Access, Visa. 9-5.30. Closed Thurs. **330A**  
OXFORD AUDIO CONSULTANTS LTD, Cantay Hse, Park End Place, Oxford OX1 1JE. (0865) 790879. Oxford Acoustics, Audio Research, Krell, Magneplanar, Apogee, Aragon, Stax, Marantz, Wharfedale, Cambridge Audio. Home trial and free installation. Instant Credit. Access, Amex, Visa. 10-6 Tues-Sat. Service dept.  
WITNEY AUDIO & VIDEO, 28 High St, Witney, Oxford. (0993) 2414. A&R, Aiwa, Akai, Bose, Denon, Dual, Goldstar, JBL, Mordaunt-Short. Dem facilities. Mon-Sat 9-5.30. Free installation, credit to £1,000. Access, Visa. Service dept.

# THE CHOICE DEALER DIRECTORY

## SHROPSHIRE

CREATIVE AUDIO, 9 Dogpole, Shrewsbury. (0743) 241924. Marantz, Meridian, Linn, Naim, A&R, Mission, Nakamichi, Revolver, Castle, Audio Technica. Dem room. Home trial and free installation. Credit to £1000. Access, Visa. Tues-Sat 9.30-5.30. Service dept.  
MID SHROPSHIRE AUDIO, 2 Holland Court, High Street, Dawley, Telford, Shropshire. (0952) 630172. Cambridge Audio, Marantz, Onkyo, Rubric, Tannoy, Alexander, Apollo, Ion Systems, Audio Innovations, SD Acoustics. 2 dem lounge. Home trial. Free Installation. Service dept. Access, Visa. Credit facilities available. Instant credit subject to status. Mon-Sat 10.5 evenings/Sunday by special arrangement.

## SOMERSET

WATTS RADIO - the engineers, Jim Badman, 1 West Street, Somerton. (0458) 72440. Castle, Dual, Denon, KEF, Mordaunt-Short, Ortofon, Quad, Rogers, Thorens, Yamaha. Dem and home trial facilities. Mon-Sat 9-1, 2-5.30, Wed 9-1. Free installation. Credit to £1,000. Access, Visa. Service dept.

## STAFFORDSHIRE

ACTIVE AUDIO, 29 Market Street, Tamworth, Staffordshire. (0827) 53355. Arcam, Ariston, Celestion, Denon, Heybrook, Kef, Cyrus, Musical Fidelity, Marantz, Revox, Rotel, Rogers, etc. etc. The only BADA Member in Staffordshire. Full demonstration and home trial facilities. Account and credit cards. Ring for opening times and free 'Fact Pack' 3024  
GRANGE HI-FI LTD, 153 Branston Road, Burton-on-Trent DE14 3DQ. (0283) 33655. Audio Innovations, Arcam, Creek, Systemdek, Snell, Spondor, Rotel, Pink Triangle, Quad, Voyd, etc. 2 dem rooms. Mon, Tues, Thurs, Fri, Sat. 9-6. Closed Wed. Free installation. Credit facilities. Visa, Access. Service dept.  
MUSICAL APPROACH, 137A Newport Road, Stafford (above Royal London Insurance). (0785) 55154. Linn Products, Arcam, Creek, NVA, Revolver, Audioteq, Onix, Epos, Marantz, Rotel and more. Home trial. Free installation. Service dept. Credit facilities available. Access, Visa. 9.30-5.30 Mon-Sat.

## SUFFOLK

EASTERN AUDIO 41 Bramford Rd Ipswich. (0473) 217217. Quad Audio Lab Denon Dual Marantz Mission NAD Nakamichi Technics Arcam. Mon-Sat 9.30-6. 3027

## SURREY

PJ HI-FI - the Hi-Fi Shop, 3 Bridge Street, Guildford, Surrey GU1 4RY. Tel: (0483) 504801. 9-6 Mon-Sat. Linn, Creek, Arcam, Quad, Revox, Musical Fidelity, Rotel, NAD, Nakamichi, Marantz. 3022  
ROGERS HI-FI, 13 Bridge Street, Guildford (0483) 61049. Ariston, Acoustic Research, Akai, Denon, JPW, Mordaunt-Short, Marantz, Onkyo, QED, Tannoy etc. Mon-Sat 9.30-6. Dem. facilities. Instant Credit. Access, Visa. Service dept.  
SPALDINGS HI-FI, 352-4 Lower Addiscombe Rd, Croydon, Surrey. (01) 654 1231. 3 dem rooms + home dem. Free installation, credit. Mon-Sat 9-6, Tues to 8. Closed Wed. Service dept. 3022  
SURBITON PARK RADIO, 48 Surbiton Rd, Kingston-Upon-Thames, Surrey. (01) 546 5549. Quad, Dual, Denon, Kenwood, Nakamichi, Rotel, Pioneer, QED, B&W, Tannoy. Dem and home trial facilities. Access, Visa. 9.30-5.00 Tues-Sat. Service dept.  
TRU-FI SOUND AND VISION, 2 Central Parade, Redhill, Surrey. (0737) 767404/766128. Aiwa, Audio Technica, B&W, Nakamichi, Mission, Mordaunt-Short, Nakoaka, Sony, Technics. Dem. facilities. Free installation. Service dept. 0% finance. Access, Visa. Mon-Sat 9.30-6.  
TRU-FI SOUND & VISION, 10 Church St, Leatherhead, Surrey. (0372) 378780. Sony, Technics, Panasonic, Mitsubishi, Ferguson, Aiwa, Pioneer, Sanyo, B&W, Mission. Free installation. Credit facilities. Access, Visa. 9.15-5.30 Mon-Sat. Closed Wed. Service dept.  
UNILET HI-FI, 35 High St, New Malden, Surrey KT3 4BY. (01) 942 9567. Kef, Mission, Musical Fidelity, NAD, Nakamichi, Quad, Rotel, Tannoy. Dem. Amex, Access, Visa, etc.

## SUSSEX (EAST)

DEFINITIVE AUDIO BRIGHTON, 8 Dyke Road Mews, 74-76 Dyke Road, Brighton BN1 3JD. (0273) 208649. Voyd, Systemdek, Audio Innovations, Helius, Audionote, JPW, Snell, Pirate Stands, Goldring etc. Home dems throughout Sussex. Credit facilities. Visa.

HASTINGS HI-FI, 33-35 Western Road, St. Leonards, E. Sussex TN37 6DJ. (0424) 442975. Linn, Musical Fidelity, Quad, Nakamichi, Arcam, Celestion, NAD, Denon, Yamaha, Tannoy. 2 listening rooms. Home trial. Free installation. Service dept. All credit cards welcome. Instant credit up to £1,000, written details on request. 9-6pm Mon-Sat.

JEFFRIES HI-FI, 69 London Rd, Brighton, East Sussex. (0273) 609 431. 2 dem rooms, closed Mon, late night Wed. Parking, bus route. Credit facilities. 3022  
JEFFRIES HI-FI, 4 Albert Parade, Green St, Eastbourne, East Sussex. (0323) 31336. 2 dem rooms, closed Mon. Late night Wed. Parking, bus route. Credit facilities. 3022

LASER SOUND & VISION, 72 Terminus Road, Eastbourne, East Sussex BN21 3LX. (0323) 640911. Marantz, Cambridge, Kenwood, Denon, Rotel, Infinity, Tannoy, Michell, KEF, Heco etc. Dem room. Home trial. Free installation. Service dept. Visa, Access. 9am-6pm Mon-Sat.

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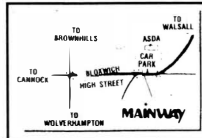
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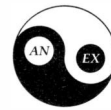
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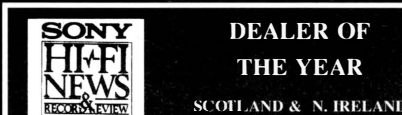
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# Audiophile Recordings

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

## ODIN SAMPLER

Ref CD2 £14.95

The Odin record label was established by the Norwegian Jazz federation in 1981. This 75-minute compilation on CD provides a taster from the label's catalogue. Not available on vinyl. Odin NJ-4028-2

## GEMINI/TAURUS SAMPLER

Ref CD3 £14.95

A pure jazz label, Gemini records was formed by producer Bjorn Petersen to record Norwegian jazz musicians who deserve wider recognition. Taurus is a subsidiary label presenting less mainstream music. This 15-track sampler is available only on CD. Gemini GMCD 6239

## 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

Water Lily Acoustics label, sponsored by Conrad-Johnson and imported from America. An essential addition to any audiophile's record 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 soundful 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 LP15 £12.95

Ref CD15 £14.95

A capella performances of Renaissance and medieval songs, beautifully



recorded in natural acoustic environments for the Norwegian For-X label.

CD: For-X FXCD39

LP: For-X FXLP39

**YTRE SULOENS JASS-ENSEMBLE / BARBARA ANN SHORTS: A Stone For Bessie Smith**

Ref LP16 £12.95

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, plays 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*. For-X FXCD69/FXLP69

**ROAR ENGELBERG / STEIN-ERIK OLSEN: Mosaic**

Ref LP17 £12.95

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! For-X FXCD81/FXLP81

**JIM BROCK: Tropic Affair**

Ref CD18 £15.99

Ref LP18 £15.99

Vibrant contemporary jazz, recorded live to two-track by Reference Recordings' Prof. Johnson. Remarkable clarity and a tremendous 3-D soundstage. RR13



**WILLIAM WALTON: Facade Suite**

Ref CD19 £15.99

Ref LP19 £15.99

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 £15.99

Ref LP20 £15.99

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 £15.99

Ref LP21 £15.99

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 £15.99

Ref LP22 £15.99

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 £15.99

Ref LP23 £15.99

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 CD24 £15.99

Ref LP24 £15.99

W177, WCD177/278

**JAMES B. WELCH: Recital**

Ref CD25 £15.99

Ref LP25 £15.99

W278, WCD177/278.

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!

**The Choir of Grace Cathedral, San Francisco**

Ref CD26 £15.99

Ref LP26 £15.99

W805, WCD794/805.

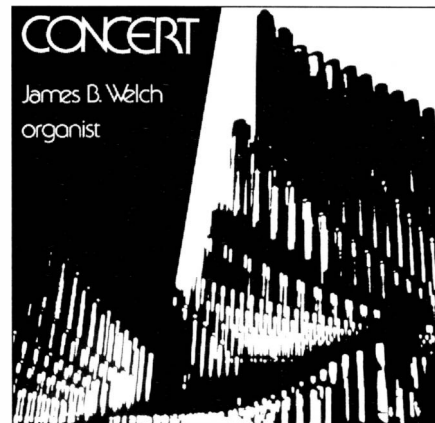
Another breathtaking example of Wilson Audiophile's pure analogue recordings, used as reference discs by hi-fi gurus around the world. The discs are hard to find in the UK.

**THELMA HOUSTON & PRESSURE COOKER: I've Got the Music In Me**

Ref LP27 £15.99

Ref CD27 £15.99

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:

**DAVE GRUSIN: Discovered Again**

Ref LP28 £15.99

Ref CD28 £15.99

ST500, CD5.

**HARRY JAMES & HIS BIG BAND: Comin' From A Good Place**

Ref LP29 £15.99

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**JIM KELTNER & RON TUTT: The Sheffield Lab Drum Record**

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LAB14, CD14/20

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LAB23, CD23.

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**Odin Sampler**

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- Ref CD3 (£14.95)

**Totti Bergh: *I Hear A Rhapsody***

- Ref LP4 (£12.95)
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**Smith/Ricci: *Paganiniana***

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**Shorts: *A Stone For Bessie Smith***

- Ref LP16 (£12.95)
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- Ref LP17 (£12.95)
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**Jim Brock: *Tropic Affair***

- Ref CD18 (£15.99)
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**William Walton: *Facade Suite***

- Ref CD19 (£15.99)
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**Stravinsky: *L' Histoire du soldat Suite***

- Ref CD20 (£15.99)
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**Vivaldi, Bach: *The Helicon Ensemble***

- Ref CD21 (£15.99)
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**Copland: *Appalachian Spring Suite***

- Ref CD22 (£15.99)
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**National Symphonic Winds: *Winds of War and Peace***

- Ref CD23 (£15.99)
- Ref LP23 (£15.99)

**James B Welch: *Concert***

- Ref CD24 (£15.99)
- Ref LP24 (£15.99)

**James B Welch: *Recital***

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**The Choir of Grace Cathedral San Francisco: *Music for Easter, Ascension and Pentecost***

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**Thelma Houston and Pressure Cooker: *I've Got The Music In Me***

- Ref LP27 (£15.99)
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**Dave Grusin: *Discovered Again***

- Ref LP28 (£15.99)
- Ref CD28 (£15.99)

**Harry James and his Big Band: *Comin' From A Good Place***

- Ref LP29 (£15.99)
- Ref CD29 (£15.99)

**Jim Keltner and Ron Tutt: *The Sheffield Lab Drum Record***

- Ref LP30 (£15.99)

**The Sheffield Lab Track Record**

- Ref LP31 (£15.99)

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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 sold 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 – ie 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 it is best to refer to the original review for this, of which more later.

The next column(s) 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 arm matching figures are given with the cartridges which tie in with the mass figures for the tonearms themselves, making it easier to avoid compliance/ mass mismatches.

Perhaps the most influential letters in the Directory are those found in the Value column, the *Rs* and *BBS* denoting the Recommended and Best Buy ratings that are appended to products we consider meritworthy. The Best Buy tag means that a product not only offers good sound quality but is reasonably priced as well. With source components a price limit of approximately £300 is usually used as a guide. Recommended means that either the performance of a product is particularly good irrespective of price or, alternatively that a good value standard is achieved but overall attainment falls short of Best Buy classification. An ideal situation would be to choose suitably priced Best Buy or Recommended products from relevant categories and create a Best Buy system, but, due to

the variety in tonal balance that exists in much audio equipment (especially the electromechanical elements – ie cartridge and speaker) system building is 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 Directory is constantly updated with the latest reviews and price changes as well as having 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 and an asterisk 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 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 pre-recorded 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 pre-

recorded music cassette material. As a hi-fi medium cassette suffers from pre-recorded 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 replays 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 over time 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 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 demonstrate 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 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 mechanically compatible cartridges (see cartridge listings).


### INTEGRATED TURNTABLES

NAME PRICE	LAB SOUND	COMMENTS	FEATURES ARM EFF. MASS	VALUE	BACK ISSUE FULL REVIEW
Acoustic Research EB101 £230	Good Good	This genuine high fidelity product offers an impressive package at a competitive price	Subchassis, manual, 13.5g	BB	48
Alphason Solo/Xenon MCS £420/£300	Average+ Good	The deck is warm and euphonious with high levels of clarity. Wow artefacts occasionally just audible.	3 point suspended motor unit, optional quartz PSU/speed change 13g		67
Alphason Sonata/HR-100S 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
Ariston Q-Deck £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
Ariston Icon £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
Ariston Forte £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
Dual CS430 £100	Average Average—	Ragged, sometimes unpleasant cartridge mixes with a modest pleasing player in a very sharply priced package.	Belt drive, with cartridge, auto return, 5g	R	67
Dual CS505-3 £160	Very Good Good	Continuous steady improvements have kept this model at the forefront of the budget market. Practicality is excellent and the deck has excellent timing bass/mid and stereo imaging	Semi-auto belt drive, 8g	BB	67
Dual CS5000 £230	Average Average+	The rare 78 facility may give grandma's collection a new lease of life but the player did not merit recommendation on price vs sound	Electronic, belt drive, subchassis, 10g		48
Goldmund ST4 £4,589	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 headshell	R	60
Heybrook TT2 turntable & arm £424/£269	Average Good+	A gradual process of informed evolution and a sensibly designed arm combine to make this a good sounding middle of the road package. Well supported by dealers	Manual subchassis motor with arm, belt drive, 14g	R	67
JVC AL-FQ555 £170	Below 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
Kenwood DP-990 £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
Kuzma Stabi/Stogi £699/£399	Average+ Stabi: Good; Stogi: Excellent	Stabi is powerful, spacious but not sufficiently subtle. Stogi is an excellent all rounder with even spread of abilities.	Manual, belt drive, subchassis, 12.5g	Stogi: R	60
Linn Axis/Akito £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
Linn Sondek/Ittok/Troika* £549/£483/£669	Excellent Very Good	Superb sound – the best LP12 combination yet. The Troika gives the system real solidity and strength, stretching the deck and arm qualities to the full. Arm has since been upgraded	Manual subchassis player, belt drive, 14g	R	60
Manticore Mantra/Musician £340/£170	Good+ Good+	Well engineered deck with satisfying sound. The arm is particularly fine and very good value	Belt drive, suspended, 15g	R	79
NAD 5120 £90	Average Average	A number of running improvements have given this player a range and tautness denied its lazier sounding antecedents.	Semi-auto belt drive, detachable arm/tube/weight, 9g	BB	67

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# THE DIRECTORY

## INTEGRATED TURNTABLES

NAME PRICE	LAB SOUND	COMMENTS	FEATURES ARM EFF. MASS	VALUE	BACK ISSUE FULL REVIEW
Omega Point Silver/Black £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 'welligie'	Manual, solid, belt drive, unipivot, 11g		55
Opus 3 Continuo/Decca London International (Revised)* £599/£99	Poor Good	Heavyweight motor unit with many fine properties, but which needs further development. The idiosyncratic arm is a suitable (though not ideal) platform for the Decca cartridge. For all its faults though, the whole transcends the sum of the parts	Belt-drive manual, damped unipivot arm, 12g		67
Rega Planar 2 £155	Average+ Good	A remarkable product at the price, surprisingly articulate and confident	Manual, 11.5g	BB	48
Rega Planar 3 £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
Revolver Rebel £169	Average— Average—	Fat, assured and forward presentation, but ragged and subjective speed stability problems. With a little further development, it will be a winner	Manual, 2-speed belt drive inc cartridge, 13g		67
Revox B291* £892	Average— Average—	Sound quality ranks as below average. Subjective bandwidth is narrow and the music lacks grace and energy. Ease of use however is unrivalled	Automatic, remote controllable, direct drive parallel arm, prefitted cartridge		55
Roksan Xerxes/Artemiz/Shiraz £695, £595, £655	n/a Very Good	Imaginatively designed, sophisticated front-end system, a little drier than some perhaps, with superior stereo, resolution and presence	2-speed manual, MC cartridge, 9g	R	72
Rotel RP-855 £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
Systemdek IIX £248	Good Average+	Poised, clean sounding deck, forward and explicit in character. A good value deck under £250, and a relatively cheap and satisfactory suspended model	2 speed belt drive manual turntable and arm, 11g	R	67
Technics SLBD-22 £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
Technics SL-DD33 £110	Average Average	As with the QD33 though better value	Automatic, direct drive, solid plinth, 7.5g, P-mount	BB	48
Technics SL-L20 £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
Technics SL-QD33 £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
Thorens TD 280 Mk II £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
Thorens TD 166 Mk V £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
Thorens TD 316 Mk II £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
Thorens TD320 Mk II £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
Townshend Rock Reference/Excalibur £1,800/£650	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
Well Tempered WTAT £1690	Average Very Good	Intriguing and challenging design. Musically it is not ideal, but it has a limpid quality and a lack of artificiality that sets standards as well as turning the ear, though it's not completely uncoloured. A charmer yet mainstream enough in its virtues to be viable	Manual 2-speed, damped, suspended arm, 7.5g	R	67
Zarathustra S4/Pluto 5A Prestige/PSU £1500/£2500/£500	n/a Excellent	The very well made and finished heavy platter S4 with the superb Pluto arm make a devastating combination ranking up there with the very best	Subchassis, manual, available without PSU	R	72

## MOTOR UNITS

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Ariston Superior £598	Good+ Good	Good but slightly damped sound quality, with powerful and stable bass. The pro quo is a certain lack of pace, energy and resolution	Belt drive, subchassis, electronic		55
CEC ST930 £599	Good Good++	A rarity – a serious hi-fi product that loses nothing to budget rivals in finish or convenience. Good clean sound, very stable and assured	Belt drive, external PSU, 78 speed inc.	R	79
CS Audio Resan kit for Rega £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
Michell Synpro £265	Good Good	A particularly happy blend of qualities endows the Synpro 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
Michell Gyrodec £595	Good Good	Sweet and natural sounding player, well exploited by the Rega RB300 arm. Aesthetics, and the acres of acrylic, are unique	Manual, belt drive, suspended motor unit		55
NVA Senior £450	Good— Average	Very high sensitivity to low-frequency vibration, especially on NVA stand, gives strange subjective bass response and confused sound. Looks are unusual but pleasing	Belt drive, electronic PSU, two-part plinth		79
Oracle Alexandria Mk III £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
Origin Live Oasis B £199	Average Average+	Aesthetics are not its strong point, but its lively and articulate – if idiosyncratic – sound will please some tastes. Highly resonant construction is very sensitive to feedback	Belt drive, 33 $\frac{1}{3}$ rpm only, solid plinth/subchassis		79
Origin Live Oasis A £495	Good— Average	Rather coarse sound with lack of detail resolution – but lively presentation may appeal. Appearance is industrial	Belt drive, external mains filter, 33 $\frac{1}{3}$ rpm only, suspended subchassis		79
Oxford Acoustics Crystal 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
Pink Triangle Little Pink 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
Pink Triangle PT T00 £650	Very Good Excellent	Uniquely clear sound, uncoloured, free from ringing and with good bass. Very close to master tape, given a good arm and cartridge	Belt drive, external PSU, suspended subchassis	R	79
Revolver £150	Average Average	Nicely balanced, but unimpressive timing and lightweight bass made this deck rather average for the price. Manufacturer has since made several changes, but not re-submitted for review	Manual, belt drive, solid plinth		48
Roksan Xerxes £695	Excellent Very Good	This unique design cuts a swathe through the conventions of turntable design, providing superb resolution and stereo. Power supply has since been upgraded – see issue 78 for our latest report	Manual, belt drive, solid/decoupled	R	67
Systemdek IIXE £248	Good Very Good	Fine, honestly specified and well built player which easily better its closest stablemate, the IIX. Frankly, at the price it's a sonic bargain	Manual 2-speed, external PSU	R	67

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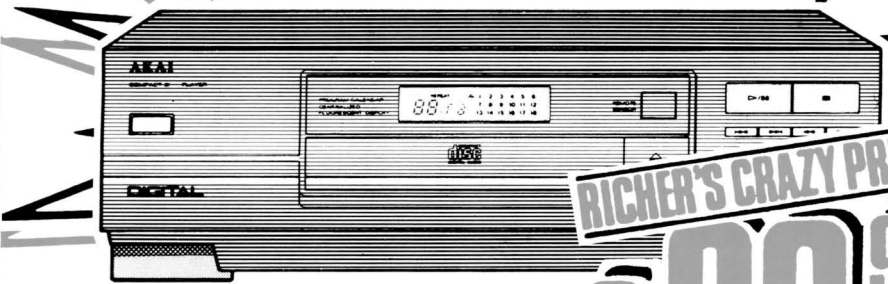
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# THE DIRECTORY

## MOTOR UNITS

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Systemdek IV £495	Good Very Good	The level of wow is a theoretical concern at least, but elsewhere this player shines, combining euphony, information and imaging in a polished, untemperamental package	Two-speed manual belt drive	R	67
VPI HW-19 £1,317	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
Voyd Valdi £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
Voyd "The Voyd Plus" £2,777	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

## TONEARMS

NAME PRICE	LAB SOUND	COMMENTS	ARM EFF. MAS	VALUE	BACK ISSUE FULL REVIEW
Airtangent 1B £1990	n/a Excellent	A complex but superbly built arm for high quality systems, giving excellent stereo and resolution	7.5g (vertical)	R	This
Alphason Opal £130	Good Average	This is a straightforward adequate sounding low cost arm, priced just above where it rightly belongs	10g		55
Alphason Delta £190	Good Average+	A highly competent design from Alphason gives good sound quality but with slight blurring and treble fizz	16g	R	48
Alphason Xenon £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
Alphason HR100S £420	Good+ + Very Good	This S-shaped arm sounds smooth, but nevertheless reproduces transients with fine attack	10g	R	48/Coll
Ariston Enigma £99	Average Average+	Good but not the best in its class: mid-band sounds a little uneven; treble a trifle "brash"	11.5g		48
Audio Technica AT1130 £186	Good Good	Well suited to most cartridges including high compliance ones, the AT is smooth and tonally neutral, if slightly lacking in 'balls'	8.5g	R	67
Decca London International £49	Average+ Average+	This uni-pivot design gives a rather rich tonal balance and some bass muddling. Could be good with Decca cartridges, but not well built	12g		48Summary
Eminent Technology £1000	Good+ Good+ +	One of the best sounding tonearms around, the linear tracking Eminent delivers impressive stereo imagery, focus and transparent sound	9g (vertical)	R	48/Coll
Goldmund T3F arm £4400	Excellent Excellent	This complex parallel tracker created an "ear-opening" experience when tested with a (since updated) Goldmund Studio turntable	16.5g	R	Coll 2
Grace G707 £299	Good Good+	This venerable is still capable, if not competitive with modern alternatives	7g		48
Helius Orion 2 £490	Very Good Very Good	Excellent engineering with rigid bearings, free from slack. It remains expensive but the level of performance deserves Recommendation	12g	R	48
Kuzma Stogi Reference £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
Linn Ekos £895	Very Good Very Good	Superb, state of the art design which builds significantly on Ittok's strengths	9g	R	67
Mission Mechanic £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
Moth Arm £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
Rega RB300 £115	Good+ + Good+ +	Despite its modest price this sets exceptional performance standards and could be used on a number of high-quality turntables	10-11g	BB	60
Roksan Artemiz £595	Average Good	Interesting design which works a treat on the Xerxes deck. Fits Rega cut-out. See issue 72 for up to date assessment	8g		67
SME 3009 Series IIIS £165	Good Average+	A simplified less flexible (as regards adjustment) Series III with a similarly 'soft' sonic character	5g		48
SME 3009 Series III £229	Good Average+	Comprehensively adjustable and very well made, suited to MM and high compliance MC cartridges	5g		48
SME 3009R £291	Average+ Average+	A higher mass version of the Series III designed for low compliance MC cartridges	12g		48
SME 309 £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
SME Series IV £810	Excellent Very Good	Superb engineering and finish with a finely balanced sound giving impressive stereo focus and low coloration	10.5g	R	60
SME Series V £1206	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
Souther Tri-Quartz £895	Average Good	A unique parallel tracking arm that makes up for what it lacks sonically in its unusual appearance	3-4g		48

\* rating refers to original tested model

## 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 (see Turntable & Tonearm entries)

NAME PRICE	LAB SOUND	COMMENTS	ARM OUTPUT/type	VALUE	BACK ISSUE FULL REVIEW
Arcam C77 £22	Average+ Average+	A sensible moving magnet package with good bounce at a competitive price	6-16g Normal, MM	BB	48

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## THE DIRECTORY

## CARTRIDGES

NAME PRICE	LAB SOUND	COMMENTS	ARM OUTPUT/type	VALUE	BACK ISSUE FULL REVIEW
<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'	3-8g 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 + Good + +	Not the very clearest in complex high-frequency sounds, but lively and exciting, good transients	5-11g Low, MC	R	85
<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 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>Audioquest AQ 404i-L</b> £400	Good + + Good +	Slight harshness detracted from the performance of this otherwise clear-sounding and detailed cartridge	8-16g Low, MC		84
<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 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
<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 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>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>B&amp;O MMC5</b> £24	Average + Average	Cheapest in the family - smooth treble and good focus, but the bass was left in the wings	5-15g Normal, MM		38 (Summary)
<b>B&amp;O MMC4</b> £43	Good Average +	Solid and well balanced in the midrange, the '4 lacks bass impact	5-15g Normal, MM		48
<b>B&amp;O MMC3</b> £57	Good Average	Slightly "laid back" sound quality but a good performer for the price. Best suited to B&O equipment	5-15g Normal, MM		48
<b>B&amp;O MMC2</b> £87	Good Average +	Only a modest improvement on its cheaper brothers (and sisters)	5-15g Normal, MM		48
<b>B&amp;O MMC1</b> £112	Very Good Good	Great clarity and detail at high frequencies but a slightly plodding bass. It may appeal more to the classical enthusiast	5-13g Normal, MM		48
<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>Clear Audio Gamma</b> £295	Average Average +	Brimming over with enthusiasm, the unusual-looking Gamma is more than an audio oddity, but it lacks a little subtlety at times	4-11g Low, MC		54
<b>Clear Audio Delta</b> £450	Average + Good	Midway between the Gamma and exotic Pradikat. The Delta sounds like neither! Nevertheless, it delivers the goods	6-17g Low, MC	R	54
<b>Clear Audio Signature</b> £995	Average + Good	This latest MC to emerge from Clearaudio features yet another graded version of its proprietary generator. Its sound strikes a balance between the Delta and Prad	4-11g Low, MC		72
<b>Clear Audio Pradikat</b> £1225	Average + Very Good	Sounded absolutely glorious, creating a full sense of scale and a large well-focused soundstage - but watch for record wear	8-18g MC		Coll
<b>Clear Audio Accurate</b> £2,000	Good Excellent	A remarkable cartridge, not only by virtue of its effortless and highly neutral sound quality but also because this has been achieved with the same basic design as Clearaudio's cheapest MCs	4-11g Low, MC	R	60
<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>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>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		48
<b>Dynavector DV10X IV</b> £125	Average Average +	Fine sounding and realistically priced, damping is recommended to ensure successful tracking ability	8-18g 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	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	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 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 Low, MC	R	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>Glanz MFG 11 OEX</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	Systems
<b>Glanz MFG310-LX</b> £50	Good + Good + +	Detail and treble outstanding for sub-£100 cartridge. Slight coloration may be due to body resonance.	6-10g Normal, MF	BB	85

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# THE DIRECTORY

## CARTRIDGES

NAME PRICE	LAB SOUND	COMMENTS	ARM OUTPUT/TYPE	VALUE	BACK ISSUE FULL REVIEW
<b>Glanz MFG610-LX</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>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 Low, MC		67
<b>Glanz GMC20E</b> £129	Average Average	You could try haggling but we thought the makers of this number were demanding too much lucre for their product	3-6g Low, MC		48
<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 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 ers 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>Grace F9E II</b> £240	Good Good	For lively presentation, excellent separation and generally satisfactory sonic delivery - consider this model	5-10g Normal, MM		48
<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>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>Highphonic MCA3</b> £360	Very Good Good +	Exquisitely crafted by a group of ex-Denon engineers, this superb tracker had a sweet and seductive (if rather bright) treble	5-12g Low, MC		43
<b>Kiseki Blue Goldspot</b> £450	Good + + Good +	Good bass and imaging, but hints of spit and coloration let the side down slightly	8-15g Low, MC		84
<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		Collection
<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 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>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 K5</b> £32.50	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> £81	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	48/Coll
<b>Linn Asaka</b> £299	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	48/Coll
<b>Linn Karma</b> £465	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	48/Coll
<b>Linn Troika</b> £669	N/a Very Good	Ex-Karma users have been seen with glazed expressions indicating smug self-indulgence the morning after fitting a Troika	8-18g Low, MC		Coll
<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	48/Coll
<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 OM5E</b> £15	Average - Average -	The OM10 is a hi-fi cartridge - the OM5E is not	5-16g Normal, MM		43
<b>Ortofon OM10</b> £20	Average Average	One of the leading "cheapers", 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 510</b> £30	Good Good +	For the price, a good blend of virtues - weight, clarity and neutrality	3-11g Normal, MM	BB	85

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NAME PRICE	LAB SOUND	COMMENTS	ARM OUTPUT/TYPE	VALUE	BACK ISSUE FULL REVIEW
Ortofon 520 £50	Average Average+	Very sensitive to load capacitance this new Ortofon maintains the company tradition for a lively, effervescent SQ	7-16g Normal, MM	R	67
Ortofon 530 £80	Good+ Good+	Very clean and assured sound; transients not quite perfectly pure but plenty of detail.	4-11g Normal, MM	R	85
Ortofon X1 £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
Ortofon MC10 Super £70	Average Good	"What a delightfully sweet-sounding cartridge this is..." we said	5-15g Low, MC	BB	48
Ortofon X3 £70	Average Average	A lack of bass power, definition and a "zitty" top end makes this competent but uninvolved	5-15g Normal, MC		48
Ortofon OM40 £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
Ortofon 540 £100	Average- Average	Graced with an advanced FGII stylus our sample possessed too high a compliance for broad arm matching. It could also sound a little unforgiving	3-8g Normal, MM		67
Ortofon MC20 Super £200	Average+ Good+	An "inviting" sound quality; polite rather than exciting it approaches much more expensive models, but does not better them	6-15g Low, MC	R	48/Coll
Ortofon MC30 Super £270	Very Good Good+	Beautifully engineered and well-balanced, it was slightly criticised as bland, though some may appreciate the lack of rough edges	5-14g Low, MC		Coll
Ortofon Quasar £300	Good+ + Very Good	Many of the qualities of the MC3000, although a touch bright. Good detail and delicacy	8-15g Low, MC	R	84
Ortofon MC3000 MkII £850	Very Good Excellent	Low levels of body resonance are a real ear-opener. Nothing to criticise elsewhere; one of the very best	9-16g Low, MC	R	84
RATA RP20 £22	Average- Average	Good integration, a clear dynamic midrange and the beginnings of fine stereo imagery merits clear recommendation	6-14g Normal, MM	R	48
RATA RP40 £44	Average Average+	The '40 did a good job of sorting out the layers and complexity of the mix, with good focus, excellent stereo spread and fine scale	6-15g Normal, MM	R	48
RATA RP70 £77*	Average Average+	Clearer and sweeter than the '40 this also seemed heavier and less lively. For £99 you can have a van den Hul stylus	6-14g Normal, MM		43
RATA RP70vdH £99	Average+ Good	Able to retrieve bags of musical detail (thanks to the vdH stylus), RATA's top cartridge ranks as one of the most articulate MM's available	11-18g Normal, MM	R	67
Rega Bias £34	Average Average+	Difficult to mount in some arms due to its shallow build, the bias offers a gentle, refined SQ that certainly makes it worthy of audition	4-10g Normal, MM		67
Rega Elys £74	Good Good	Clearly superior to the Bias, despite their common heritage, the Elys is both more detailed, accurate and musically convincing	8-15g Normal, MM	R	67
Revolver £20	Average+ Average	This modified AT-95E enjoys a very lively mid and treble even if the bass is somewhat 'slower' in protection. A firm budget buy	8-16g Normal, MM	BB	67
Shure M92E £17	Average- Average	Though lacking depth, the overall sound quality was competent, but treble was not its forte	10-15g Normal, MM		43
Shure M99E £29	Average- Average-	Sister to the 92E this is a solid but not particularly exciting cartridge	5-10g Normal, MM		38 (Summary)
Shure ME75ED £26.50	Average Average-	Rather bright and splashy in the high frequencies but nevertheless a competent model	5-10g Normal, MM		38
Shure M104E £36	Average- Average	Capable in many ways, but giving no substantial improvement over the 92E in our view	5-15g Normal, MM		38
Shure ME97HE £49	Average Average+	It won't turn a sow's ear of a turntable into a silk purse, but will at least keep going and produce an acceptable result	8-20g Normal, MM	R	48
Shure M105E £49	Average Average-	A slightly 'spitty' sound lacking deep bass and dynamic contrast, but can be used in virtually every system where it will perform "unobtrusively"	5-12g Normal, MM		38 (Summary)
Shure M110HE £60	Average Average	Sound quality was thought eminently presentable, but not exciting; smooth clear high frequencies, but a loss of bass definition	5-10g Normal, MM		38 (Summary)
Shure M111HE £72	Average Average	Early reviews of this cartridge complained principally of the price - which has since come down	5-10g Normal, MM		38 (Summary)
Shure ML120HE £95	Average+ Average+	Quite decent sound quality and a generally fine balanced performance	6-18g Normal, MM		48
Shure ML140HE £120	Average+ Good	Qualitatively the treble of this well-balanced moving magnet model was a match for many moving coil cartridges	6-16g Normal, MM		43
Shure V15 VMR £215	Good Average+	Initial listening gave promising results, but extended familiarity gave the feeling of a lack of energy and a "shut-in" sound	5-12g Normal, MM		38
Shure VST V £158	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
Shure Ultra 500 £499	Good Good	There was no doubting the accomplishments of what could well be the finest moving magnet cartridge around	6-14g Normal, MM		48
Stilton/AT-F3 £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
van den Hul MC10 £499	Good Good+	A neutral balanced performer giving transparent midrange, fine depth and focus with firm extended bass. Gosh!	5-10g Low, MC	R	60
van den Hul MC One £699	Good Very Good	This extended all the positive qualities of the '10 but added greater authority and scale - worth it for the extra money	6-12g Low, MC	R	60
van den Hul MC1 Super £800	Good+ + Very Good	Slight softening effect on transients was the only real flaw, but it didn't quite seem to have that special touch one expects for the money	8-15g Low, MC		84
van den Hul MC Two £899	Good Very Good	Connected directly to any standard MM input the vdH MC Two rewards with a highly detailed yet fluid and musically convincing portrayal	6-13g Normal, MC	R	72

\* rating refers to original tested model

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## AMPLIFIERS

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Conrad-Johnson Premier Seven £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
Creek CAS 4040 S2 £179	Good Good	More neutral than its predecessor tonally, substantial improvements in transparency were also noted, while the lively punchy, character is retained	30W, MM, 4 inputs, tone controls	BB	62
Creek CAS 4140S2 £219	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
Creek CAS-5050 £399	Average Good	Strong RF IMD compromises the sound of the CD input which contrasts with the delightful performance via MM/mc	72W, MM/mc, aux CD and video + pre/power mode	R	74
Croft Super Micro A £549	Average+ Very Good	The looks are somewhat improved, while this 'hot rod' version with tuned components performed very well indeed. There is still no gain on the line inputs	4 inputs, MM, straight line	R	57
Croft Series IV(S) £850	Good Good	The original IV is still available now supplemented by the higher price and power (S); both are fine performers	40(60)W channel	R	57
Croft Series IVSA £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
Cyclone Catalyst £1995	Good+ Very Good	Exceptionally load tolerant and very refined in delivery. Extra options available in future	74W, external MM or MC stages, 3 line inputs	R	80
Deltec DSP-50S DPA-50S Pre/Power £725/£925	Excellent Very Good+	Remarkable pre/power combo based around the highly linear DH-0A32 hybrid op-amp. Unmatched detail resolution, control and transparency	63W, external feedback wiring, 3 line, MM/mc no tone controls	R	68
Deltec DPA 100S £2200	Very Good Very Good	A top-quality transistor power amp, sounding fast, articulate and well controlled, though maybe a touch clinical for some tastes	80W	R	50
Denon PMA-250II £140	Good Good+	Spacious yet tactile and gutsy sound via all inputs. Worthwhile upgrade over original PMA-250	53W, MM 3 line inputs, source-direct	R	80
Denon DAP-2500 PDA-4400A Pre/Power £549/£599 pr.	Very Good Good	Denon's fully-fledged preamp also incorporates D/a converters that did not improve the sound of our £299 CD player. The power amps are brilliant!	172W, monoblocks Opt/Coax dig + 2 tape, 4 line and MM/mc inputs	R	68
Denon PDA-6600 £1,000/pair	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
DNM 3A From £1000	Good+ Very Good	The DNMS in its acrylic case is a remarkably revealing and neutral state of the art preamp	5 inputs MM/mc twin vol controls	R*	44
E.A.R. 802/509mkII £1098/£1868	Average Very Good	Extremely well made and combining the sonic strengths of both transistors and valves this EAR combo warrants attention	100W, MM, 6 inputs, monoblocks	R	63
E.A.R. 549 £3,628/pair	Very Good Very Good	A valve monoblok that measures like a solid state amp is itself an achievement, but exceptional power delivery and bass 'slam' is not fully matched by delicacy and transparency elsewhere	200W monoblok, bias setting	R	60
Exposure VII/VIII £430/£470	Very Good Good	Supplied as a combination without the separate preamp power supply, this pre power combination performed satisfactorily especially on the moving coil input	50W, MM/mc, 3 inputs, straight line	R	62
Exposure VI/VII*/VIII Pre/Power £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
Exposure XI/XII/VIII Super £1600	Good Very Good	New preamp and improved power amp led to a smooth and refined sound, MM/mc less transparent than CD	61W, MM/mc, 5 line inputs	R	80
Grant G60AMS £948 pr.	Good Very Good	This neat and compact 60W valve monoblok gave good sound on the 8ohm tap, better still on 4ohms. The midrange was particularly natural	60W monoblocks 8ohms	R	57
Hafner DH120 kit form £295	n/a Fair	We didn't build one; see below	60W	R	44
Hafner XL-600 £1,145	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
Hafner DH120 assembled £360	Very Good Fair	Sound quality results were decent enough, but this power amp won't set the world on fire at this price	60W	R	44
Harman Kardon HK6100 £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
Harman Kardon Citation 25/22 £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	R	74
Jadis JP30/JA30 £4,145/£4,200	Fair Excellent	Two-box preamp plus monoblok power amps, classic valve design gives stereotype valve sound. Beautiful build, nostalgic styling and delightful sounding midrange transcend limitations at frequency extremes, in lab, and re cartridge matching	30W 2-box pre-, monoblok power, MM-only, 4 line inputs	R*	60
Jeff Rowland Coherence One/Model 7 £3950/£9900	Very Good Very Good	The technical design of these amps is very elaborate but ensures they achieve an extraordinarily transparent and potent sound. However, the CD i/p is clearly superior to the disc inputs	448W monoblok MM/mc with variable loading options. Balanced topology	R	72
Kelvin Labs Absolute Zero/M30 £395 + £295/£595pr.	Good+ Average+	Latest versions of the M30 offers a true 30W Class A and a slightly muddled but very comfortable sound. MC preamp is a very linear design	33W monoblok MC only + 4 line inputs. Separate L/r balance	R	74
Kelvin Integrated £395	Good+ Very Good	A true 20W Class A amp with lush, detailed and very musical sound to match. Watch out for re-style	18W, MM/mc, 4 line inputs	R	80
Kenwood KA-550D £130	Very Good Fair	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, hdpd, tone controls	R	62
Kenwood KA-4010 £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
Kenwood KA-5010 £210	Good Good	Offers a slightly bass-light but very smooth, fresh and alive sound. Well built and sensibly equipped	101W, MM/mc, cd 3 tape, tuner, aux + direct	R	74
Kenwood KA-7010 £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	R	74
Klyne SK5a £2590	Very Good Very Good	Beautifully made and presented this American thoroughbred has a good lab performance, but although versatile, is rather expensive for the quality of sound offered	Balanced output, versatile cartridge loading	R	72
LFD £2,995+	Very Good Excellent	Can set the subjective standards that others merely aspire to, but this outstanding if unconventional multi-box preamp needs careful matching to ancillary components	MC (with care), passive line extra	R	60
Lectron JH50 £2,300	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	R	78
Linn LK1/LK280 Pre/Power £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.	R	68
Marantz PM-50 £230	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	R	80
Marantz PM-75 £500	Good Average	More successful than most amps with on-board DACs but still not as balanced as other Marantz products	136W, opt/coax dig inputs, 6 line + MM/mc	R	68

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## 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

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
<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>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 converters were less successful than its conventional analogue CD input.	112W, coax and optical dig inputs. MM/mc		68
<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>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>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
<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 200</b> £429	Poor 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 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 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	12W, MM and 4 line inputs	R	77
<b>Audio Innovations Series 1000/2nd Audio Amplifier</b> £1379/2579	Poor Excellent	This valve combination offered awesome dynamic range with superb transparency and power to match. Compatibility with other brands is unpredictable	15W, MM, 6 inputs, monoblocks	R	63
<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 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 8000P</b> £495	Excellent Good +	A dynamic powerhouse, load tolerant and sonically reliable	100W	R	62
<b>Audion CD-1</b> £399	Average + 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> £189	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>Bead Audio CA35/P35mkII</b> £695/£895	Fair + 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>Bead 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>Bead 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>Cello Audio Suite</b> £1200	Excellent V Good/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>Concordant Excelsior</b> £856	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 PV10</b> £1,395	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>Conrad Johnson MV50</b> £1995	Good + Good +	Coupled with the PV5, this CJ power amp performed well on audition	50W		Collection
<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

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# THE DIRECTORY

## AMPLIFIERS

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
<b>Marantz PM94</b> £1,200	Very Good Good	At 23kg the PM94 is no lightweight in either physical or sonic respects. A very powerful and comprehensively equipped amplifier	140W MM/mc tone controls (switchable)		60
<b>Marantz PM-95</b> £1,800	Very Good Average+	Beautifully constructed, this amp was less convincing via its digital i/p 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 remote capable straight line	R/—	62
<b>Mission Cyrus One</b> £200	Very Good Good	A red hot class winner, which caused the whole issue to be re-rated! It's even well built – however, the headphone socket will only take a 3.5mm jack	30W, MM/mc, 5 inputs, hdph, straight line	BB*	62
<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</b> £330	Very Good Very Good	Also a top performer in its group with fine moving coil and compact disc sound. Since our review Mission has omitted the headphone socket on the Cyrus Two	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 A1</b> £269	Good Good++	Fine-ranking in terms of overall sound quality for money, the excessive heat output could be hazardous to your vinyl if you're careless	20W MM/mc 4 inputs straight line	BB	56
<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 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 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 P270</b> £1,399	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>Musical Fidelity MXV/a370</b> £2399/£2399	n/a Excellent	In its latest guise, the A370 confirms its status alongside the MXV as amongst the best indigenous components for both sound and presentation	MXV – mm/mc/4 line/phase invert. A370 – 150W	R*	72
<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+ Fair	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£8,000	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>NVA P70MC/a60</b> £830	Fair 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>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>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>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>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>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	Good+ + Good+	Redesigned 240SA represents a significant allround improvement 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>Quad 34</b> £299	Very Good Fair	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 Fair	Not an impressive power amp but easy on the ear if not pushed and very reliable	100W		44
<b>Ray Lumley Model 75</b> £1,995 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> £1,047	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> £1,467	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 RA810A</b> £120	Very Good Fair	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-840BX4</b> £250	Good Good+	Very sedate and controlled in presentation but must check phasing for optimum stereo effect	63W, MM/mc, 4 line inputs, passive tone	R	80
<b>Rotel RA870BX</b> £330	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 RB/RC850</b> £160/£140	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-870BX/RB-870BX Pre/Power</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 in bridged mode. CD direct, 4 line, 2 tape and MM/mc	R	68

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## AMPLIFIERS

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
SAE P102/A202 £499/£599	Average + Average +	Microprocessor-controlled pre and power amp that sounds much better at low rather than high volume levels. Pro-oriented aesthetics	151W, MM/mc + CD tuner and 2 tape tone memory, spk switching		74
Solen Tiger B50 £870	Average - Food +	Stylish French hybrid with a very rich, melodic and beguiling sound. Not so hot with complex recordings	45W, optional disc, 5 line inputs		80
Sony TA-F200 £130	Average - Average	Over-ambitious protection circuit is hardly in keeping with modern amp design. Lean but 'dead' sound quality.	74W, 2 tape, 3 line and MM/mc inputs		68
Sony TA-F400 £200	Good Average +	Some lack of integration across the frequency range but still offers a more open and detailed sound than the F200	76W, 2 tape, 3 line and MM/mc inputs. Rec-out		68
Sony TA-F530ES £300	Good Average +	Chunky UK-oriented design that offers a rich, smooth and full sound. Slight loss of focus via MM/mc disc	120W, MM/mc, 4 line sources + record out + tone	R	74
Sony TAF 500ES £349	Good + Fair	Not too hot at the price, lacking in bass action, rating poorly on vinyl, and only marginally improving on CD	75W hdp tone controls MM/mc		50
Sony TA-F630ESD £350	Good Average	Based on the '530 but equipped with PDM D/a convertor. Amp is competent but DAC sounds truly magnificent!	130W, as above + opt. and coax digital inputs	R	74
Sony TA-F730ES £450	Very Good Good	A very stable and coherent amp but one that lacks a crucial sense of involvement	133W, MM/mc, 3 tape, 2 line, full rec-out		80
Sony TAF 700ES £500	Good + + Fair	Scoring higher than the 500 but still not offering the sort of standards set by the competition. But many buttons to push	100W MM/mc tone controls		50
Sumo Athena/Polaris £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
Sumo Nine + £1200	Very Good Excellent	Macho styling of this class A stereo power amp conceals a sonic subtlety that is exceptional for the price, limited by lots of waste heat and a noisy fan on our sample (being improved)	65W	R	60
Sumo Andromeda £1585	Very Good Very Good	Well made with lots of power from a sensibly sized box. It was good in the lab and demonstrated a sound which offers a fine blend of performance at an almost reasonable price	200W, balanced input	R	72
Technics SU-V660 £250	Good Fair	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
Technics SE-M100 £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 MM or MC disc	R	74
Vacuum State FVP £999	Good Very Good	This well thought out valve preamplifier is designed for optimum musicality and transparency, a goal which is handsomely achieved	5 inputs, MM, straight line	R	57
Yamaha AX-330e £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
YBA Model 3 pre/power £995/£995	Good Good	Suited to high 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 l/r p's. Separate L/r volume controls		72
YBA 2 pre & pwr £1395/£1695	Good + + V Good/Excellent	Superbly finished French audiophile separates, with very good space and transparency, slightly softened bass. Needs extra transformer (£300) for MC cartridges	70W MM (MC extra) straight line	R	56
YBA 1 preamp £2895	Very Good Excellent	A front line French audiophile product. Great stereo and a fine Krell style finish	MM/mc, 3 inputs, straight line	R	62
YBA 1 power amp £2995	Good Excellent	This equally well finished power amp offers front rank stereo staging and transparency, and is capable of driving the most difficult loads	85W	R	62

\* rating refers to original, tested model

## 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 similar rigid stands. The listener should be about the same distance from and listening angle to each loudspeaker. The ideal placement depends on the way a particular model has been balanced (not to mention a number of other factors), and our recommendation is given in the entries

MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	BACK ISSUE FULL REVIEW
Acoustic Energy AE1 £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
Acoustic Energy AE2 £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 free space	88.5dB/w 45Hz	R	66
Acoustic Energy AE4 £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
Acoustic Research Red Box £100	Average Average	Lively and balanced if a bit crude and uneven, this under-£100 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
Acoustic Research AR112 £125	Average Average -	Nicely presented and engineered, but sounds a bit small and boxy without true coherence.	36 x 19 x 18.5cm stands near rear wall	87dB/w 75Hz		66
Acoustic Research AR122 £150	Average Average	Despite a promising enough list of ingredients, the 122 failed to excite real enthusiasm amongst the listening panel	38.5 x 19 x 22cm stands near rear wall	87dB/w 68Hz		68
Acoustic Research AR132 £200	Average + Average -	Good presentation and detail engineering was not sufficient to counter bass heavy balance problems on auditioning	44.5 x 23 x 25.5cm stands 1ft from rear wall	87dB/w 50Hz		66
Alexander SE5 £199	Average Average	Particularly well suited to surround sound A/v applications, the SE5 can give any miniature a run for its money on bass performance; hardness and coloration 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
Alexander SE11 £299 (stands £69)	Good Good	Clearly better than its cheaper stablemates, the metal jacket delivers a different - and in some respects superior - sound than the wood-based competition	52 x 14 x 17.5cm stands close to wall	86dB/w 25Hz (in room)	R	82
Allison AL105 £150	Average Average -	Pretty enough in appearance, sonically the AL105 doesn't really make the grade at the £150 asking price	37 x 24 x 21cm high stands against wall	87dB/w 45Hz (in room)		78

# THE WORLD'S NO 1 GUIDE TO BUYING HI-FI

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## LOUDSPEAKERS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	BACK ISSUE FULL REVIEW
Allison C06 £290	Average Good—	An unusual cube-shaped model designed for wall mounting gives exceptional bass extension from a small box, though it's also a bit heavy, coloured and slow	28.5 x 28.5 x 28.5cm stands against rear wall	88dB/w 45Hz	R	71
Alphason Amphion £680	Good Good	This fine-sounding, nicely finished compact wall-mount is just a little too expensive for formal Recommendation, but is a good performer for all that	44 x 23 x 27.5cm high stands against wall	88dB/w 47Hz (in room)		78
Alphason Orpheus £1000	Good Good+	Large hi-tech two-way features unusual, sweet-sounding isodynamic tweeter; well engineered and balanced if a shade odd in appearance	65.5 x 28 x 34cm stands near rear wall	87dB/w 43Hz	R	71
Apogee Caliper Signature £3350	Good+ Very Good	Pretty but power hungry full range panels have remarkable transparency and delicacy, though loudness and bass 'grunt' both a bit lacking; need very costly amplification	122 x 59-70 x 6.5- 28cm floor, free space	81dB/w 30Hz (in room)	R	81
Arcam Three+* £150	Average+ Average—	Arcam's baby speaker did not delight our listeners, but it might do better in less expensive systems	34 x 18 x 23cm close to wall at head height	88.5dB/w 95Hz		53
Arcam Alpha £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 for money as well	46 x 26.5 x 26cm stands close to wall	89dB/w 30Hz (in room)	BB	82
Arcam Two+* £280	Good Average	Most things to most men this compact is unlikely to disappoint with its lively "balsy" character though lacking weight... a bit	38 x 23 x 28cm near wall shelf or 40cm stands	88dB/w 55Hz		59
Arcam One+ £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
Ariston Image £180	Average— Average—	Despite a sweet treble character, the Image fails to impress with a 'lumpy' over-rich balance that has room integration problems	42 x 22 x 27.5cm stands in free space	89dB/w 28Hz (in room)		82
Audio Electronics TC10 II £599	Good— Good+	Oddball appearance is rescued by a respectable technical performance, interesting and impressive engineering and fine sound quality at a realistic price	70 x 33.5 x 33.5cm low stands in free space	87.5dB/w 40Hz	R	68
B&W Vision DSI £99	Average Average—	Although significantly hampered by upper bass cabinet coloration, the DSI cleverly combines high sensitivity with a rich and generous soundstage	36 x 21 x 19cm stands quite close to wall	91dB/w 40Hz (in room)	R	82
B&W DM550 £149	Good+ Average—	Beautifully presented, well engineered near-miniature with precise sound but a distinct lack of 'wellie'. Ideal for considerate flat dwellers	35 x 20.5 x 22.5cm stands in free space	86dB/w 70Hz		71
B&W DM560 £200	Average+ Average—	Fine cosmetic presentation and good engineering for the price; overload protection may be handy but listening panel was underwhelmed	49 x 23.5 x 30cm stands in free space	88dB/w 55Hz		66
B&W CM1 £345	Good Average	Cleverly thought out luxury design package is also fundamentally well engineered, if a shade pricey on 'sound for pound' basis	24.5 x 16 x 22cm close to rear wall	84dB/w 90Hz		74
B&W Matrix 801 £2500	Good+ Good+	Lacks the transparency of the best panels, and the drama of the best dynamics, but is something of an acoustic tour de force, with low coloration and fine stereo imaging	77/99 x 56 x 43cm floor or stands, free space	86dB/w below 20Hz (in room)	R	81
BLQ Q2 £275	Average— Average	Nearly a good loudspeaker, the basic balance is good, but the midband is very uneven and there are severe losses of resolution, 'space' and dynamics	43 x 25.1 x 24.5 semi open on stands	87.5dB/w 70Hz		59
Bose Interaudio 3000XL £150	Average Average—	Lots of perceived value and well enough balanced, but low cost cabinet and driver engineering results in a crude and unsubtle sound	46.5 x 29 x 23cm stands in free space	89dB/w 45Hz		71
Bose 305 £350	Average Good—	A bit of an oddball, fine dynamic liveliness and a good room match more than make up for the strange stereo imaging and treble	28 x 45 x 23cm high stands near wall	88dB/w 40Hz (in room)	R	78
Boston A4011 £120	Average Average—	Competent performance for size and price but below average relative to the UK competition	34 x 21 x 20cm on stands near wall	88.5dB/w 63Hz		41
Boston Acoustics T830 £399	Good Good	A lot of speaker for the money, the T830 is a smooth and accomplished performer with a big and easy – or alternatively a lazy and laid back – sound	82.5 x 25.5 x 24cm floor, away from walls	91dB/w 28Hz (in room)	R	82
Castle Clyde £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
Castle Warwick £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
Castle Durham £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 67Hz	R	46
Castle Pembroke £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
Celef Cirrus £180	Average Good	It's nice to see Celef back in the UK, with this decent sounding small reflex box that seems unusually tolerant of siting	39 x 20.5 x 23cm stands in free space	84dB/w 60Hz	R	66
Celef CF2 Nimbus £230	Good— Good—	Nicely balanced overall but a little uneven with it, this lively and dynamic large bookshelf model came close to Recommendation	46 x 25.2 x 24cm stands in free space	88dB/w 55Hz		71
Celestion 3 £109	Average+ Average	This attractive little wall-mount gives good balance and stereo imagery, with a character which leans more towards inoffensiveness than excitement	31 x 18.5 x 21cm high stands against wall	86dB/w 55Hz (in room)	R	78
Celestion DL6 Series Two £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
Celestion DL8 Series Two £199	Very Good Good	A refined middle market speaker has a smooth but slightly dull quality, with good definition and deep, if slightly boxy bass	50 x 27.5 x 27.8cm open, stands	87.5dB/w 60Hz	R	59
Celestion SL12Si £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
Celestion SL600Si £799	Good+ Good	This Aerolam high tech miniature has certain remarkable qualities that some will find irresistible, but needs careful system and room matching	27 x 20 x 23cm matching stands in free space	82dB/w 52Hz		68
Celestion SL700 £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 20 x 23.5cm free air on tall stands	83dB/w 45Hz		60
Celestion 6000 £1470	Very Good Very Good	A genuine fullrange audiophile quality speaker system – with Star Wars styling to suit a high tech environment	Complex, on floor in free space	82.5dB/w	R	60
Doxa 5 – 2 £900	Average Good	The high sensitivity and seductive midband makes an obvious partner for valve amplifiers, though obtaining a good room match may prove a little tricky	98 x 21 x 28cm floor well away from walls	91dB/w 30Hz (in room)	R	82
Duntech PCL500 Marquis £3998	n/a Very Good	Better value for money than the Crown Prince – and arguably more dynamic, with real bass 'slam' – but a little less refined in the higher registers	147.5 x 27 x 40 free standing away from walls	92dB/w 48Hz	R	65
Duntech PCL1000 Crown Prince £6120	n/a Very Good+	Immensely 'listenable', refined sounding speaker capable of creating lifesize 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
Energy 22 Pro Monitor £600	Good Good	Presentation is a bit rough for the price, but this Canadian entrant is an impressive sonic allrounder that will appeal to most listeners	62.5 x 27 x 30cm stands in free space	87dB/w 40Hz	R	66
Goodmans Maxim Two £90	Average+ Average	More wham-bam-thankyou-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
Goodmans B-Max/Maxim Two £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
Goodmans M300 £99	Average Average—	Conveying much of the charm and life which has made the Maxim 2 so popular, the M300 is sensitive, but also significantly 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

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## LOUDSPEAKERS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	BACK ISSUE FULL REVIEW
Harbeth LS3/5A £343	Good Average	Still a classic miniature, though not to every taste, and none the better for the recent update under our listening conditions. Limited dynamic range	30.5 x 19 x 16cm stands n free space	81dB/w 60Hz		66
Harbeth HL Compact From £539	Very Good Average	The clean and neutral sound lacks resolution and gives rather unobtrusive though well differentiated stereo. Can be bi-wired to advantage	52 x 27.2 x 28.1cm open space, on high stands	87.5dB/w 65Hz		59
Heco Interior 90S £159	Good Average—	Neatly finished and engineered miniature, but the disappointingly 'lifeless' sound left the listening panel decidedly underwhelmed	27 x 18 x 16cm on high stands	87.5dB/w 90Hz		74
Heco Interior 120 £169	Good Average	Drab appearance belies a lively enough character, though the balance is altogether a bit bright for UK tastes	32 x 23 x 23cm high stands against wall	88dB/w 50Hz (in room)		78
Heco Interior 430s £429	Good Good—	This tall floorstanding enclosure delivers an impressively even sound balance with good bass extension, if not the lively dynamics to satisfy enthusiasts	85 x 24 x 27.5cm free space	88dB/w 43Hz	R	71
Heco Superior 740 £599	Good Good—	A similar sonic package to the cheaper Interior 530, these Superior clothes are very pretty indeed, though spikes are still awaited	84.5 x 22 x 25cm on floor in free space	88dB/w 30Hz (in room)		78
Heybrook Point 5 £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
Heybrook Point 7 £185	Average Average	Physically an attractive package, but not entirely convincing in lab or listening panel test; interesting for all that	40.5 x 23 x 23cm stands against rear wall	85dB/w 60Hz		68
Heybrook HB1 £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
Heybrook HB100 £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
Heybrook HB150 £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
Heybrook HB200 £399	Average Average	This luxury successor to the HB2 is lively and informative, but sounded insufficiently balanced to convince our listening panel	46 x 23 x 26cm stands against rear wall	87dB/w 55Hz		66
Infinity RS2001 £180	Average Average+	A little coloured and unruly in the treble, the 2001 nevertheless retains the lively dynamic bounce of its predecessor; pity the price has gone up	36.5 x 22.5 x 20cm lightweight stands	87dB/w 50Hz (in room)	R	78
Infinity Kappa 6 £795	Good Good	Interestingly styled US loudspeaker has unusual high tech drivers and good neutrality, but the sound seriously lacks excitement	63 x 38 x 24cm stands, free space	85dB/w 35Hz		66
Infinity Kappa 8 £1850	n/a 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
Jamo Concert 2 £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
JBL TLX12 £149	Good— Average	This smart near-miniature has a 'boppy', lively bottom end, but beware of the fizz in its top	37 x 23 x 23cm stands 0.5m from rear wall	87dB/w 55Hz	R	71
JBL LX33 £259	Average+ Good	A bit of a cheat, but a lot of speaker for the money, which manages a better room balance than many 'large bookshelf' rivals, and delivers a fine acoustic performance	80 x 25 x 21cm floor, 1ft from wall	89dB/w 48Hz	R	82
JBL LX44 £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
JPW Minim £79	Average+ Average—	Very civilised but dynamically limited, the Minim is well suited to the smaller room and where limited loudness is acceptable	27.5 x 18 x 19.5cm stands against wall	85dB/w 28Hz (in room)	R	82
JPW Sonata £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
JPW P1 £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
JPW AP2 £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
JPW AP3 £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
KEF C15 £99	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
KEF C25 £139	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
KEF C55 £219	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
KEF C75 £349	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
KEF R102 £365	Very Good Very Good	High class near-miniature with expressive, articulate midband and clean, accurate bass and top. The sound quality of the Kube circuitry, however, is suspect	33 x 20.7 x 26.3cm near wall or open on stands	89.5dB/w 60Hz	R	59
KEF C95 £599	Good Good	Rich and lazy, but nonetheless very endearing in a cosy sort of a way, the '95 is a lot of speaker for the money, and delivers a big sound with grace and subtlety	88.5 x 24.5 x 31cm floor in free space	90dB/w 28Hz (in room)	R	78
KEF 103/3 £680 inc. stand	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
KEF 104/2 (inc KUBE equaliser) £895 (£994)	Very Good Good++	A reference point for dynamics, preferred without KUBE, suited to many rooms. Good stereo, high sound levels	90 x 28 x 41.5cm floor standing in free space	92dB/w 50Hz	R	60
KEF 107 £2025	Very Good Good+	A welcome sense of ease and lack of strain at most normal levels. Minor criticisms included a dulling in the extreme treble. Excellent bass extension	116.5 x 33 x 45cm on floor in free space	87.5dB/w 20Hz	R	60
Linn Helix £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 stands 1ft from rear wall	88dB/w 53Hz	R	66
Linn Kan 2 £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
Linn Nexus £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
Linn Kaber £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
Magneplanar SMGa £675	Average— Average	Tonally 'rich', in the right room it proved a satisfactory musical experience	122 x 48 x 4.5cm on floor clear of wall	85dB/w 56Hz		46
Magneplanar MG1.4 £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 40Hz	R	72
Magneplanar MG2.5R £1998	Good Good	Offers the low coloration and profound musical insight of better electrostatic loudspeakers but without loss of low frequency extension	183 x 56 x 4.5cm Open space	83-85dB/w 35Hz	R	60



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MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	BACK ISSUE FULL REVIEW
<b>Magneplanar MGIIa</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>Marantz LD20 DMS</b> £170	Average Average	Recommended more for CD users than vinyl keepers, soundly engineered and built but should be heard before bought	36 x 23 x 24cm free space on 45cm stands	86.5dB/w 55Hz		53
<b>Marantz LD50DMS</b> £200	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	42.5 x 27 x 28cm stands in free space	87dB/w 50Hz	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>MB Quart 220</b> £270	Average — Average	The elaborate and pretty enclosure in a wide range of finishes works better than the drivers and crossover, which impose a lumpy balance	30 x 22.5 x 21cm stands in free space	87.5dB/w 80Hz		74
<b>MB Quart 280</b> £340	Average — Average	Despite redoubtable build quality and good dynamics, the 280 has a rather 'obvious' mid bass and a balance that adds rather too much of its own character	44 x 27 x 29cm uncritical	88dB/w 40Hz (in room)		78
<b>MB Quart 390</b> £469	Below Average Poor	An aggressive, messy sounding design whose uncouthness undermines the positive level of detail	52 x 31 x 30.5cm open space, on stands	89.5dB/w 60Hz		59
<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 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 Cyrus 781</b> £250	Average + Average +	Superb build, finish, presentation and engineering for the price, this romantic sounding Cyrus needs careful system matching to achieve good results	43 x 22.5 x 28cm medium stands near wall	88dB/w 40Hz (in room)		78
<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 40Hz	BB	68
<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>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 0.5+m 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) electronics	138 x 29 x 43cm floor, flexible	91dB/w below 20Hz (in room)	R	81
<b>Monitor Audio Monitor 7</b> £150	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> £190	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	84dB/w 40Hz (in room)		78
<b>Monitor Audio R300/MD</b> £250	Average Average —	An attractive 'large bookshelf' model that's handicapped by poor crossover and integration between paper cone bass and metal dome tweeter	47.5 x 25 x 30.5cm stands in free space	88dB/w 50Hz		71
<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
<b>Monitor Audio MA700/Gold</b> £349	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 R852/Gold MD</b> £449	Good Good	Luxury build and 'high tech' tweeter or not, this compact model offers good refinement and detail on an open soundstage	45 x 25 x 26cm stands in free space	86dB/w 50Hz	R	66
<b>Monitor Audio 1200 Gold MD</b> £799	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> £1299	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>Mordaunt-Short 3.10</b> £100	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 high stands near wall	84dB/w 50Hz (in room)	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 3.30</b> £180	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 MS100</b> £189	Average + Average +	A 'mid forward' tonal balance is its main drawback but other aspects such as ambience, transparency and stereo depth compensate	32.5 x 22.5 x 21.5cm stands near wall	85dB/w 80Hz	R	46
<b>Mordaunt-Short MS300</b> £319	Average + Average +	Not considered particularly competitive in its class, though it has good power handling and stereo focus	54 x 22.5 x 25cm on stands near wall	89dB/w 65Hz		46
<b>Mordaunt-Short 442</b> £1150	Good + Good ++	A resounding success with the listening panels. Make sure your room can accommodate the bass	95 x 26 x 38cm floor standing in free space	87.5dB/w 40Hz	R*	60
<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>Musical Fidelity MC-2</b> £299	Very Good Good ++	This exceptionally clean and clear design offers real subtlety and finesse. Bass quality is light but exceptionally clear; the treble is smooth if slightly shallow	48.5 x 25.5 x 16.5cm open space and stands	87.5dB/w 65Hz	BB*	66
<b>Musical Fidelity MC-4</b> £499	Very Good + Good ++	Achieving a very high standard, the MC-4 sounds detailed and coherent like the MC-2, but with more bass depth and solidity, and large image scale	56.5 x 26.9 x 29cm open space on stands	87.5dB/w 60Hz	R*	59
<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 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 Cubix</b> £1,100	Average Good	Too idiosyncratic for formal recommendation, the Cubix possesses remarkable bass extension for its size, but is tricky to optimise and has some aggressive tendencies	60 x 32.5 x 32.5cm low stands against wall	88dB/w 20Hz (in room)		78
<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>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>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

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QLN Model One £700	Good Average	Similar to Signature at two thirds the price, Model One exaggerates the latter's rich and heavy midbass and lacks its velvet smoothness	35 x (16-25) x (21-27)cm pillar stands, free space	85dB/w 28Hz (in room)		82
QLN Signature £1,100	Good Good	Beautiful but expensive luxury compact has a rather laid back and 'heavy' sound, but coloration is low and stereo imaging very good	37 x 18 x 36cm heavy stands in free space	83dB/w 30Hz (in room)		78
Quad ESL-63 £1690	Good+ 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
Richard Allan CD5 £184	Average— Average—	This neatly presented small reflex design can sound engagingly communicative, but is flawed sonically and technically and quite expensive too	38 x 19 x 23cm on rigid stands	88dB/w 80Hz		68
Rogers LS2a £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
Rogers LS4A £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
Rogers LS7t £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
Rogers Studio 1a £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
Rotel RL850 II £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
Royd A7 Series 11 £115	Average+ Average	Lively clear sound; good upper bass and dynamics, but treble "ramp" made vocals sound shut in. Try before you buy	31 x 20 x 17cm shelf or 50cm stands near wall	86dB/w 75Hz	R	53
Royd Eden £235	Average Average+	Delightful mid/treble speed and transparency but determinedly bass light, this oddball miniature threatens cult status but could use a sweeter tweeter	31 x 20.5 x 18.5cm stands close to rear wall	87dB/w 85Hz	R	66
Royd Apex £485	Average+ Good	Not the smoothest sound around, it more than compensates with an impressively communicative and informative musical presentation	85.5 x 20 x 30cm on floor close to wall	87dB/w 33Hz (in room)	R	78
Ruark Swordsman £219	Good Average	Very attractively styled and finished, the Swordsman is a well built 'small bookshelf' model that delivered better test than listening results	38.5 x 20 x 27.5cm stands 0.5m from wall	84dB/w 50Hz		71
SD Acoustics DBS £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
SD Acoustics SD1 £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
SD Acoustics Ribbon £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
Shan Shimna £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
Snell Type C £2350	n/a Very Good	Pricey, yes, but an extremely capable loudspeaker. Musical and transparent; excellent bass extension	112 x 38 x 33 free standing away from walls	90dB 35Hz	R	65
Sony APM-101ES £100	Good Average	Big hearted sound from small bookshelf successor to BB '10ES, sounds a little untidy at frequency extremes, so suits CD better than vinyl	39.5 x 22.5 x 23.5 stands in open space	86dB/w 52Hz	R	71
Sony APM-141ES £200	Average Average	A great deal of loudspeaker for the money, the rich-sounding '141 needs a big room and still shows significant 'loudness' (boom'n'tizz) tendencies	61.5 x 26 x 32cm large room, free space	88dB/w 30Hz (in room)	R	78
Sony APM-181ES £300	Very Good Average	Big and beefy but also somewhat fat and bass heavy, this well engineered three-way has notable strengths but lacks transparency and sounds better at lower levels	57.5 x 29 x 36cm stands in open space	87dB/w 40Hz		71
Sony APM 66ES £700	Average+ Average+	Powerful heavyweight sound with a brilliant midband – clear articulate and transparent. But the bass is on the boomy side and the treble can sound grainy	66 x 38 x 36.5cm open space, low stands	89dB/w 60Hz		59
Spendor SP2/2* £500	Very Good Good+	Conceding little to the SP1, this 30 litre model displayed good tonal balance with a highly articulate midrange, only slightly marred at frequency extremes	50 x 25 x 30cm free space, stands	87dB/w 45Hz	R*	59
Spendor SP1 £800	Very Good Good	A very subtle and musical performer that works particularly well with digital material. An exceptional allrounder	63.5 x 29.5 x 30.5cm stands in open space	87dB/w 41Hz	R	60
Spica TC50 £599	Good— Good	This triangular-profile 'grown up' miniature is a shade boxy and laid back but has good rhythmic and musical integrity	40.5 x 33 x 29cm stands in open space	88dB/w 55Hz		71
Spica TC50SE £799	Good— Good	A heavily UK-modified TC50, the SE sounds less boxy and more spacious, but lacks some of the urgency of the standard model	40.5 x 33 x 29cm stands in open space	88dB/w 55Hz		71
Spica Angelus £1295	Good Average	A little bass shy and soft in the bass and lower mid, the free standing Angelus is otherwise tidy, extremely lively and fluid, if uneven overall	116.8 x 53.3 x 26cm away from walls	86.5dB/w 50Hz		60
Studio Power DMS100 £249	Average+ Average+	Close to a BB rating, and in many respects remarkable value for money. Delivers an impressively smooth and large sound, but sheer ugliness will limit its appeal	51 x 26 x 32cm open stands 1ft from wall	86dB/w 25Hz (in room)	R	82
Sugden CL £275	Average+ Good—	A thoroughly impressive and likeable near-miniature, the CL is prettily and properly built, and needs a good driving amplifier	35.5 x 18 x 26.5cm high stands in free space	86dB/w 35Hz	R	78
Tannoy E11 £129	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
Tannoy M15 £170	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
Tannoy DC1000 £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
Tannoy DC2000 £300	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
Tannoy DC3000 £600	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
Tannoy Westminster £3600	n/a Good+	These awesome horn loaded speakers are remarkably controlled and impressive, if only suited to a few pockets and rooms	Huge, flat against rear wall, away from corners	96dB/w (manuf.)	R	Coll
TDL Studio 1 £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 low stands in free space	84dB/w 25Hz (in room)	R	78
TDL Monitor £1799	Very Good Very Good	Fine solidity and good accuracy, with enough bass extension to satisfy even organ freaks. Needs a big room and can sound a bit lazy and a shade tinkly	118.5 x 30 x 47cm 0.5m from walls	85dB/w 28Hz	R	66
Technics SBC 250 £140	Average+ Average—	Despite a fairly even tonal balance, the 250EK sounded muddled in the midrange and dull in character	36.5 x 23.5 x 20.5cm free space, stands	86dB/w 60Hz		46
Technics SB-RX50 £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

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## LOUDSPEAKERS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	BACK ISSUE FULL REVIEW
Videotone Minimax 2 £80	Poor Average—	Cheap in build and QC as well as price, but cheerful (if coarse) with it – if a little too cheerful after extended listening	27.5 x 17 x 20cm near rear wall	84dB/w 90Hz	R	74
Visonik David 6001 £173	Average— Poor	Sharp styling a classy looking miniature makes, but the complex grillework worsens a sound which starts off with too much top and not enough bottom	20 x 12 x 13cm against rear wall	87dB/w 130Hz		74
Wharfedale Delta 30 £80	Good Average	Very clear and surprisingly neutral for the price, with good dynamics and stereo within limited volume ceiling	37.9 x 20 x 16.9cm near wall on high stands	88.5dB/w 80Hz	BB	59
Wharfedale Delta 50 £100	Average+ Average—	"There's nothing obviously wrong, but it seems a bit mundane," is what we said when the Delta 50 was £129. But since then the price has dropped by 30 per cent, making it great value	48 x 27 x 19cm near wall on 40cm stands	88dB/w 55Hz		53
Wharfedale Diamond III £100	Below Average Average—	This latest version of the long running Diamond sports a better tweeter, but bass, though deep, is soft, and the midband is indistinct and uneven	24 x 18.5 x 20.5cm near wall, stands	86.5dB/w 75Hz		59
Wharfedale Super Diamond £140	Average Average—	Although there are improvements on the basic "legendary" model, listening panelists did not get airborne about this upgrade	24 x 19 x 19cm close to wall at head height	88dB/w 57Hz		53
Wharfedale 504/2 £150	Average Average	Not strictly accurate, this musically involving miniature sounds unusually coherent and well integrated, if a shade dull in balance	29 x 18.5 x 19cm stands against rear wall	84dB/w 60Hz	R	68
Wharfedale 505/2 £180	Average Good	This lively Wharfedale provides plenty of speaker with unusual refinement for the money, and should be fairly tolerant of room siting	44 x 25.5 x 24cm stands 1ft from wall	86dB/w 55Hz	BB	66
Wharfedale 507 £220	Average+ Average—	Generous in size but ungratifying sonically, the 507 doesn't seem to get in the way the smaller 505.2 does, finding a good in-room balance difficult to achieve	49 x 25.5 x 29.5cm high stands 1ft+ from wall	86dB/w 35Hz (in room)		78
Wharfedale Coleridge £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
Yamaha NS 1000M £900	Good Good+	Living up to its monitor label, and tonally well suited to digital material, the NS 1000M is superbly crafted and capable of high levels	67.5 x 37.5 x 32.5cm 30cm from wall, stands	90dB/w 40Hz	R	46

\* rating refers to original, tested model.

## 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.

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Acoustic Research RD-06 £280	Average Average+	Acceptable middle market player with very simple facilities and cramped control section, but unusually good looks	Dolby B/c/hx pro, fine bias, counter memory, repeat		69
Aiwa AD-F270 £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
Aiwa AD-F370 £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
Aiwa AD-R470 £150	Average Good	For once, an auto-reverse deck with the performance of a decent unidirectional one at a similar price. The Aiwa is modern in concept and execution, and has good, transparent electronics	Dolby B/c/hx pro, auto reverse, cue & review, bias adjust	BB	69
Aiwa AD-WX777 £179	Very Good Very Good	Excellent, middle price dual deck with quick side change and a living, breathing sound – though prerecorded tapes sound bright	Twin auto-reverse, one records. Dolby B/c, fine bias	BB	75
Aiwa AD-F700 £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
Aiwa AD-F800 £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
Aiwa AD-WX888 £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
Aiwa XK-007 Excelia £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
Aiwa AD-WX909 £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
Aiwa XK-009 Excelia £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
Akai GX-32 £170	Average Poor	Constrained and smeared sum this deck well. It has poor bass and treble definition alike, though it proved well aligned for prerecorded cassettes	Dolby B/c, variable bias, headphone out, track search		69
Akai GX-52 £250	Very Good Very Good	Well finished and a pleasure to use this well specified deck sounds clean and defined with all tape groups, with or without Dolby	Dolby B, C, HX Pro, track locate features	BB	57
Akai GX-65 £299	Poor Poor	Uneven sounding deck with poor bass reproduction and dynamics. A pity this, because the deck looks and feels good	3-head, Dolby B/c/hx pro, optional remote		81
Akai GX-6 £330	Good Good	There is a strong sense that someone has really thought this one through; it has an indefinable "specialness"	Real-time counter, track search, Dolby B, C, bias adjust	R	52
Akai GX-95 £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
Denon DRM-400 £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
Denon DRM-500 £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

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## CASSETTE DECKS

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Denon DRW-750 £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
Denon DRM-700 £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
Denon DRM-800 £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
Goodmans GSW-5200 £90	Poor Poor	Musically unimpressive but at least it's cheap!	Dolby B, twin, one records		69
Grundig Fine Arts CCT-903 n/a (system component)	Good Good—	[Competent part of complete Grundig system]. Solid and well engineered deck with small but significant problems preventing it scoring highly. Basic design generally – and transport specifically – are excellent	Dolby B/c, twin auto reverse, one records		69
Harman Kardon CD491 £695	Good Good+	Excellent audio engineering and tremendous flexibility make this an audiophile cassette deck 'par excellence'	Real-time counter, auto reverse, track search, Dolby B, C, HX Pro, bias adjust	R	52
Kenwood KX-440HX £130	Average+ Poor	Uneven, unstable sounding player with limited resolving power, but good control layout and finish	Dolby B, C, HX Pro, intro scan		63
Kenwood KX-3010 £170	Average+ Average	Minor ergonomic shortcomings notwithstanding, this is a workmanlike deck that only misses recommendation due to an azimuth problem leading to very dull sound with prerecorded tapes	Dolby B, C, HX Pro, auto bias		75
Kenwood KX-4520 £260	Good+ Very Good	Some high frequency Dolby misalignment and obscure minor functions aside, this is a vital and engaging performer	Dolby B/c/hx pro, 3 heads, various search functions	R	81
Kenwood KX-5010 £270	Very Good Excellent	This important new middle price deck is a well thought through and thoroughly developed design which eschews gimmicks for the sake of musical excellence	Dolby B/c/hx pro, auto tape calibration, track/intro search	BB	69
Kenwood KX-9010 £400	Very Good Average+	Clean, detailed but flat and overtly hi-fi-ish sound quality makes the 9010 a little less than the sum of its parts.	3-head, auto tape calibration, Dolby B/c/hx pro, remote control		75
Marantz SD-40 £170	Average Average—	Transitory sounding electronics mar a basically good recording machine. Prerecorded material suffers from effects of Dolby pumping	Dolby B/c/hx pro, bias adjust		81
Marantz SD-50 £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
Marantz CP230 £300	Average Average	This is a competitively priced portable recorder though not suited to replay of musicassettes	Dolby B, bias adjust	R	52
Marantz SD585 £300	Average Average—	Sound quality is a little sat upon, and control ergonomics are somewhat opaque, though the twin auto-reverse/recording capability makes this a powerful machine	Dolby B/c, twin auto-reverse & record, parallel recording etc		69
Marantz SD-60 £350	Good Very Good	A first rate, highly capable deck offering energetic yet refined sound largely due to good electronic design	3-head, Dolby B/c/hx pro, variable bias & sensitivity	R	81
Memorex SCT-84 £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 with auto-reverse record, unidirectional play	R	69
NAD 6300 £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
Nakamichi CR-1E £345	Very Good Good	Modestly equipped by any standards, the CR-1E stands or falls by its build quality, which is high, and sound which is highly competent	Dolby B & C		57
Nakamichi CR-2E £395	Very Good Good+	Ordinary to look at, in some respects rather awkward to use (tape switching especially), the CR-2E sounds very slightly better than the CR-1E, and therefore ranks well. But it doesn't come cheap	Dolby B & C, bias adjust, remote control	R	57
Nakamichi RX-202E £545	Good Very Good+	Fine, clear and articulate sounding player. Excellent with prerecorded material, but idiosyncratic and sometimes obstructive control system	Auto reverse, Dolby B, C, 2 Head	R	63
Nakamichi CR-3E £595	Very Good Very Good	The user interface is a little clumsy, though conceptually straightforward. Sound quality approaches the CR-4E, and is amongst the best at the price	Dolby B & C, bias adjust, remote control	R	57
Nakamichi CR-4E £745	Very Good+ Very Good+	High class deck with a reasonably full range of features and superb sound at a slightly unlikely price	Dolby B & C, bias adjust, remote control, 3 Head	R	57
Nakamichi CR-5E £995	Excellent Excellent	A slightly simplified version of the all-conquering CR-7, the CR-5 has a very similar standard of audio performance – the best	Dolby B/c, fine bias, 3-head	R	69
Nakamichi CR-7E £1500	Excellent Excellent	Remarkably this deck is not only ergonomically but also sonically superior to the Dragon, particularly on record/replay	Real-time counter, track search, Dolby B & C, tape alignment adjust, bias adjust, remote control, 3 Head	R	60
Nakamichi Dragon £1750	Excellent Excellent	Previous to the birth of the CR-7E, this machine stood head and shoulders above the rest. It is still the ultimate for musicassette replay	Auto reverse, Dolby B & C, tape alignment adjust, bias adjust, remote		60
Onkyo TA-2120 £130	Average+ Good	Clear, vivid sound with good timing and resolution when using Type II tapes without Dolby. The controls are less inspiring – the meters in particular are plainly inadequate	Dolby B/c, auto tape sensing, block/side repeat	R	63
Philips FC566 £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
Philips FC870 £250	Average Average	Disappointing at the price, this is a well equipped deck with off-tape monitoring, but a somewhat listless, smeared musical style	Dolby B/c/hx pro, 3-heads, track/intro search etc		81
Philips FC567 £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
Pioneer CT-225 £100	Average+ Average—	At last – a cheap Pioneer with auto-tape select! Well specified ultra cheapie, but poorly set up, especially for commercially recorded material	Dolby B/c, track search		81
Pioneer CT-335 £150	Average Average	Mostly satisfactory mainstream deck, at its worst with prerecorded material which sounded edgy. It made very good Type II recordings	Dolby B/c/hx pro, track search		81
Pioneer CT-445 £180	Good Good	Exactly engineered and fine sounding deck with a strict emphasis on function. Best with good Type IIs	Dolby B/c/hx pro, electronic counter	BB	81
Pioneer CT-656 £250	Good Good	Well conceived and executed low cost 3-head recorder. It benefits from and makes good use of metal tapes, but is never less than couth and stable sounding – even with ferric tapes	3 heads, off tape monitoring, fine bias, Dolby B/c/hx pro	R	75
Pioneer CT-737 Mk II £350	Good Average+	Easy to use and sensibly equipped, the CT-737 is much improved, but sound quality is still a tad lacklustre	3-head, Dolby B/c/hx pro, manual record bias/sensitivity		75
Pioneer CT-91a £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
Revox B215-S £1,826	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
Rotel RD-845 £130	Below Average Good/Poor*	Extremely fine transport and clean sounding electronics for the price. Bass lacks weight, but deck works remarkably effectively with chrome tapes. *See text	Dolby B/c, manual tape selector	R	81
Rotel RD-865 £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

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## CASSETTE DECKS

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
SAE C102 £549	Average+ Good	Looking most unlike a cassette deck designed in the States and proving competitive in its price group. Not sonically that outstanding, however	Real-time counter, track search, Dolby B & C		52
Sansui O-X301i £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
Sansui O-X501 £230	Poor Poor	Unhappy mixture of good looks, excellent ergonomics and mediocre, sometimes poor sound	Dolby B/c, random track search		81
Sansui D-X701 £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
Sony TC-FX110B £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
Sony TC-TX55 £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
Sony (WMD6C) ProWalkman £249	Good+ Very Good	"One of the finest sounding cassette decks on the market today. A mandatory Best Buy, which also fits in your pocket"	Dolby B, & C	BB	60
Sony TC-RX60ES £250	Average Average	For once a stable sounding auto-reverse deck but sound quality is rather 'dirty' and compressed, especially with Dolby C	Auto-reverse, Dolby B/c/hx pro, auto tape recognition		63
Sony TC-K630ES £300	Average- Average	Acceptable-to-good sounding deck despite some measured shortcomings. At its best with metals; lacks vitality with lower bias tapes	3-head, Dolby B/c/hx pro, bias adjust		81
Sony TC-RX80ES £350	Average+ Good	Clean, powerful and detailed sound, especially without Dolby C. Stable pitch - but prerecorded cassettes sounded disappointing	Auto reverse, Dolby B/c/hx pro, bias/level adjust	R	63
Sony TC-K730ES £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
Teac V-270C £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
Teac V-480 £129	Average Average+	A rather utilitarian model, the V-480 just makes it on to our recommended list by virtue of a clean, open sound that to an extent transcends the measurements	Dolby B/c/hx pro, fine bias	R	75
Teac W-470 £129	Average- Average	A low grade transport is allied to respectable electronics to give sound quality ranging between acceptable and good. Prerecorded tapes sound bright	Twin deck, one records, Dolby B/c, intro-search		75
Teac V-870 £349	Good+ Good	Cut-down V-970X for the proletariat. Expensive and carefully engineered with mostly very good but slightly cold sound quality	Dolby B, C, HX Pro, 3 Head, manual tape calibration	R	63
Teac V-970X £449	Very Good Very Good	An excellent sounding deck with useful features (tape calibration etc) that fully justifies the price	Real-time counter, track search, Dolby B/c/dbx & Dolby HX Pro, bias adjust, remote control, 3 Head	R	57
Teac W-990RX £445	Good Good	A mess with dbx, but taut and articulate otherwise. The 990, though expensive, has a powerful range of features, making it one of the few really ambitious decks to successfully straddle both sets of requirements	Dolby B/c 9 dbx, dual auto-reverse/record, parallel & sequential recording, remote	R	69
Teac R-919X £489	Very Good Average	Superbly equipped, yet usable - and well built too. But sound quality is something of a disappointment at this price level, being appropriate for a model about half the price	3-head auto-reverse, tape calibration, Dolby B/c/hx pro/dbx		75
Technics RS-B555 £160	Good+ Good+	Very good value. Resolution, stability and quality of set-up are strong points, a slightly strained, synthetic quality is sometimes apparent	Dolby B/c/hx pro, bias adjust, track search	BB	81
Technics RS-TR255 £160	Average Average	Neat, sensibly designed middle of the road dual transport recorder, suitable where the ability to dub tapes is a particular priority	Twin transports, one records and auto-reverse, Dolby B/c	R	75
Technics RS-B655 £200	Good Very Good	Excellent middle price deck, well equipped with a not over-refined but highly articulate and crisply defined style of musical presentation	Dolby B/c/hx pro, bias adjust, track search	BB	81
Technics RS-TR355 £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
Technics RS-TR555 £300	Average+ Average	Sound quality varies with mode of use, but is rarely less than competent, and is often highly enjoyable, dbx is best avoided	Dual auto-reverse/dual record/Dolby B/c/hx pro & dbx	R	81
Technics RS-B905 £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
Yamaha KX-230 £140	Average+ Average+	A strong near-budget performer, the strengths include good overall sound, excellent search aids. Weaknesses: ergonomics, soggy bass with prerecorded material	Dolby B/c/hx pro, variable bias	R	75
Yamaha KX-300 £160	Average+ Average-	Uncommonly well equipped and adequately made and presented, this model turned out to be a disappointingly uncertain proposition on audition	Track search, Dolby B, C, HX Pro with 'play trim', bias adjust, remote control		57
Yamaha KX-500 £210	Very Good Very Good	An accomplished performer, strongest in the areas of pitch and spatial stability, but slightly rough around the edges	Real-time counter, track search, Dolby B/c/hx pro with play trim, bias adjust, remote control	R	57
Yamaha KX-630 £300	Good Very Good	Well equipped and immaculately presented, offers fine, articulate music making with a bias towards high bias tapes, especially metals	3 head, Dolby B/c/hx pro, optional remote	R	81
Yamaha KX-800 £330	Good Average	The present Yamaha range seems oddly inconsistent. This sophisticated model sounds fine (almost) but came a clear second best to the KX-500	Real-time counter, track search, Dolby B, C, HX Pro with play trim, bias adjust, 3 Head		57
Yamaha KX-1200 £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

## DAT RECORDERS

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Aiwa Excelia XD-001 £1300	Very Good Very Good	Clear and very listenable recorder roughly comparable to but slightly sweeter sounding than the Sony DCT-1000ES - but with an inferior front panel design	Track ID and search, remote	R	63
Grundig Fine Arts DAT-9000 n/a (system component)	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
Luxman KD-117 £1499	Good Good	Slightly soggy, earth-bound sound quality, this model trails the other DAT decks tested so far	Two analogue inputs, remote twin address		63
Sony DTC-M100 £799	Very Good Very Good	Clean, clear sounding 2nd generation model with most of the features and sound of the DTC-1000ES	Mid-width, alpha-numeric display, remote, optical interfaces	R	63
Sony DTC-1000ES £1299	Very Good Very Good	Fine, consistent performer with accomplished tape handling and good build quality	Standard track ID and search, remote	R	63

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## THE DIRECTORY

## CD PLAYERS

This all-digital music source is well established, despite still high disc prices and the opposition of many hi-fi enthusiasts. Compact Disc's strengths over conventional vinyl are complete freedom from surface noise with automatic and programmable play, plus track skip and fast music scan – frequently under full remote control. However, many vinyl enthusiasts find CDs sound less involving than

top quality vinyl replay

Introduced five years ago at around £500, CD players now average less than half that price, and for the main offer improved performance besides. Even cheaper players may have the latest decoding chips and the most useful play features; extra money can buy remote control, remote volume control, audio 'tweaks', plus improved build and component

quality control.

Compared with many hi-fi components, CD players give impressive lab performance, though there are differences between players nonetheless. **Sound quality** variations are even more marked, particularly in a good quality system. As it behaves very like a preamp, there are no problems connecting a player to a normal amplifier

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
<b>ADC CD 2000E</b> £330	Good + Fair +	One of the slimmest players in the business but nothing special inside. Nice ergonomics but overpriced	Remote, timeshared 16 bit		64
<b>Aiwa DX-M45</b> £149	Fair Fair	Cutdown Philips technology, but results are quite good for this British made machine	Manual	R	64
<b>Aiwa XC-005</b> £280	Average Average +	Very comprehensively equipped including double digital and audio outputs. The average performance was still sufficient for recommendation at this price	Power vol, edit-dubbing, shuffle 2 digital op	R	76
<b>Aiwa CD-001</b> £300	Good Good	Pretty close to Recommendation, delivering a respectable sound quality and lab performance from an ergonomically attractive package, but ultimately failed to excel in any particular respect	Track entry/volume remote, direct recorder connection etc.		58
<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>Akai CD 558</b> £230	Good Average-	Budget model which fails to compare with the CD52	Remote, hdph, Good programming		83
<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-62</b> £330	Fair 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 CD93</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 Delta Black Box</b> £260	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
<b>Arcam Black Box II</b> £300	Very Good Very Good	An addition to the BB I, it also offers improved sound and more inputs	Optical and wired input digital decoder	BB	76
<b>Arcam Alpha</b> £375	Very Good Very Good	Arcam's new star, its best CD player yet and great value	Remote, hdph, etc, coax dig. out	BB	83
<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 170 Transport</b> £600	Very Good Very Good	While no bargain, this is a well made metal boxed transport providing clean digital data for outboard decoder/processors	Transport only, display off, usual programming	R	76
<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> £1,995	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>dbx DX5</b> £640	Good Poor	Sound quality proved a single disappointment, though it's refreshingly unique in providing semi-pro post-production facilities that some users will undoubtedly relish.	Track entry/volume remote, compression, impact recovery, ambience etc.		58
<b>Deltec POM-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 620</b> £180	Average + Average-	Not competitive on performance though feature pack is good	Hdph + vol, edit, remote		83
<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>Denon DCD 920</b> £320	Good Average +	Highly featured and well presented but unexceptional performance	Everything! inc remote volume		83
<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 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 digital output	R	70
<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 programming features	R	72
<b>Ferguson CD007</b> £130	Good Fair	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	Fair Fair	Not as strong as its relatives, sample fault perhaps? Though performance is fair enough overall	Remote, midi digital output, 2x 0/s, timeshare 16 bit		64
<b>Goodmans GCD300</b> £129	Average Average	It may be adequately made, but with cheap good sounding players available this particular Goodmans isn't quite good enough	Programmable, skip, search, repeat		70
<b>Goodmans GCD530</b> £140	Good Poor	Old fashioned sound, cheap and cheerful, includes remote	Simple remote, basic controls and programming		83
<b>Goodmans GCD550</b> £199	Average + Fair +	A slow autochanger with a weakish lab performance but the sound is fair enough, the features good and the price is low	Remote, 6 disc autochanger, 2x 0/s	BB	64
<b>Goodmans GCD555</b> £219	Average Average-	Scores approval on grounds of low price. You must pay more for better sound and a faster mechanism	6 disc changer, 32 track memory, remote etc	R	76
<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>Harmon 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

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Harmon Kardon HK7500 £299	Average+ Average	Decided improvement over 7300 in all respects. Still fairly unimpressive sound	Remote, hdph + vol, remote vol, good programming, A-B repeat etc.		83
JVC XL-Z1010 £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
Kenwood OP-8020 £500	Excellent Very Good	Fine build and finish, a fine performer in the lab, and in sound quality	Comprehensive remote inc volume, display off, opt & coax digital output, versatile	R	83
Marantz CD50SE £330	Very Good Very Good	Souped up CD50 delivers reference performance in its class. Worthy successor to the '65SE legend	Full remote, power (7 step) volume, Hdph, (fixed), FTS disc memory. Good programming	BB	83
Marantz CD60SE £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
Marantz CD12LE £2800	Very Good Excellent	This top of the range two-box player may be very expensive but it is very well made. Technical performance is very good and the sound is the best from Marantz yet	Two box, digital processor, FTS, optical connection, hdph socket, comprehensive display, balanced output etc	R	70
Meridian CD206 £800	Very Good Very Good	Fine build, finish and styling, very good sound, classy	Good programming, remote, coax digital output	R	83
Meridian CD208 £1490	Excellent Excellent	State of the art CD sound combined with a decent preamp and full remote control	Opt & coax dig. output, fixed and variable output. Hdph + remote level. Programming, phase invert	R	83
Micromega CDF1 Classic £1400	n/a Very Good	A very well made and stylish player from France, the CDF1 is a CD player for analogue lovers or as close as we've come across	Basic remote, digital output, suspended chassis	R	72
Micro Seiki COM100 £3850	Very Good Good	One of the hernia inducing bricks of hi-fi, the Micro is extravagantly styled, finished and built. The good lab performance led to an 'only good' sonic display when the price demanded excellent	Balanced output, remote, display blanking		72
Mission Cyrus PCM II £400	Very Good Good+	Improvements in price and performance keep this classic remote player in the running	Remote vol, phase inv, display of, dig op. PSX option	R	83
NAD 5320 £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
NAD 5220 £230	Average— Poor	Conforms sonically to a stereotype of the medium that most players have grown out of. Hard, thin and raw sound with poor stereo and resolution.	Time/track display, memory		62
Nakamichi OMS-1E £395	Good Good	This neat enough player doesn't really follow the Nakamichi tradition of providing exceptional sound quality while at the same time perpetuates that of selling at an above average price	Simple remote etc.		58
Nakamichi COP-2E £495	Very Good Good	It's ergonomically superior and has above average sound, but it isn't cheap. The standard of build quality and finish is first class which isn't quite matched by the sound quality	Programming, hdph, remote track entry, digital output		70
Nakamichi OMS-4E £1200	Very Good Very Good	Solidly controlled and comparatively simple this clearly represents one of the major benchmarks for CD sound quality, though the midrange sounded a touch thin	Skip and scan, headphone socket		51
Nakamichi OMS-5EII £1500	Good+ Very Good	"... delivers near state of the art performance and build quality in a deliberately starkly functional package, but at a very high price..."	Skip and scan, simple track programming, manual control		51
Nakamichi OMS-7EII £2000	Good+ Good	The only serious criticism here is of the price. And in our not always humble opinion you can get better sound quality for less elsewhere in Nakamichi's range	10 digit track entry keypad programming, headphones		51
Onkyo DX-1500 £170	Average Fair	Ruled out on the grounds of its poor DAC filter, but it's not so bad really given the price	Manual, 2x 0/s, timeshared 16 bit		64
Onkyo DX-7500 £490	Good Very Good	This comes close to the state of the art performance in many areas. It has lots of facilities and is well made too.	Key pad remote, memory, hdph, comprehensive display, optical output etc	R	70
Philips CD610 £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
Philips CD630 £250	Very Good Good	Large clear display with an international flavour. Strong Philips style, high value CD player	FTS, digital op, versatile programming, remote, remote vol (7 steps) hdph (fixed)	R	83
Philips CDC875 £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 its likely 'muzak' application	6 disc changer/dig op remote, hdph, memory, shuffle		76
Philips CD840 £350	Good+ Very Good	Philips best yet and bitstream too! Very versatile programming and easy to Recommend. Fine stereo imaging for price	FTS, hdph + vol, full remote programming	BB	83
Philips CDV185 £350	Average+ Average	Hard to value with the video singles facility but it all works well enough for a recommendation	Video singles + CD scart + digital out etc	R	76
Pioneer PD9300 £499	Excellent Average	A mid price flagship of excellent build and lab performance but only average sound - interesting though	Remote, 24 track programming, 2 digital op		76
Pioneer PD-91 £899	Excellent Very Good+	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, index search, etc	R	64
Proton AC-120 £180	Average Average—	Fine styling, low price but barely average performance	15 track memory, simple design, remote, hdph		76
Revox B126 £649	Very Good Good	Made in Switzerland so the build quality and technical performance is high but then so is the price and the sound quality is only good	Programming, Revox remote system compatible		70
Revox B226S £840	Good Average	Top quality build and finish for the Revox system enthusiast. For high value sound look elsewhere	Remote vol, hdph, 19 track memory, digital op		76
Rotel RCD855 £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
SAE D102 £700	Good Good	Considering the high price of this player, most of the innards seem fairly prosaic. Sound quality and lab performance are both respectable enough, but hardly justify the price premium involved, though styling is unusual.	Remote (inc volume), skip, scan etc		58
Sansui CD-X711 £550	Excellent Very Good	Luxury features, finish and sound from this classy Sansui; no excuses required here	Balanced and normal op, Digital; opt & coax; hdph + vol, remote full programming	R	83
Sharp DX150 £129	Fair Fair	This is a none oversampled player which is rather outclassed for technical and sonic merit by the vast majority of the competition. Pretty enough but would you want to put discs in it?	Programmable, skip, search, repeat		70
Sharp DX750 £179	Fair Fair	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

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MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Shure Ultra D6000 £495	Average + Fair	Ergonomically well thought out with full function remote control, but not really scoring sonically considering its price	Remote control (full function inc volume)		51
Sonographe SD1 (by CJ) £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	51/Coll
Sony CDP-M47 £160	Good + Average -	Clean styling, rock bottom price, near music centre performance	remote, hdph + vol, edit-fader, good programming, No digital op		83
Sony CDP-770 £200	Average Average	Very well equipped player with good ergonomics belying the moderate price. Average overall performance	Remote, remote vol, hdph + vol, edit, fade etc	R	83
Sony CDP-228ESD £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
Sony CDP-338ESD £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, 2 digital op		76
Sony 557ESD £1000	Excellent Good +	Superbly built flagship model that produced excellent lab results and very good sound. Many luxury features though not that good value	Full remote, disc directory, digital output, power volume, 8x 0/s, 18 bit		64
Sony CDP-X7ESD £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, balanced audio + phonos		76
Sony CDP-R1/DAS-R1 £5000	Very Good Excellent	Sony has aimed high with the R1 and in some ways has created the reference player. Build quality is amazing and it offers a high level of facilities. One or two faults were revealed in both the lab and the listening, but it's generally excellent	Two box, dual optical connection, digital processor, FTS, remote		72
Stax Quattro £2995	Very Good Very Good	Now in mkII guise this substantial player recreated exceptionally strong and convincing bass lines together with a beguilingly musical midband	18-bit DACs, 20-track memory, full IR remote, variable o/p	R	72
Teac PD470LE £279	Average Average	With the LE upgrade the 470 has improved to a just average position	Remote, hdph, 20 track prog		76
Teac ZD880 £450	Good Fair	Decent enough in most respects with a very good build and finish. Its sound isn't competitive enough to inspire any real enthusiasm	Remote, track key access, auto space, comprehensive display, hdph socket etc		70
Technics SL-P227A £160	Very Good Average +	High value, budget priced, yet well equipped and finished, a strong example in its group	Remote, programming, hdph + level, No BB digital op.		83
Technics SL-P550 £220	Very Good Average	Superb, slick presentation, well equipped, average sound, fine build	Remote vol (6 steps) hdph + var, remote programming, edit/fade, digital optical only		83

## 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 at least as big as 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, double 'dubbing' cassette decks, and elaborate equaliser tone controls. And the top end of the market is developing with surround sound audio/video-ready packages.

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Aiwa X-D80K £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
Aiwa X-D100 £1000	Average - Fair	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 etc		77
Ferguson HFD28 £300	Poor Poor	Similar to Goodmans 5000 system but with greater power and marginally superior sound	One-piece, semi-remote		77
Goodmans 5500 £320	Poor Poor	It offers the basic features (but no Dolby or magnetic cartridge) and rough and ready sound	One-piece, remote		77
Goodmans 5300CDM £400	Average - Average +	Crisply styled system with gutsy amplifier and sophisticated speakers. CD player works well, other sources are variously mediocre	Combined cassette/tuner/amp, plus T/ t and CD with remote	R	65
Goodmans Maxim-Midi System £520	Average Average +	De-luxe version of 5200 system – very good value for money and readily upgradeable. Sonics rough but OK and speakers good; CD crude	All separates with twin cassette	R	54
Grundig Studio Line 1 £330	Poor Average +/ Poor	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
Hinari DK200 Disc Deck £300	Poor - Poor -	Confused user interface is matched to inadequate electronics. Poor – and poor value	Single unit, two cassettes, CD, tuner, remote		77
JVC Midi-W900CD £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
JVC Midi-W91CDM £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
Marantz MX493AVCD £549 with LD20 speakers, £449 without	Average Mixed	Good source components (ex cassette) let down by poor amplifier. Flexibility is strong point, and the system may prove attractive where the A/v possibilities can be fully utilised	Twin auto reverse, opt speakers, surround processor etc	R (with LD20)	77
Marantz MX583 £750	Average - Poor	The system has potential in an A/v context, but is patently lacking in a purely audio one. Only the CD excels	Component system with A/v amp, no speakers		65
Marantz MX673CD System £900	Average + Average	Tremendously flexible audio/visual system. Sound quality is satisfactory at best and ergonomics a mess	Various A/v inputs, remote, speakers optional		54
Pioneer S-11 £510	Average - Average -	Fine lower middle market system, with one useful extra – the built in timer. Only the record deck is disappointing	Twin auto reverse cassette, built in timers, one piece amp/cassette		77
Pioneer S-330D £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
Proton AI-3000 £550	Good Good	There are a host of minor problems, including no LW, but the unit is attractively packaged and can be made to sound very good despite a woolly sounding amplifier	One piece CD, cassette, tuner and amp, remote	R	65

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NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Sanyo 39CD £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
Sanyo 49CD £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
Sanyo 59CD £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		77
Sharp CD-X17E £550	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
Sony Compact 301CD £400	Average— Average	Mainly crisp, articulate sound and excellent ergonomics offset by modest FM results and lack of pitch integrity on cassette	Twin unidirectional cassette, equaliser, 30 preset tuner etc		77
Sony 501CD £500	Average Average	Fair all round performance except noisy FM. Ergonomics and visuals good, but no auto source select, tuner stereo defeat	Twin auto-reverse, 3-band tuner, equaliser etc	R	77
Sony Compact 701CD/711CD £700/£800	Average+ Good	Sound quality good all round, though cassette pitch accuracy is below par. Features average but system control is weak	Twin auto-reverse, graphic equaliser (711 only), 30 preset tuner	R (701CD)	77
Technics X900CD £470	Average Average—	Good build and mostly good sound is offset by mediocre amplifier and loudspeaker and some operational oddities	Main cassette/tuner/amp, separate T/t and CD		65
Technics X1 £500	Good Good	Superb value for money from a system with solid straightforward engineering at an attractively low price	Auto-reverse record transport, auto-disc/tape editing, surround sound, remote	BB	77
Technics X5D £800	Very Good Very Good	A mainstream system offering considerable flexibility and power in a traditional suit of clothes, and embodying values that place music first	Twin auto-reverse, tuner/timer, auto record deck, digital amp	R	77
Yamaha AST-C10 £600	Average+ Very Good	Brilliant if flawed luggable with weighty, powerful bass, and a rare combination of expressiveness and clarity unprecedented from such a small package. Good features	Mains portable twin cassette/CD/radio system detachable speakers, remote	R	77

## 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 receiving 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.)

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Akai AT-52L £150	Very Good Very Good	Holds its own on FM against many much more expensive tuners, but AM is very poor	All bands	BB	65
Akai AT-93L £250	Good+ Good+	By AM standards presentable (good) while FM delivers the goods	All bands, aerial switch	R	65
Arcam Alpha £120	Good Average++	Attractively classic British analogue tuner with sound quality comfortably better than most	FM/am analogue	BB*	50
Arcam Delta 80 £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
Harman Kardon TU920 £299	Good Average	Rather weak sound quality for the price despite good lab test results	16 presets, AM/fm, digital auto scan, active tracking		55
Harman Kardon Citation 23 £559	Good Very Good	Fine performance, interesting features and ease of use are this tuner's forte, and the sound quality is top notch	FM/am seek/manual adjustment muting 16 presets remote control	R	60
Kenwood KT-660L £130	Fairly Good Fairly Good	You get your money's worth of gadgets and the radio's basically sound although programming is complicated. AM - fairly good	Timer, clock, all bands	R	65
Kenwood KT-1100D £300	Good+ Good+	Behind a gaudy and rather useless display the radio is much better than you might first think. AM - good	Firework display, FM/mw bands only	R	65
Linx Theta £400	Good Very Good	A Magnum Dynalab on the cheap with the hallmark styling of this small British newcomer. Some of the best midrange from any tuner	Manual analogue tuning, no presets, signal strength meter	R	72
Magnum Dynalab FT101 £599	Good Very Good	Although expensive for its fairly minimum set of facilities its excellent sound makes up for what it lacks elsewhere	Analogue manual tuning, no presets, signal strength meter	R	72
Marantz ST35L £125	Good+ Average—	It works well enough but the sound could be better for the money	16 presets, AM/fm, digital auto scan, active tracking		55
Meridian 204 £525	Good+ Good	Pleasant sounding with a fine finish but does not make the grade at this price	FM only, auto scan, digital, remote, clock timer		55
Musical Fidelity TI £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, manual tune, signal meter	R	55
NAD 4020 £139	Good Average+	Not the quietest or most sensitive tuner tested, it still provided good sound for the money, being "musical and ambient"	Analogue FM/am	BB	50
Naim NAT 01 £1098	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
Nakamichi ST-7E £750	Good+ + Good+	Exceptionally good for weak-signal areas, and good all round	16 AM/fm presets, Schotz enhanced sensitivity, auto time digital		55
Onkyo T9090 II £590	Very Good Very Good	It has most of the facilities you could possibly want and more beside. 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
Pioneer F91 £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

# THE WORLD'S NO 1 GUIDE TO BUYING HI-FI

## THE DIRECTORY

## TUNERS

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Proton AT-300 £199	Good Good	The AT-300 is pretty on the outside, orthodox on the inside and rather dear. AM – poor	FM/mw only	R	65
Quad FM4 £289	Very Good Good+	Fine sound, excellent ease of use, good build and finish and a more than satisfactory technical performance	7 presets, Digital	R	50
Revox B260 £918	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
Rotel RT-830AL £110	Good+ Good	Fine sounding budget audiophile material, no frills, no fuss	Manual dial analogue, FM, MW, LW	BB	55
Rotel RT-850AL £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
SAE T-102 £449	Good+ Good+	Expensive for all the radio you get, but sounds interesting. AM – poor	FM/mw only	R	65
Sony ST-S300L/ ST-S100L £140/£100	Good Good	A reasonable entry point, not for difficult areas. AM – poor	All bands	R	65
Sony ST 500ES £200	Good+ + Average-	Disappointing sound quality but good lab performance. (Includes long wave)	10 AM/fm presets, auto scan digital		55
Sony ST-S 700ES £299	Very Good Very Good	First class in every respect including FM sound quality. Even AM was well above average	FM/am, 10 presets, digital scan	BB	60
Yamaha TX-L400 £130	Good+ + Good+	Good FM sound, let down by poor AM but otherwise good value	16 presets, auto scan, digital, FM, MW, LW	BB	55
Yamaha TX-500 £150	Average+ Average	Under a gaudy coat, this sensitive tuner gave reasonable stereo results. However, the AM had again been thrown down a well	20 presets (10 buttons) digital		50

Rating refers to original, tested model

## 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 Jeklin 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 via a

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 and irritate 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 or ears. 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.

NAME PRICE	COMFORT SOUND	COMMENTS	TYPE	VALUE	BACK ISSUE FULL REVIEW
Aiwa HP-X30 £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
Aiwa HP-V99 £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
Aiwa HP-X80 £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
Aiwa HPEX-200 £90	Good Good	Modern looking and well finished the Excelias, as they are dubbed, had meaty bass and sounded reasonably open for the type	Circumaural, closed-back, dynamic		63
AKG K135 £35	Poor Fair	Despite a very appealing design the K135s don't live up to the usual AKG standards, though they do have the ability to reproduce rhythm well	Supra-aural, semi-open, dynamic		63
AKG K145/S £58	Good+ Good+	Electrostatic tweeters combine with a dynamic mid/bass unit to create very confident sounds in a comfortable headphone. Balance is on the bright side	Supra-aural, semi-open, electrostatic/ dynamic	R	75
AKG K240 Monitor £60	Very Good Good	Something of a classic these AKGs are very user friendly in all respects: sonically on the warm side of neutral	Circumaural, semi-open, dynamic	R	63
AKG K280 Parabolic £110	Good Very Good	A very revealing and unusual twin driver design that uses the same principle as a satellite dish to beam sound into the ear	Circumaural, open-backed, dynamic	R	63
AKG K340 £136	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
Audio Technica ATH 909 £55	Average Average	Quite impressive in the treble though a bit bass shy, the 909s worked well at highish levels	Circumaural, semi-open, dynamic		55
Audio Technica ATH 910 £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
Audio Technica ATH-911 £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
Beyer DT 325 £30	Very Good Fair	Lightweight in more ways than one, the 325s may be a little bright for some systems and tastes but will suit duller sources	Supra-aural, open-back, dynamic	R	63
Beyer DT330 Mk II £45	Good Poor	Not the most revealing phones encountered, the 330s were nevertheless enjoyable and rarely offended	Circumaural, semi-open, dynamic		55
Beyer DT550 £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
Beyer DT880 £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
Beyer DT990 £119	Very Good Very Good	The 990s are definitely a significant pair of dynamic headphones: they have a smooth and yet revealing, neutral sound that is hard to criticise.	Circumaural, open-back, dynamic	R	55
Beyer IRS690 £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
Jeklin Float Model One £79	Good Very Good	Whist very unusual in appearance the Floats give remarkable sound quality and openness at a reasonable price	Circumaural-ish, open-back, dynamic	BB	55
Jeklin Float Model Two £99	Good Very Good	Helmet shaped and pretty unflattering but open sounding and comfortable in the long term. Note lack of adjustment means you should try before you buy	Circumaural-ish, open-backed, dynamic	R	63
Jeklin Float Electrostatic £399	Good Excellent	One version of the state-of-the-art, these electrostatics have an openness of sound rarely found in the breed, with good dynamic range to boot	Circumaural-ish, open-back, electrostatic	R	55

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# THE DIRECTORY

## HEADPHONES

NAME PRICE	COMFORT SOUND	COMMENTS	TYPE	VALUE	BACK ISSUE FULL REVIEW
JVC HA-D990 £65	Good+ Good+	Good looking well made cans that offer good sound quality for the money. Sonic nature is of the easy-going, laid-back variety	Supra-aural, closed-back, dynamic	R	75
Koss TD/60 £20	Good Average	Although they're devoid of channel identification and have a decidedly Stateside approach to sound, these are very listenable phones for the price	Supra-aural, closed-back, dynamic		75
Koss K/6X Plus £30	Fair 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
Pioneer SE-72 £30	Good+ Average-	Neat, nicely made personal stereo oriented phones along the lines of Sony V3s. Sound is on the veiled side, good for aggressive sources	Supra-aural, closed-back, dynamic		75
Quart Phone 30 £40	Good Fair	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
Quart PMB 25II £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
Quart Phone 70 £70	Good Good	Competent performers that were hard to criticise but lacked the life and sparkle of which some of the competition are capable	Circumaural, closed-back, dynamic		63
Quart PMB 65 £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
Quart PMB 85 £90	Fair Very Good	These more expensive Quarts bear a striking resemblance to the JackIn Float models and use two drivers per ear. Sound is a bit bass heavy but not bad overall	Circumaural, open-backed, dynamic		63
Realistic Pro-X £25	Poor Average-	Robust, unanimously uncomfortable and heavily veiled in sonic terms - not a great success	Supra-aural, closed-back, dynamic		75
Ross RE2530 CD £20	Average Average	Rather an 'average' £20 phone that some found uncomfortable due to high pressure on the ears. Sonic balance is on the bright side	Supra-aural, closed-back, dynamic		75
Ross RE2560 CD £25	Good Average+	If you're not too fussy about quality of finish and don't have an elfin head then these British phones warrant attention. Sound could be smoother	Supra-aural, semi-open, dynamic		75
Ross RE-2760 £35	Poor Fair	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
Sennheiser HD40 £20	Very Good Good-	Very light and comfortable headphones with an even sonic balance that will suit most sources, but jack is 6.3mm and not suited to personals	Supra-aural, semi-open, dynamic	BB	75
Sennheiser HD450 £35	Good Fair	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
Sennheiser HD480 £45	Good Fair	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
Sennheiser HD520 £65	Good+ Good+	A very comfortable and musically capable headphone. If you've got this sort of bread to blow on cans, give 'em a blast	Circumaural, semi-open, dynamic	R	75
Sennheiser HD530 £75	Very Good Good+	One of the better dynamics in its group, the 530s create a sense of space that eludes most sub £100 cans, and they're dead comfy to boot	Circumaural, semi-open, dynamic	R	75
Sennheiser HD540 Ref Gold £160	Good Very Good	The 540 Golds prove that dynamic headphones can be subtle, informative and capable of creating a remarkable sense of space	Circumaural, open-back, dynamic	R	55
Sony A21L £20	Good- Good-	Forward facing in-ear drivers on a folding plastic band provide exceptional clarity for such an inexpensive phone. However, no bass, and fit isn't to everyone's taste	Intra-aural, semi-open, dynamic	BB	75
Sony MDR V3 £30	Fair 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
Sony MDR-V5 £50	Very Good Average+	A nicely made comfortable headphone let down by a limited ability to reproduce music in a natural fashion	Supra-aural, semi-open, dynamic		75
Sony MDR V7 £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
Sony MDR-CD999 £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
Sony MDR-R10 £2500	Excellent Very Good+	Costly state of the art sealed moving coil design built to the highest standards using the finest materials. Sound quality reflects this care, being big, clear, sweet and refined	Circumaural, closed-back, dynamic	R	72
Stax SR34 £140	Fair Very Good	The least expensive Stax headphones around, the SR34s are lively and rhythmic with good tight bass and a sweet midrange	Supra-aural, open-back, electret		55
Stax SR84 £210	Very Good Very Good	The stepping stone between dynamics and full electrostatics, these electret phones are revealing, open and highly enjoyable	Supra-aural, open-backed, electret	R	63
Stax Gamma pro/SRD-X pro £296/£230	Very Good Excellent	The Gamma pros are like a stethoscope for your hi-fi, revealing subtleties that many loudspeakers fail to resolve	Circumaural, open-backed, electrostatic	R	63
Stax SR Gamma £299 (inc. SRD-6 Adaptor at £100)	Very Good Very Good	The next model down the Stax range from the Lambda, the Gamma is an excellent headphone with little to criticise but the price	Circumaural, open-back, electrostatic	R	55
Stax SR Lambda Pro £545 (inc. SRD-7SB Mk 2 Adaptor at £185)	Very Good Very Good	A bit of an industry reference the Pros are frighteningly revealing, bringing across more information than loudspeakers costing twice as much	Circumaural, open-back, electrostatic	R	55
Stax SR Lambda Pro £360/ SRM-1 energiser £635	Very Good Excellent	This combination extracts layers of information that other headphones only hint at. The SRM-1 has more edge than the SRM-T1, but it's good	Circumaural, open-back, electrostatic	R	75
Stax Lambda Signature/SRM-T1 £470/£895	Very Good Excellent	The Signature when combined with the SRM-T1 valve driver must be the most transparent headphone available	Circumaural, open-backed, electrostatic	R	72
Yamaha YHL-006 £30	Average Average	Unusual personal stereo oriented phones that curl up when not in use. Earphones are like golf balls and balance is well suited to Walkmans	Supra-aural, open-back, dynamic		75

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## THE DIRECTORY

## 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 Discmen going for £300.

Despite their diminutive size personals attempt to incorporate as many gimmicks and features as

possible, cassette players often incorporating tuners, graphic equalisers and Dolby noise reduction. CD players are still relatively expensive and don't tend to vary that much on the features front, rather the amount and quality of accessories differs. 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 NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Aiwa HS-PL300 £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
Aiwa HS-PX303 £150	N/a Good	Chunky and macho styling combines with comprehensive features and a half decent transport to make a powerful personal	Dolby B & C, chrome/metal eq, remote	R	78
Panasonic RQ-P505 £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
Panasonic RQ-P525 £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
Philips D6658 £30	Very 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
Saisho PS90R £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
Sharp JC-270E £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
Sony WM-BF65 £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
Sony WM-701C £150	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
Sony Walkman Pro £249-£289	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
Toshiba KT-4549 £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 NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Goodmans GCD-10 £120	Average- Poor	Cheap, flashy and not short on accessories the GCD-10 is a rather noisy player that left a lot to be desired on the sound quality front	13.5 x 3.7 x 18cm, 478g, mains adaptor		66
Kenwood DPC-77 £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	12.8 x 3.5 x 14.5cm, 750g, digital output, mains & in-car adaptors	R	66
Philips D6800 £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, 3" ready, twin hdph sockets		66
Sanyo CP-12 £260	Fair Good+	Sonically amongst the more enjoyable personal CD players and capable of revealing the musical aspects of a disc in an interesting and entertaining fashion	12.5 x 2 x 12.7cm, 380g, wired remote, mains adaptor	R	66
Sony D-20 £150	Average+ Fair	Not bad for a machine at this price, it's nicely designed and reasonably robust, with reasonable sound quality	13.8 x 3.8 x 15cm, 450g, mains adaptor	R	66
Sony D-88 £300	Average- Fair+	A stylish and 'cultish' object, the D-88 is very small and has an adjustable disc drive for three and five inch discs. Sound quality doesn't quite match appearance	9.4 x 3 x 9.8cm, 300g, 3" ready, mains adaptor, no line out		66
Sony D-150 £300	Fair+ Very Good	One of the most enjoyable machines encountered, sounding informative and sweet and looking very tasty to boot. Comes complete with a tough carrying case	12.6 x 2.1 x 13.5cm, 420g, 3" ready, mains adaptor	R	66

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## 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 such as a preamplified vinyl disc signal, and microphone sockets for recording live events (although the usual lack of record level adjustment is a nuisance).

MODEL PRICE	SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
<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

## 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 speaker 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	TYPE FINISH	COMMENTS	TOP PLATE SIZE HEIGHT	VALUE	BACK ISSUE FULL REVIEW
<b>Appolo A820</b> £44	4 leg Fair	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>Appolo A10</b> £52.50	4 leg Fair	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>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 x 52cm	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 Sir Fred</b> £80	2 leg Good	Upgraded 'Fred' with special in-fills. Sweet sound but one that also lacks bite and edge	19 x 19 x 46.5cm		83 supp
<b>Foundation Maggi</b> £159 to order	Pair Very Good	Made for Magneplanar and other similar panel speakers they seem to have a healthy effect on the sound quality thereof.	50 x 2cm 2cm	R	58
<b>Foundation Pi</b> £269 to order	2 leg Very Good	Overpriced in material terms the Pi nevertheless has a very positive effect on the low frequency performance of conventional speakers.	20 x 20cm 25/38/46/53cm	R	58
<b>Goldring 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 x 46cm	R	83 supp
<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>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	F	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 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>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 x 44cm		83 supp

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## LOUDSPEAKER STANDS

MODEL PRICE	TYPE FINISH	COMMENTS	TOP PLATE SIZE HEIGHT	VALUE	BACK ISSUE FULL REVIEW
Partington PP4 £60	1 leg Good	The PP4 offers a rather mixed performance, though when damped with sand infill it was less ready to embellish the overall sound and low frequencies became tauter and quicker.	18 x 16.5cm 48cm		58
QED TS22 Tristand £60	3 leg Very Good	Most tracks sounded uplifted or buoyant, never thick nor coloured. It worked well with most of the speakers tried and encouraged a fluid and revealing midband.	19 x 17cm 45/50/58cm	BB	58
Stand Design Z20 £70	1 leg Excellent	Well built and finished with optional sand in-fill. Ideally suited to Wharfedale 505.2's	16.5 x 19 x 50cm	R	83 supp
Target T-40 £48	2 leg Very Good	Not very stable, tends to infer a slightly forward, ragged sound with diluted pitch	19 x 19 x 40cm		83 supp
Target HS20 £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
Target H115/3 £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

## EQUIPMENT SUPPORTS

MODEL PRICE	TYPE FINISH	COMMENTS	SIZE (H x W x D)	VALUE	BACK ISSUE FULL REVIEW
Alphason New Concept £99	Rack Good	A heavyweight structure with stressed MDF shelves, ideally suited to the Sonata turntable	82 x 60 x 39.5cm	R	83
Audioquest Sorbothane Feet £40 for four	Feet Good	These large gumdrops are very useful for damping vibrations in amplifiers and especially CD players.	6.5 x 2.5cm (circular)	R	57
Cornflake TCS6 £60	Shelf Good	A squat and rigid frame supports a Medite top board with four adjustable spikes, better suited to suspended sub-chassis turntables.	43 x 23 x 33cm		57
Foundation Stable Table £100 (with Super Board)	Table Good	Similar to Stand Design's table though less well finished and certainly less stable	64 x 46.5 x 36cm		83
Origin Live Skyline Super £100	Table Good	An asymmetric table that helps provide a quick, lucid and solid sound with most decks	41 x 50 x 40cm	R	83
Roksan Equipment Table £169	Rack Good	An upgrade/expandable system suited to Roksan's Xerxes if not other competing turntables	65 x 52 x 38cm		83
Sound Organisation Table £55	Table Very Good	A deceptively simple structure that just happens to be engineered in a thoughtful, and ultimately successful manner.	37 x 45 x 35cm	BB	57
Sound Organisation Wall Stand £40	Shelf Very Good	The first of its ilk and still amongst the best, this simple framework represents a vast improvement over standard furniture shelves.	27.5 x 43 x 35cm	BB	57
Sound Organisation Z022 £97	Table Excellent	A small but costly table made from thin steel tubing. Suited to the LP12 but not other decks	49 x 45.5 x 36cm		83
Stand Design Duplex £75	Table Very Good	Well made and nicely finished, this table is broadly compatible with most heavy turntables	63.5 x 46.5 x 36cm	R	83
Target TT1 £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
Target TT2 £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

\* rating refers to original tested model

## 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 plugs yourself.

The features column contains information on the material make-up of the different cables with the following abbreviations: OFC - oxygen free copper, OFHC - oxygen free high conductivity (Audionote define the HC as high crystal), PC-OCC - pure copper by ohno continuous casting, LC-OFC - linear crystal oxygen free copper.

## INTERCONNECT CABLES

MODEL PRICE (per metre)	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Audioquest Livewire Topaz £35	Good Fair	Sounding 'bigger' and faintly richer than Reference 2, Topaz was also slightly grainy at the top end.	Gold-plated plugs, OFHC copper		59
Audioquest Livewire Ruby £49	Fair 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
Audio Technica AT6115 £40	Very Good Fair	This cable sounds somewhat 'quieter' than the original LC-OFC interconnect, but is also less transparent and three dimensional.	PC-OCC copper coaxial		59
Audionote Copper ANC £44	Fair 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
Audionote Flexible Silver ANS £99	Fair 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
Audionote Silver ANV £154	Poor Excellent	Far weightier-sounding than the flexible ANS, ANV interconnect also possesses a fair degree of treble clarity and sparkle.	21 strand silver Litz		59
Budget Patch Cords see text	Fair Poor	As thrown in gratis with cassette decks and the like - frequency extremes were restricted and performances were veiled.	Thin coaxial		59
Budget OFC circa £7	Fair Fair	Subjectively, this cable did lift much of the aural fog experienced with scrawny standard hook-up leads.	OFC		59
Chord Mono-t £27/1.2m	Average+ Average+	Offers a slightly rolled-off treble but its rich sound is an upgrade from patch-cords	Unsymmetrical 4-conductor cable		83 supp.

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## INTERCONNECT CABLES

MODEL PRICE (per metre)	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
<b>Oeltec 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>Deltec Black Slink</b> £152	Excellent Excellent	Inherently neutral the cable faithfully reproduced broad and deep stereo soundstages with precise focus and a sense of facility.	8 silver plated OFC strands PTFE dielectric	R	59
<b>Deltec Gortex Black Slink</b> £152	Very Good Excellent	A true reference quality cable providing an exceptionally detailed and transparent sound	Symmetrical, 8-conductors, Gore-tex ins.	R	83 supp.
<b>Denon LC-0FC</b> N/a separately	Very Good Fair	Supplied with Denon's dearer CD players this cable introduced a peculiar 'twangy' coloration at high frequencies, and a slightly soft bass.	LC-0FC, non-magnetic gold plated plugs		59
<b>ONM Solid-core</b> £23	Fair 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 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>Kimber Kable KC-1</b> £65.55	Very Good Fair	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 KC-AG</b> £390	Good Very Good	Treble detail resolution was perceived in a slightly abrupt if wholly controlled fashion. Depth re-creation and lateral separation were excellent.	Multi-gauge silver, PTFE dielectric	R	59
<b>Monster Interlink 300</b> £22	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> £32	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 Fair	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 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>QED Incon Graphite GP1 Gold</b> £18.95	Fair Fair	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>Sterling</b> £250	Fair 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 Fair	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 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 Fair	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>van den Hul MC-Gold</b> £250	Fair 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>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-0FC signal & screen	R	59
<b>Yfere LC-0FC 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	BACK ISSUE FULL REVIEW
<b>Absolute Wire Force 4</b> £4.75 per metre	Good Fair+	By current standards there was a loss of fine, sharp detail at the frequency extremes, but it has a big and friendly sound	744 OFC strands, PVC dielectric		64
<b>Audio Innovations OR-200</b> £16 per metre	Fair + Fair +	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>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 nonetheless	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	Figure-of-eight multi-strand, PVC dielectric	R	83 supp.
<b>Audio Technica AT6120</b> £10 per metre	Fair + Fair	Compared to earlier LC-0FC cables this PC-OCC derivative sounded smoother and less aggressive	PC-OCC, PVC dielectric		64
<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>Oeltec 8S</b> £144 – 5m pair	Good Good +	The unerring transparency and detail resolution of 8S throughout the midband makes it a far cleaner and more spacious sounding cable than others at the price	4 silver plated OF copper strands, PTFE	R	64
<b>Oeltec 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>Deltec Black Sixteen</b> £648 – 4.5m pair	Very Good Excellent	Bass was deep and rhythmically secure, the mid tonally pure and free of additional sibilance while the treble was both relaxed, sweet and highly detailed	16 silver plated OF copper strands, PTFE dielectric	R	64
<b>DNM Solid core</b> £3 per metre	Average Fair	A good general-purpose solid-core, though too bandwidth limited for high-end applications. Sounds great in some systems	0.65mm single strand, webbed PVC dielectric	R	64
<b>Exposure</b> £2.50 per metre	Good Good	It could sound a trifle matter of fact but this emotive flattening was also somewhat dependent on the music program. It is also highly suited to long runs	56 OFC strands, webbed PVC dielectric	R	64
<b>Furukawa FS-2F09</b> £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

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## LOUDSPEAKER CABLES

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
<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 strands	R	83 supp.
<b>Kimber 4VS</b> £7.15 per metre	Average+ Average	Similar construction to 4TC but dissimilar materials infer a slightly tizzy sound	Open-weave, multi-strand with PVC ins.		83 supp.
<b>Kimber Kable 4PR</b> £54 - 5m pair	Fair Fair+	This directionally marked cable benefitted 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 dielectric		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 Fair	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	Fair Fair	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 dielectric		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 SCI 16-4</b> £2.50 per metre	Average Average	Not as thick-sounding as early Monster cables but still slightly unbalanced. Versatile construction	4 x 16-gauge conductors, OF copper strands		83 supp
<b>Monster Original</b> £4 per metre	Good Fair+	Original sounded relatively congested and murky at higher frequencies but possessed weight and conviction in the bass	Multistrand		64
<b>NVA LSI</b> £6 per metre	Average+ Good	A light and breezy sounding cable best suited to short lengths, NVA benefitted 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 Fair+	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 Fair	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 Incon Graphite</b> £2 per metre	Fair+ Fair+	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>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>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>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>Sony RK-5SES</b> £60 - 5m	Fair+ Fair+	The sound of this cable was also somewhat controlled and over damped. The treble was relatively free and airy but lower octaves, including the midband, were constrained	350 x 0.08mm OFC strands, heat shrink dielectric		64
<b>Solid core mains cable</b> 36p per metre	Fair+ 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	Fair Fair	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	Fair+ 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	Fair+ Good-	Characterised by a driving and powerful bass, CS-122 proved to be 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 Fair+	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 dielectric		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	Fair Good	Subjectively the better of Vecteur's three-strong cable line-up offering a neutral overall perspective but with a slight loss of detail resolution at both frequency extremes	4 x 0.8mm LC-OFCC PTFE insulated strands	BB	64
<b>Vecteur S-CV90</b> £69 per metre	Fair+ Fair+	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-OFCC strands		64

## IN-CAR ENTERTAINMENT

In-car entertainment is an area not usually associated with the esoteric world of domestic hi-fi. However, it represents a source of musical entertainment that many of us are exposed to every day. The majority of new cars are fitted with some form of radio before they leave the showroom and in many cases this usually very basic player is taken for granted and accepted as representative of in-car audio standards.

For the price of a budget amplifier or more, there is a wide variety of in-car machines to choose from,

including cassette, CD and even DAT players. The majority of sub £300 players are integrated units featuring a cassette player, AM/fm tuner and amplifier, all in one remarkably compact standard sized box. At this price level the cassette players tend to be fairly basic affairs, although autoreverse and noise reduction systems are both fairly common. Tuners are usually of the digital variety with varying degrees of sophistication in signal tuning and presetting, with some machines featuring as many as 18 FM presets. The emphasis is on the frequency

modulated band and AM often suffers as a consequence, but fortunately for radio enthusiasts there are some exceptions

The amplifier is usually designed to drive two pairs of speakers mounted fore and aft of the vehicle, and a fader is fitted to adjust the balance between the two. The dearer machines feature separate bass and treble controls which can be quite handy given the unusual acoustic of the car environment and the variety in balance and presentation to be had from car speakers

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
<b>Alpine 7282L</b> £250	Good Very Good	A very attractive and seductive sounding player. The matt surfaced transparent preset keys are especially sexy	Bass/treble controls, 12 FM 6 AM presets, chrome eq., clock, 8W	R	61
<b>Alpine 7905M/3539</b> £650/£350	Excellent Excellent	An easy to use and attractive CD/tuner, partnered with a powerful and flexible amplifier to give an effortless source of in-car entertainment	Bass/treble controls, 12 FM, 12 AM presets, slide-out, 150W	R	68

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## IN-CAR ENTERTAINMENT

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
<b>Blaupunkt Windsor SQR 38</b> £275	Good Average	Not very enthralling sonically, the Windsor is rather low powered but does have a reasonably stable tape transport	5 FM, 10 AM presets, 3.1W		62
<b>Clarion 916HP</b> £160	Good Average	With its rubbery buttons and touches of white this is a modest looking player let down by a weak cassette	Bass/treble controls, 5 FM, 5 AM presets, 9W		61
<b>Clarion 946HP</b> £250	Very Good Very Good	A good FM side let down slightly by AM performance. This Clarion is particularly nice to use with its nifty SAM tuning system	Bass/treble controls, 12 FM/6 AM presets, Slot-in, 15.1W	R	61
<b>Clarion CDC7000/10028HA</b> £650/£250	Very Good Excellent	Despite a slightly off-beat cartridge system the Clarion combo put in a performance that had the sonic edge over other CD/tuners in its test group	Bass/treble controls, 12 FM, 12 AM presets, security code, 80W	R	68
<b>Goodmans GCE229</b> £150	Fair Average	If knobs, switches and legends are your bag then the GCE229 is the one for you – a lot of gizmos for the price and it even sounds OK	Bass/treble controls, 6 FM/6 AM presets, Chrome eq., clock, MSS, 10.1W	BB	61
<b>Hitachi CSK-402E</b> £250	Good Good	An attractively designed little player that for once doesn't disappoint when it comes to playing music, and it even has a security system	Bass/treble controls, 6 FM, 12 AM presets, Dolby, chrome eq., music search, 7.4W	R	62
<b>Nakamichi TD-400E/pa-300 II</b> £495/£329	Very Good Very Good	If you want your in-car entertainment to compete on sound quality grounds with your domestic system, this combo offers a very strong challenge	Bass/treble controls, 5 FM, 10 AM presets, uni-directional, chrome eq., Dolby B, C, 75W	R	62
<b>Nakamichi TD-700E/pa-300II</b> £874/£329	Very Good Excellent	For those who appreciate the wonders of analogue there are few in-car players to really compete with this superb cassette/radio. You can even adjust azimuth	Bass/treble controls, 6 FM, 6 AM presets, music search, Dolby, 75W	R	68
<b>Panasonic CQ-497</b> £117	Fair Poor	The CQ-497 has a traditional style analogue tuning system making it easy to use. AM reception was good but the other sources are less encouraging	Bass/treble controls, chrome, NR, 7W		62
<b>Philips DC680</b> £180	Average Good	A colourful and musically competent player that despite a gammy volume knob is well worth checking out.	8 FM, 4 AM presets 3.5W	R	61
<b>Pioneer DEX-M300/CDX-M100/GM-3000</b> £300/£450/£280	n/a Very Good	Separate control unit and boot mounted multi play autochanger make this a bit of a hefty installation but it uses the same magazines as their domestic players and sounds fine	Bass/treble controls, 18 FM, 6 AM presets, 80W, removable fascia		68
<b>Proton 214CD/d275</b> £300/£175	Very Good Very Good	This Proton cassette/tuner offers good power and a level of fidelity appropriate to its price. Musically it has a Decca-like charm that is very appealing, plus a sensitive radio	Bass/treble controls, 8 FM, 8 AM presets, Dolby B/c nr, chrome eq., 85W	R	68
<b>Sharp RG-F816E</b> £200	Poor Average	Nothing if not novel the 816, with its unusual anti-theft system is custom built for the furry dice brigade, but is sonically a bit lacklustre	Four band graphic, 8 FM, 16 AM presets, ASP, Dolby, MSS, 10.9W		62
<b>Sharp RG-F882E</b> £220	Average Average	Again a glitzy full feature machine with a flip out control panel and plenty of lights. However, sound quality is a bit disappointing	Seven band graphic, 5 FM, 10 AM presets, ASP, chrome eq., Dolby, 8.5W		62

## RECEIVERS

Purists will look down their noses at the very idea of combining two functions into one box, and indeed they always have done. But unless we're talking about the exotic elite, the creme de la creme of amplifier and tunerdom, intrinsic technical shortcomings simply aren't an issue.

One obvious reason why you should buy a receiver if you were otherwise considering an amplifier and a tuner is that there are savings, ie of

size. Generally you end up with one box in place of two similarly sized boxes, which has got to be a good idea. Receivers are also simpler to operate, in principle anyway. At the very least you save on one power switch, and typically you are presented with an integrated control system that is bound to oil the wheels of ergonomics.

But there is one important point to watch. Because receivers don't sell in vast quantities in

this country, and because this is one of the very few countries to use Long Wave for public service broadcasting, many – no, most – receivers on sale in this country cover FM and MW only. Remember that LW is the home of Radio 4, where it can be heard on the all too frequent occasions it is not on FM.

MODEL NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
<b>Harman Kardon HK330Vi</b> £259	Average Average—	No LW, and FM section best suited to strong, local transmissions. The amplifier is quite powerful but favours the treble. Bass is tuneful but lacks weight	5 inputs (inc 2 tape), FM/mw tuner		70
<b>Harman Kardon HK440Vxi</b> £299	Good Good	Clear, dynamic, slightly bright sounding design, a little grainy in extremis. Mono switching and LW missing from tuner, which otherwise performs well	5 inputs (including 2 tape) with FM/mw tuner	R	70
<b>JVC RX-777VL</b> £500	Good Good	Sharp, lively but euphonious sound quality from line and phono source is matched to a high grade tuner. However, many half-baked facilities blunt value for money	A/v capable with 6 inputs, equaliser, digital ambience, FM, MW/lw		70
<b>JVC RX-1001V</b> £770	Average Poor	Power output is well below spec, and sound quality is cluttered and messy on all inputs	Digital ambience processing, Dolby Surround, 2/4 speaker, 40 FM/mw presets		70
<b>Revox B285</b> £1782	Average Average—	Sophisticated and capable tuner is married to a muddled, compressed sounding amplifier, which also has low sensitivity preventing the amplifier being driven fully in many situations	70 watts/ch, 4 inputs (inc 2 tape), 29 FM/mw/lw presets		70
<b>Rotel RX-850AL</b> £230	Good Good	Well built and sensibly equipped receiver with outstanding sound quality for the price via the tuner, phono and line sources alike. It majors on subtlety however, and may not impress the heavy metal brigade	4 inputs (inc 1 tape), FM/mw/lw tuner	BB	70
<b>SAE R102</b> £599	Average— Average	This is an uneven but mostly good performer. It sounds constrained but musical, but the tuner is weak on both wavebands.	4 inputs (inc 2 tape), FM/mw tuner		70

# THE WORLD'S NO 1 GUIDE TO BUYING HI-FI

# Personal Messages

*Thanks to further fine tuning of his system, Paul Messenger is well on the way to a satisfactory hi-fi experience. Well, almost...*

My hi-fi system has undergone more changes in the last four months than it suffered in the four years preceding. Some of these have already featured in two of the last three columns, but lots of loose ends have cropped up along the way, and are going to find themselves crammed untidily into this particular page.

Chronologically, the first change was to substitute six 5 metre lengths of Naim NAC A5 loudspeaker cable for the 10m lengths of NAC A4 I had been using for the past several years. A5 is a P in the B to use 'cos it's (far) less flexible than even cooker cable. However, such is a minor consideration for nuts like yours truly, and doubtless I'll eventually get around to running it under the floorboards one of these years.

NAC A5 has actually been around for about a year now, and was developed specifically with Naim's own loudspeakers in mind, and the company warned that its use with other models, including my active *Isobariks*, was unpredictable. But curiosity had gotten the better of me, especially after the *Mana Sound Table* had wrought such a big improvement in my systems vinyl sound.

For the first few days I came very close indeed to dumping the A5 and returning to the familiar. The sound was certainly very quick and tight, but was also decidedly splashy and uncomfortable. Naim had warned me it mightn't work, and it was looking as though they might be proved right. And if I was finding the sound uncomfortable, my partners views were a lot less complimentary than that. However, I wasn't prepared to give up that easily, and some fiddling around was called for. Rather to my surprise, I got quite dramatic and entirely positive consequences from the simple expedient of changing the absolute phase of the complete system (by

reversing the polarity of all six loudspeaker leads at the power amplifiers).

I've absolutely no idea why this made such a substantial improvement. Changing the absolute phase of a system is certainly audible, as I've found from using the *Mission Cyrus* CD player, which has remote phase switching. But the 'right' setting for such a switch is unpredictable, varying from one recording to another in both sense and degree of effect.

It's fun to swap phase with different discs to get the best sound, but ultimately I suspect it all depends on how good a job the engineer has done to ensure phase integrity during the recording process. Which with modern multi-track techniques means it's all rather random and unpredictable. However unlikely it may sound, the system's vinyl sound is certainly now consistently better with the phase reversed, and since I don't have a handy switch I'm content to leave it that way.

Incidentally, it's my suspicion that this phase difference is more obvious with my vintage vinyl from the 50's and 60's than on more recent recordings. The obvious inference is that the overall phase relationships are much better preserved in simple recordings than the fricassé created by a multi-track mixing desk.

Another inference is that the NAC A5 cable does a much better job of preserving phase relationships than its more flexible predecessor. Indeed, I'd go so far as to say that the best hi-fi systems available, aided by recent advances in support furniture, cabling and loudspeaker stands, are at last starting to add wide bandwidth phase coherence to their established capability over amplitude relationships. All of which is rather conjectural, bordering on woolgathering, but I can't think of a better explanation.

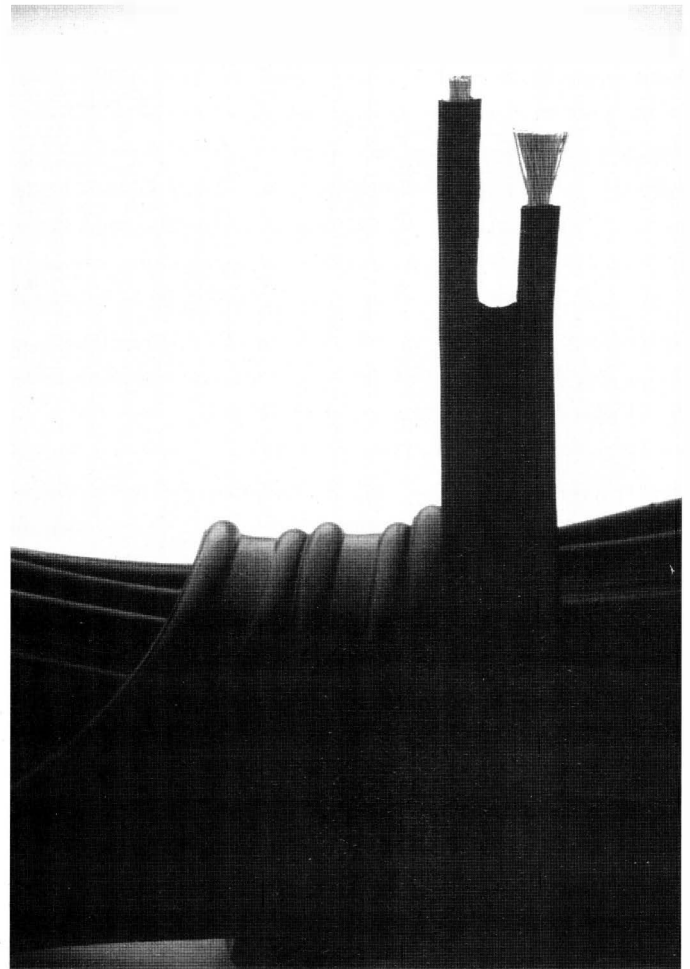
If reversing the cable

connections started to make the system tolerable, tipping the balance of improvement over listenability in favour of the new cable, the arrival of two more *Mana* tables - one of five and the other of two levels, sufficient to support all twelve separate Naim units that comprise my complete system (no, I'm not going to list them) - provided the final piece of the jigsaw.

I wouldn't say all is now totally sweetness and light - I've still got a few more tweaks to try - but the sound quality got substantially better nonetheless, and the new cabling became much easier on the ears, if the turntable support had improved the system by 50 per cent, the electronics supports added at least another 25 per cent, and the cable effect isn't far behind. The nicest thing about the

*Mana* equipment tables is the way they somehow harmonise with the *Sound Table* itself, the former complementing rather than clashing in any way with the latter.

At the end of the day, achieving a really good sound in your - or my - home has as much to do with choosing components that work together in a complementary way as it has to do with choosing the components themselves. Squeezing the last drop of performance out of the basic chain components has everything to do with the way they're linked together and supported. Add in the influence of the listening room, give your personal taste free rein in making decisions and you're well on the way to a satisfactory hi-fi experience. Sounds easy doesn't it...

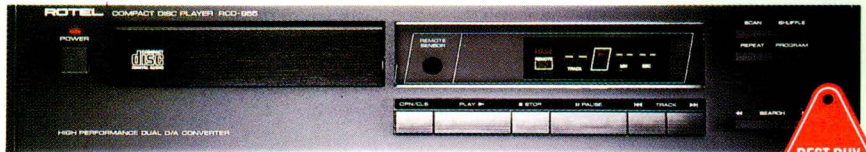


*Naim cable: preserving phase relationships in PM's system?*

SO WHAT? AND



# REACH FOR THE BEST



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