

HI-FI CHOICE

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

47 TURNTABLES AND
26 TONEARMS – SUMMARISED

109 CARTRIDGES
– SUMMARISED

68 CASSETTE DECKS
– SUMMARISED

20 LOUDSPEAKER SUPPORTS
– UNDER REVIEW

THE PWB EFFECT:
MYTH OR MAGIC?

89 LOUDSPEAKERS
– SUMMARISED

36 CD MIDI SYSTEMS
– SUMMARISED

FOCUS ON:
TWEAKING

122 AMPLIFIERS AND
32 TUNERS – SUMMARISED

77 CD PLAYERS
– SUMMARISED

40 COMPACT DISC PLAYERS ON TEST
TEST SUMMARIES ON OVER 600 HI-FI PRODUCTS – FROM OUR OWN INDEPENDENT LABS

TURNING THE TABLES IN '88 ...



The New Electronic Q Deck
– winner of What Hi-Fi's 1988
award for best turntable and a
prestigious Chicago C.E.S. Design
Award the Q Deck has established itself
as the leader in its market place. Now with a
remote power supply the reduction in spurious
mains noise provides cleaner, more precise
power, producing the best ever Q Deck – setting
even higher standards of performance.

The New Icon – a completely flexible package that, together with the
Q Deck, has become an industry standard at an affordable price.
Featuring a semi-automatic operation with auto lift off and
electronic speed switching, the Icon provides all the functions
of the Q Deck. The 3 point spring suspension, precision Icon
tone arm and precise remote power supply results in a
sound quality that will satisfy the most demanding
listener.

Hear for yourself – cut out the coupon today for
further information and a list of your nearest
dealers.

Electronic Q Deck Inc. Ortofon OM10 Cartridge – £139.95
Icon Inc. Ortofon OM20 Cartridge – £219.00

ARISTON ACOUSTICS
Ariston Acoustics Ltd
Freeport
Prestwick
Ayrshire
Scotland KA9 2TA
Telephone: (0292) 76933/4
Telex: 777568 ARIS G
Fax: (0292) 70561

Please send me more information on Ariston products

Name _____
Address _____

IF IT'S WORTH RECORDING, IT'S WORTH THE NEW MAXELL XL II.



In the shape of the XL II, Maxell pushes out the boundaries of tape technology. Creating new levels of magnetic energy, noise reduction and sensitivity in both the high and low frequencies. With an advanced housing mechanism that doesn't just act the part, but looks the part as well.

So watch out for the new Maxell XL II with the distinctive gold wrapping, and the super-distinctive sound.

Because we think you'll agree: You won't find a better tape that's worthy of your music.



maxell®

If it's worth recording, it's worth Maxell.

HI-FI CHOICE

ISSUE NUMBER 58: MAY 1988



Front Cover: A&R's Recommended Arcam Delta. See review on page 39

7

UPDATE

Keeping you up to date on the latest products, business and technical developments in the industry.



15

READERS WRITE/CHOICE ANSWERS

Your chance to air your views on audio matters and for us to answer your queries.



18

ASPIRATIONS: AN AFTERNOON WITH THE DIVAS

Dan Houston confronts the Divas plus backing group in their *pied à terre* near Marble Arch.

FOCUS



24

FOCUS ON: TWEAKING

Jason Kennedy guides you through the maze of hi-fi fine tuning.

COMPACT DISC PLAYERS

33

MARKET RESPONSE

Dan Houston's market survey summarises dealers' opinions on the current state of the compact disc player market.

37

CHOOSING AND USING CD PLAYERS

A practical guide to compact disc player selection.

39

COMPACT DISC PLAYER REVIEWS

Martin Colloms and Chris Bryant test 31 new CD Players and reassess 9 past reviews.



91

TECH TALK

Martin Colloms explains the CD player review approach and test methods.

93

CONCLUSIONS, BEST BUYS AND RECOMMENDATIONS

Summarising the best performers from these latest tests plus those previously reviewed.

HI-FI FURNITURE

95

CHOOSING AND USING: HI-FI FURNITURE

What to look for when choosing loudspeaker stands.



97

HI-FI FURNITURE REVIEWS
Paul Miller tests 20 Loudspeaker stands.

113

TECH TALK

Paul Miller discusses the methods behind the testing.

115

CONCLUSIONS, BEST BUYS AND RECOMMENDATIONS

The leaders of the stands.

116

PERSPECTIVES: PETER BELT: MAGIC OR MYTH?

PWB – is it all in the mind or an inexplicable fact? Dan Houston reports on Peter Belt's controversial products and theories.

122

SELECTED DEALER DIRECTORY

Where to go for the best hi-fi in your area.

126

SYSTEM BUILDING

What to look for and how to allocate your budget when putting together a system.



129

CHOICE DIRECTORY

Our unique information packed buyers' guide to all the hi-fi products we have reviewed and which are currently available.

MENU

This month compact disc takes centre stage, for the first time since we established the new format six issues ago (though we carried some budget players in the December relaunch). It is now almost a year since we 'did' the complete CD player market, and the sound quality of the mass market players continues to advance more rapidly than any other hi-fi component. Meanwhile the DAT threat seems to have (temporarily at least) fizzled out.

This still new format looks increasingly secure with the passage of time, though the relative merits of vinyl and 'silver' discs continue to dominate (hi-fi) discussions at hi-fi shows. However, each side seems to be learning to live with the other, even whilst reserving its own point of view.

As an on-the-record CD sceptic myself, I nevertheless feel that each and every individual interested in listening to music should give it a try. In my experience some people can't get enough CD, others can't come to terms with the sound at all, though from the point of view of creating the greatest good for the greatest number the format seems to be working pretty well. (Could it be that CD really does stand for common denominator?)

In fact I believe that attempting to compare the two disc formats directly is as futile an exercise as comparing different kinds of wines, of apples, or of coffee beans, to name but three obvious examples. Qualitative differences are not susceptible to quantitative analysis. Ultimately there is no accounting for taste, and each has to establish his/her own.

Our other reviews are back to the specialist heartlands. Jason Kennedy has been trying a whole range of enthusiast 'tweaks', giving a good idea of the range of possibilities, and the relative improvements he gained with each. In a more formal framework Paul Miller has been doing even more interesting things with loudspeaker stands than he did with equipment tables last month. And if there's anyone out there who hasn't yet heard them demonstrated properly, speaker stands are simply the most cost effective and subjectively convincing upgrades you've ever clapped ears on.

Paul Messenger

EDITOR: Paul Messenger, ASSISTANT EDITOR: Jane Hadley, STAFF WRITERS: Daniel Houston, Jason Kennedy, CONTRIBUTORS: Martin Colloms, Chris Bryant, Paul Miller, DFSIGN CONSULTANTS: Jimmy Egerton, Tim Brown, GROUP ART DIRECTOR: Hazel Bennington, ADVERTISEMENT MANAGER: Susie Triffitt, ASSISTANT ADVERTISEMENT MANAGER: Fyona Galvin, ADVERTISEMENT PRODUCTION: Kit Barnes, ADVERTISEMENT DIRECTOR: Alistair Ramsey, PRODUCTION MANAGER: Judith Middleton, MARKETING MANAGER: Bryan Denyer, CIRCULATION EXECUTIVE: Katrina Edmonson, PHOTOGRAPHY: Chris Richardson, Liz Heaney, Derek Gourd, Ian Dobbie, COVER PHOTOGRAPHY: Ian McKinnell, PUBLISHER: Marianne McNicholas, FINANCE DIRECTOR: Colin Crawford, MANAGING DIRECTOR: Stephen England, CHAIRMAN: Felix Dennis, PUBLISHED by Dennis Publishing Ltd, 14 Rathbone Place, London W1P 1DE. Tel: 01-631 1433
Telex: 8954139 DENNIS G. Fax: 01-636 5668. Company registered in England. REPRO: Graphic Ideas. TYPESET by: Time Graphics Ltd., PRINTED by: Riverside Press. DISTRIBUTED by: SM Distribution, 16-18 Trinity Gardens, London SW9 8DX Tel: 01-274 8611.

Enquiries regarding the content of this book 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 book, the publishers cannot be held responsible for the accuracy of the information herein, or any consequence arising from them. 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 © 1988. Felden productions.



FROM THE INVENTORS
OF COMPACT DISC, THE
PHILIPS CD 473. A NEW
BRILLIANCE IN DESIGN.

BRILLIANCE

With compact disc, Philips introduced new levels of fidelity to sound reproduction. ▶ Now with the CD 473, they combine technological flair with the designer's art. ▶ It offers a specification so complete, no other player matches it at the price. ▶ The brilliance of its sound comes as no surprise. ▶ Philips' own 16 bit 4x oversampling where each piece of digital information is checked four times, sees to that. ▶ Less expected, perhaps, is the wealth of features designed into the machine. ▶ Philips' unique Favourite Track Selection system, for example, is included. ▶ So you can edit a disc to play only the tracks you like, in the order you like, as often as you like. ▶ Full remote control is specified with key pad and, unusually, a volume control. ▶ A beautiful shape where form follows function is also part of the deal, with controls placed logically for easy operation. ▶ It is a shape, moreover, that fits in totally with Philips' new range of hi-fi separates, allowing you to build yourself a perfectly matched system. ▶ Other niceties abound. ▶ A volume control on the headphone socket. ▶ An uncannily quiet loading tray. ▶ And a price that takes some believing - £250. ▶ The most brilliant touch of all, perhaps? ▶

TAKE A CLOSER LOOK



PHILIPS

TIME

PAUSE

REPEAT

FTS



PHILIPS
SH-PP

FTS FAVORITE TRACK SELECTION

COMPACT DISC PLAYER CD-473

WIRELESS REMOTE CONTROL / FAVORITE TRACK SELECTION
DIGITAL FILTERING WITH 8-BIT CONVERTER FROM TMS320C40 DSP



327

REMOTE CONTROL

PLAY/REPLAY STOP/PM

STOP/PM

SEARCH DD

POWER OFF

OPEN/CD-LOCK

TRACK FINE

PROGRAM

PAUSE

REPEAT

PREV. KT

PAUSE

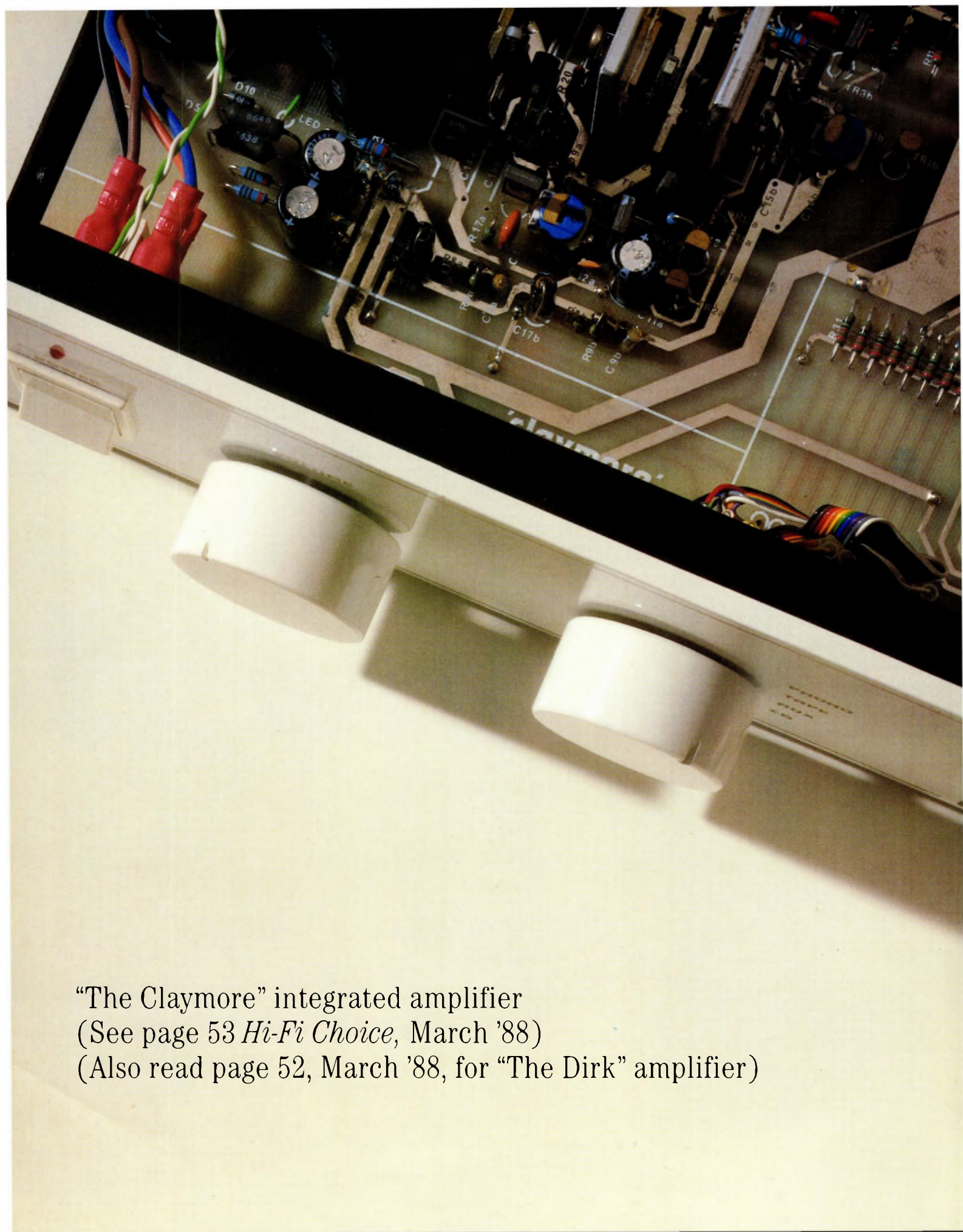
DE NEXT

PREV. KT

TRACK

DE NEXT





“The Claymore” integrated amplifier
(See page 53 *Hi-Fi Choice*, March '88)
(Also read page 52, March '88, for “The Dirk” amplifier)

INCA TECH

23, LINCOLN WAY, CANVEY ISLAND,
ESSEX, ENGLAND, SS8 9SE TELEPHONE: (0268) 565458



PRODUCTS

KENWOOD TECHNOLOGY

Engineers and representatives from Kenwood in Japan stopped off in London last month as part of their European whistle-stop tour promoting the latest products.

The firm demonstrated their new digital amplifier and CD player and promoted the fact that they have gone to exhaustive lengths to ensure total stability for all their products by inventing 'Dyna-Pneumatic Suspension' feet.

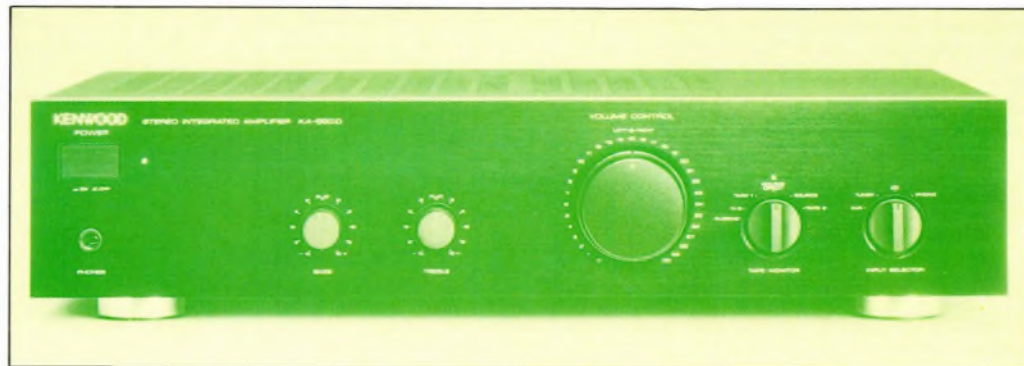
The feet, which look innocuous enough under the budget *KA 550D* amplifier (pictured) actually consist of many working parts. They look like the kind of stationery embossing tools used by the *nouveau riche*, being jointed with coil springs and pneumatic dampers with lots of rubber – very impressive.

Audio journalist Alvin Gold, who was also present, told the gentlemen that in his opinion they should be concentrating more on tracking problems. "The Japanese are much worse on tracking than the Europeans," said Alvin squeezing his foot sample, "why are you spending so much time on isolation?"

Whatever one thinks of tracking in CD players, Kenwood's efforts on isolation are impressive to say the least; heavily insulated casing on all models has been designed to reduce the effects of airborne vibration as well.

Kenwood also demonstrated their latest triumph – the Digital Axis Pulse Control which is included in the *DP 1100SG*, *DP 990SG* and *DP 880SG* CD players. The DAPC (as it will soon become known) is the result of years of research by Kenwood who discovered a jitter effect caused by slight (nano second) time differences between the analogue and digital signal.

Mr. Hachiroh Satoh, Chief Engineer of the Hi-Fi Audio Engineering Division at Kenwood, explained that the firm



Kenwood: springy feet.

had made a device which would eliminate that tiny time difference. The CD players therefore have the DAPC as a functional feature; you can hear it working by switching the chip in and out of the circuitry. First brief impressions of this breakthrough were that it certainly works, bringing a new depth and ease to the music.

The Kenwood team were powering their demonstration with the new budget *KA-550D* amplifier. This, and the *KA-660D* (£130 and £160 respectively), promises 'shortening and simplifying of the signal paths' such that the source chosen will take signal straight to the volume control. A new second generation digital amplifier was also on show in the form of the £600 *KA-D1100EX*. This offers five digital inputs and six analogue inputs, and Kenwood say the internal layout has been specially designed with the analogue and digital signal processing areas set on either side of the machine –

separated by the power supply. Kenwood say: "the low level signals and the high-level signals will be kept separate to guarantee fidelity."

SURROUNDED BY PHOBIAS

Jim Rogers, original founder of the eponymous loudspeaker manufacturer and subsequent designer of other successful models under the JR banner, is introducing a new ultra-compact cylindrical loudspeaker dubbed *Phobos*. Specifically intended to operate with surround sound processors such as the Yamaha *DSP-1* or the Marantz *RV55* and *RV363* models, it sells at a competitive £103/pair.

Jim Rogers observes that the frontal image created by conventional stereo systems is inherently unable to replicate the 'all round' acoustic impression of the live situation. The addition of rear channel

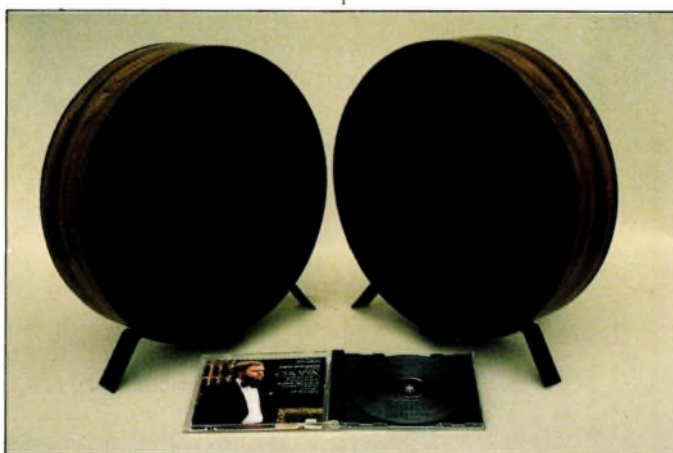
delayed and phase-manipulated information helps considerably in recreating the illusion of the live experience, while the compact dimensions of *Phobos* ensures that these will not be too intrusive domestically. Jim Rogers M.A.R.S., Flat 2 De la Warr Mews, Station Road, Bexhill on Sea, Sussex. Tel (04243) 4172.

SYSTEMLINE

Accessory and amplifier manufacturer QED are about to introduce devices that will probably comprise the world's first 'universal' system for 'round the house' audio wiring. Hitherto such systems, notably from B&O and more recently Revox, have been restricted to products of the particular manufacturer. The QED approach could be adapted to extend anything from a low cost midi system to full scale audiophile exotica.

Systemline, as it is to be called, consists of wall-mount remote controllable 'slave' amplifiers, referred to as *RCA's* (room control amplifiers), that may be discreetly fitted in any number of secondary rooms, along with the tiny remote sensing 'eye' (*SLI*) (plus a pair of loudspeakers of course).

Systemline's *SLI's* not only communicate simple remote commands to the local *RCA's* (covering power on/off, volume and local/system input switching), but are also linked back to an infra-red transmitter located in the main system room. This means that any remote handsets appropriate to equipment in the main room (eg CD player, system, or VCR) could



The new Phobos 'speaker from Jim Rogers.

operate the relevant items remotely from the subsidiary rooms.

However, to avoid losing remote handsets all round the house, it is envisaged that customers will adopt 'universal programmable' handsets such as the Onkyo *RC-AVIM* in subsidiary rooms, transferring all main and remote system functions onto one convenient keypad (and then take an Open University course in learning how to use it).

This outlines only the bare bones of a fascinating new concept, which could incidentally provide a whole new *raison d'être* for caddy-loading CD autochangers. QED have a number of other bright ideas which they hope to incorporate, including a master control unit which will enable remote multiple source selection from secondary rooms even where the main system is not normally under remote control.

SUMO ON DOWN

Acoustic Gold, importers of the American-made Sumo amplifiers, have announced price cuts due to the weakening dollar against the pound. The *Athena* pre-amplifier and *Polaris* power amplifier are each down from £695 to £595.

CLOCKWORK ORANGE

Beyer Dynamic's latest £29.99 *DT325* headphone is especially suited to owners of portable CD players. The firm says it's light, open, balanced and provides exceptionally clear reproduction of high frequencies. Colour-

conscious compact disc carriers can choose between red, green or yellow earpads (presumably Rastafarians have to buy all three!)

Incidentally, our headline has nothing to do with the headphones – they're powered by electricity

DELUXE-MEN

Luxman have a new matching CD player, amplifier and tuner on the market

The \$900 *LV117* 'digital' amplifier is a 110W per channel integrated model with a built-in digital-to-analogue converting input using 4x oversampling, plus optional fibre optic input. The amplifier proper uses FETs up to the pre-driver stage, and has video facilities and remote control.

The \$845 *D-117* CD player is styled to match, with fibre optic output connection, 4x oversampling, a new 'high rigid lock mechanism' to isolate the optical pick-up from the main chassis, two sets of line outputs (one on the front panel), remote control, and fixed and variable outputs.

The \$399 *T117L* tuner has FM and long and medium wave AM bands, with 24 station presets, timer programme function and remote control with the Luxman U-100 unit like the amplifier and CD player. The tuner retails at \$399.

TOWERLET

ProAc Speaker Systems are marketing their latest floorstanding *Mini-Tower* loudspeaker, which is some 40



Luxman's amplifier: don't stand on it if you suffer from vertigo.

per cent smaller than their *Super Tower* launched last Autumn.

The *Mini Tower* stands 36in. high, yet is only 10in. deep and 6in. wide. Two 4½in. bass/midrange drivers sit above and below the ¾in. Scanspeak dome tweeter. The speakers feature a resistive reflex port.

Celef International, who market ProAc, say the *Mini Tower* has a compartment which can be filled with sand or lead shot to provide extra mass. Available in teak, walnut or black ash finishes at £684 per pair; further details from Celef Audio, 130-132 Thirsk Road, Borehamwood, Herts. Tel: (01) 207 1150.

CANADA POWER

Bryston amplifiers are reappearing in the UK after an absence of a number of years. Roksan Engineering are taking up the distribution agency for this popular transatlantic brand that was last handled by KJ Leisuresound a decade or so ago.

The earlier Bryston power amplifiers were as popular amongst professional users as hi-fi enthusiasts, and were notable for macho styling with razor sharp corners and curly mains leads, plus bulletproof build and awesome load-independent power delivery. The current versions are reportedly recognisable developments that are now better house-trained, being available in both domestic and professional versions, the latter physically beefed up, featuring balanced line operation and £100 price premiums.

The new range consists of a



Slimmer of the Year: ProAc's beam pole.



Naked dynamics: the new Beyer headphone.

WALTON AUDITIONS

The first of the new Auditions shops was formally opened in Walton-on-Thames during February. The high standard of 'art deco' presentation and attractive shopfitting – even down to bespoke logos on the green carpet – could well set the tone for a new professionalism in UK specialist hi-fi retailing, though it is also symptomatic of the substantial investment involved. The two demonstration studios in particular 'feel' right and create a relaxed and relatively informal atmosphere with gentle multicoloured mottled wallpaper, indirect up-lighting, and a conspicuous absence of unsightly wiring. Auditions is the specialist hi-fi wing of Lockton Shops plc. This ambitious retailing operation run by ex-Kimberleys John Edwards was launched under the tax-break financed Business Expansion Scheme a year ago, and includes the general consumer electronics Wires shops. George Bartlett of Bartlett's Hi-Fi is taking a sabbatical to supervise the Auditions sub-chain, and some twelve of these shops are planned over the next three years, broadly speaking in 'M25 country'.

There was much advance speculation over which manufacturers would supply such an ambitious operation, given that the UK specialists are choosy in selecting outlets and tend to avoid supplying more than one dealer in any particular area of the country. Sceptics were confounded by the wide range of brands stocked, including such hard to get agencies as Naim Audio and Exposure Electronics. Linn and Denon were notable absentees, but the roster of brands on offer is highly impressive, and the stocking in depth no less so.

It remains to be seen whether Auditions can maintain a promising start with future stores in Orpington and elsewhere, the other big question



From shoes to the Blues: Time Out's exhibition has it.

mark being whether it can attract staff of sufficiently high quality. However, the news that the highly experienced Tom Baron is joining the Auditions ranks after many years at Tonbridge Hi-Fi is a singular coup for the new company.

TAKING TIME OUT

Hi-Fi Choice has joined forces with *Time Out Magazine* to sponsor the audio section of the *Time Out Live* exhibition at Olympia 2 in London, over the spring bank holiday from 27 to 30 May.

The exhibition concentrates on 'lifestyles' and covers just about every aspect of life that concerns the 18-35 age group. *Time Out* are hoping to make *Live* different from all other exhibitions. Said organiser Jane Staley: "It's the first of its kind, and rather than people just gawping at stands we're trying for a hands on approach."

For our part we are going to let you get your hands (or at any rate ears) on some juicy high end equipment, as well as the latest in home entertainment, CD Video, and (rumour has it) we'll be giving away hi fi in easy to enter competitions.

As well as audio, *Live* will offer continuous entertainment in a specially constructed two-stage theatre, and will include aspirational sports like wet biking, hang gliding or micro-lighting, fashion shows, clothes, art, sports gear, satellite TV, holidays with a difference, cars, furniture, jewellery, film previews, new books (with their authors to sign them) and the list goes on... It looks good, especially if you're able to keep

within your budget in the heady, free spending atmosphere the show promises.

The price for getting into this Mecca to mammon? *Time Out* say £5, which seems fair considering that a lot of freebies are going to be flying about.

FIVE FOR SIX

Nakamichi are selling posters of their current advertising campaign in sets of six for £5. The 40 x 30cm posters are copies of Liam Woon's photographs and are available in limited numbers only from Nakamichi B&W UK Ltd., Marlborough Road, Churchill Industrial Estate, Lancing, West Sussex BN15 8TR.



Nakamichi's Arts sponsorship.

DOWN AGAIN

Since supply exceeded demand at the turn of the year, compact disc prices have continued to fall. This month sees a new £2.99 low achieved in a 50-title predominantly MOR catalogue being introduced by MSD (Multiple Sound Distributors) for sale through chains such as Woolworth, W. H. Smith and Our Price.

PRODUCTS

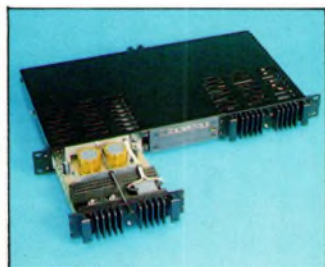
SPLIT SLAB

Rega *Planar* owners wishing to upgrade their turntables may find a new invention that is just the ticket. For £60 they can buy the 'Split Slab', a kit which allows the solid Rega plinth to be decoupled in a similar way to the Linn Axis.

Chris Smeeton of CD Products, producers of the *Split Slab*, says that his easy-to-assemble kit will cut out any vibration problems suffered by your Rega.

The kit caters for both *Planar 2* and *3* models and consists of a top plate suspended on rubber anti-vibration mountings which

£325 step-up transformer, the simple £595 *5B* and 'singing and dancing' £995 *12B* pre-amplifiers, plus a quartet of power amps ranging from the 50W £695 *2B* via £995 *3B*, £1,395 *4B* (all stereo but also bridgable) to the £1,595 each 800W/10hm mono *6B*. High tolerance components are used throughout, plus extensive soak-testing during manufacture resulting in a five year guarantee.



Bryston: returning to conquer?

BUSINESS/TRADE

RETIREMENT PLANS

Moves at Goldring, the cartridge manufacturer, were expected in early April following Managing Director Gerry Sharp's impending retirement plans. Mr. Sharp, the major shareholder in Goldring confirmed that John Gay, his old friend who runs Veda Products, was "interested in acquiring my interests in Goldring".

Veda are sole distributors of Goldring and Mr. Sharp, 56, said he had been considering early retirement and looking to sell for some time. But at the time of writing he stressed that he had not seen a contract and that the move was by no means certain.



The Auditions room.



Take one Split Slab, stir in Rega and season to taste.

sit neatly into the lower plinth. Three adjustable squash balls support the whole deck and it sits a few millimetres clear of table or shelf surface. Rega owners can either swap components such as the motor and arm themselves, or have a dealer do it; the operation is said to take about twenty minutes.

Asked why he had not just designed a whole new turntable, Mr. Smeeton replied that he could not manufacture a comparable arm, motor or cover cheaper than Rega. "A mould for the cover alone would cost me over £18,000," he explained, "this is the best way I know of marketing the deck I have designed while keeping it cheap." There are more than 80 components in the *Split Slab* and it is obvious on first sight that a great deal of thought has gone into it. But whether it makes a Rega sound better is as yet unknown.

Roy Gandy, who runs Rega, doesn't suppose so. "We have

been trying to make quality turntables for many years," he told *Choice*. "But just changing the plinth does not necessarily improve the sound. Built-in isolation is not quite as simple as some manufacturers feel; it increases motor noise resonance."

The other problem Rega owners face is the existing guarantee system, as Rega guarantee their stuff indefinitely. Mr. Gandy pointed out that if one of his decks was damaged by somebody's deliberate action then this guarantee would not necessarily stand.

However Chris Smeeton is going ahead with his product, and says he has already had some favourable reaction from Rega owners. "They will buy it because by definition they want something good for very little money," he added saucily.

CS Products, 35 Howland Way, Reveley Lock, Rusher Dock East, London SE16.
Tel: (01) 252 1245.

CD BARGAINS?

Ferguson, now owned by French-based multinational Thomson, are planning to get back into audio products with a vengeance. Most of their new product consists of downmarket portables and systems, but two new standalone CD players, sourced from the Thomson factory in Singapore, look like setting a new low price point for what is still seen as a prestige 'name' brand.

The £130 *CD07*, available from May, is a manually operated basic player with just the usual basic operational features including 20-track programming; the £150 *CD08* is the remote control equivalent and will be in the shops by June.

MEITNER AMPLIFIERS

The American Audio firm Meitner, which produced the turntable equivalent of the Walnut Whip with its platter-less design, have launched two amplifiers here.

The *FA-6i* pre-amplifier and *MTR-101* monoblok power amplifiers are being imported by The Music Room retailers, and



Meitner's cone style turntable and new amplifiers.

promise improvements over the existing Meitner *FA-6* and *NTR-100* model. Both come in solid mahogany cases and are cited as having the following advantages over their forerunners: more three dimensional sound and depth, increased realistic space and dimension, extended power and bass and better high frequency definition and clarity.

The *FA-6i* retails for £1,695 and the *MTR-101* for £1,895 a pair.

HIGH WIRE

Monitor cables are now available in the UK from Bandridge Ltd. The full range of German-made



Somebody beautiful about to run into a stack of Monitor cables.

accessories and cables are in the shops now.

Top of the speaker cable range is the Monitor *PC Silver Line* which retails for £3.99 a metre. It uses 100 per cent oxygen free copper strands, each coated in pure silver to convey the clearest sound, insulated in clear plastic and divided by a smart marine-blue strip. Bandridge also market the *Silver Slimline* which has been flattened to run under carpets without looking like an invading gopher.

Other products in the lineup include phono-plugs, interconnect cable, and isolation cones to mention a few.

MORE FIDELITY

Not content to rest on their current laurels and recent spate of launches, the fast growing Musical Fidelity brand have further ambitious plans for 1988. A third loudspeaker will be joining the successful *MC2* and *MC4* models, the £199 *Reference 2* being a bookshelf model based on a largish 8-inch bass/midrange unit, while a much larger design is another gleam in proprietor Anthony Michaelson's eyes.

MF also hope to have an add-on D-to-A converter ready in prototype form to show at this year's Chicago CES in June, dubbed *Digilog*, targeted at £399 and suitable for use with any CD player possessing a digital bitstream output. And there are further intentions to rationalise the rather random array of case sizes which MF currently use,



Hitachi Power Block; "third floor going up".

leaving just the standalone A1/A100-style for the lower price product alongside the standard rack-mount width used in the more upmarket models

POWER BLOCK

Hitachi's latest midi system onto the market is a fully remote controlled allrounder with power output of 120W per channel (RMS).

The MD 1200 package contains CD player, record deck, tuner, dual cassette deck and a video enhancement feature that allows you to plug in the speakers for better sound while waiting patiently for the BBC to introduce stereo TV sound.

The whole thing, speakers and all, retails for a penny less than £1,200, and Hitachi will give you a five year guarantee if you buy it before the end of June - which sounds like a fairly good incentive to buy the bank manager a drink after golf.

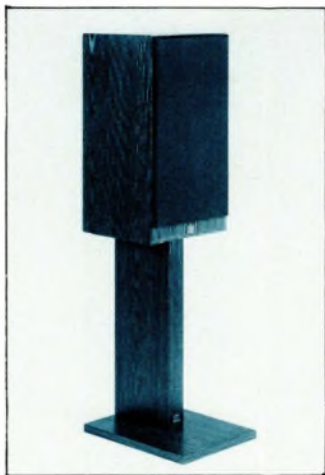
This five year guarantee extends to all new products in Hitachi's 'Spring Collection'. Other systems and separate amplifiers, tuners, cassette decks and compact disc players will also be on offer

MONITOR COMPACT

Monitor Audio have distributed their Compact Monitor loudspeaker to the shops with the uncton: "Efficient, Dynamic, Fast" that has become the company's motto

Nothing else is written on the

press release that tells us anything about the loudspeaker, apart from that it retails at £199 per pair. Interested parties will have the choice of Kenya Black or Black Ash colour veneers from which to choose.



The starkly veneered Monitor Compact

NON-SLIP

Readers who like to jog with a 'personal stereo' but also suffer from sweaty hands (so they keep dropping the thing), will snap up Sharp's latest offering.

This intelligent consumer electronics company have realised that their jog men or walkthings are just like wet bars of soap for runners on July mornings, so they have come up with a non-slip grip version.

The £59 JC-S58 is an auto-reverse cassette and two-band radio compact which lists an

anti-rolling device for active outdoor use! But the best thing is the grip created from nonsense black plastic and fashioned to fit the four main digits of *homo sapiens'* hands.

However Sharp also include a handy carry strap for those moments when you have to release your grasp on their machine... to shake hands with someone for example.



Sharp's non-slip-grip personal.

TECHNOLOGY COPYCODE RIP

The Copycode spoiler system proposed by CBS Labs as the music industry's answer to copyright theft and the threat of 'perfect' DAT (digital audio tape) direct digital copying from CD seems most unlikely to survive the savaging it has received from the US National Bureau of Standards.

Copycode inserts a 'notch' filter, removing a narrow segment of music from the lower treble (around 4kHz), and the plan was that DAT (or for that matter any other recording machine) should be compelled to carry circuitry which would automatically take the machine out of record mode if such a notch was detected, implying that the recorder was attempting to copy copyright material.

Copycode proponents claimed that the notch was inaudible (which is a patent absurdity as it coincides with a piano's top B-flat), and the NBS carried out 'blind' testing which refuted this claim. The tests also incidentally found that the copy protection system was unreliable in use, successfully copying some protected material, and refusing to copy unprotected program!

The resolving of this issue removes one of the barriers against the introduction of DAT in the UK, though there are still some hurdles left. It seems likely that when machines do become officially available (as distinct from the grey imports currently being snapped up in small quantities by enthusiastic professional users), they will continue to prevent direct D-to-D

CD copying by maintaining their different sampling rate, while circuitry and flagging will also prevent pre-recorded DAT tapes from being copied in the digital domain

DIGITAL PAPER

There is a new opportunity for someone in the audio industry to take advantage of ICI's latest development. The chemicals giant have been promoting *Digital Paper*, a totally new form of recording and storing information that is both flexible and cheap.

The paper is claimed to be able to store one Megabyte of information (500 A4 size pages) at a cost of a third of a penny. It is based on a polyester substrate up to 75 microns thick which is coated in a dye polymer.

Information would be recorded by a laser making a pit in the dye and then retrieved by the same laser 'reading' back the pattern of pits at a lower strength. ICI say the paper should be able to store information for up to 25 years.

Barry Lycett, Marketing Services Manager at ICI, was at the Information Technology Industry's premier show *CEBIT 88* in Hanover where ICI were promoting their latest 'find'. "At the moment we have been talking to people in computers about the possibilities of developing the product," he told *Choice*, "but there is no reason why it could not be used for digital music storage."

"It could be made into a tape product that would store 600Gigabytes (a Gigabyte is a 1000Megabytes) of information. That is the equivalent of 1000 compact discs - or three hundred full length feature films."

Clearly the potential of the paper is staggering, but the fact that it can store so much is also likely to mean that it will only be used by institutions that need vast amounts of on-line information.

Apart from its archive potential, *Digital Paper* may help to reduce the amount of paper being used in offices around the world. Existing optical storage techniques have barely made a dent in a filing and ledger situation that goes back to Dickens' day - 95 per cent of information is still stored on paper, according to Mr. Lycett.

So far only one company, Creo from Canada, is developing a drive to store data on a 12-inch open reel. Production was expected for April. ICI, who spend over a million pounds a day on ten thousand research scientists, have taken two years to develop the paper.

Beware of imitations



With the coming of the true digital age, new standards in product performance and quality of sound will have to be achieved.

And no-one is in a better position to meet such a challenge as Akai.

Since 1929 our belief has always been the same.

We specialise in hi-fi and are totally committed to producing the best of its kind.

We do not compromise on quality.

We welcome innovation.

We copy no-one.

The ultimate achievement in product performance and quality of sound is "Grand Excellence."



A true example is our AM-73 Digital Integrated amplifier. 150 watts of pure sound. It represents what is predicted to be the future.

Among the many state-of-the-art features are the four digital inputs, one of which is for optically transmitted signals. Making it possible to connect it with Akai's matching CD players, using their digital transmission output and optical fibre cable, so that high grade digital sources are transmitted in their purest form.

The results from the first reviews on the "Grand Excellence" range speak for themselves.



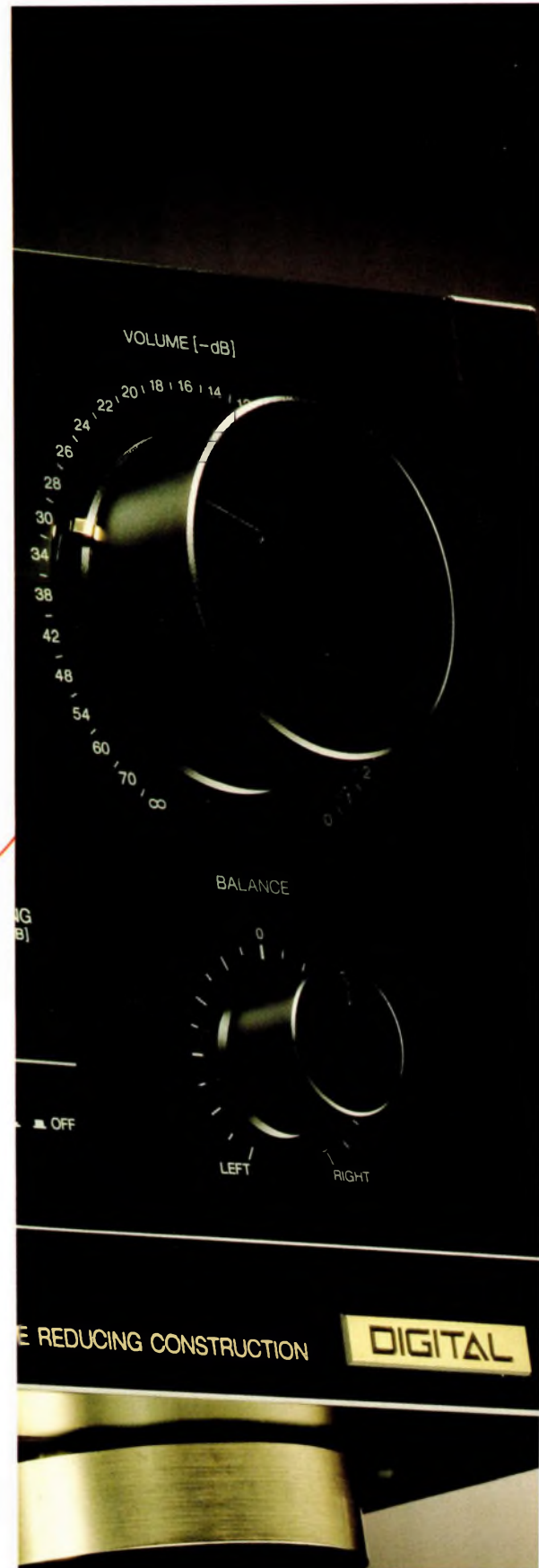
HiFi Choice (April) had no hesitation in describing the GX.52 as "A Classic Best Buy."

HiFi News and Record Review (April) evaluated the CD.73 (matching compact disc player to AM.73) as possessing "Strong performance in the laboratory coupled with fine build quality, the latest technology and a comprehensive set of controls and facilities."

You won't find Akai's equipment bearing the Grand Excellence in any ordinary hi-fi shop. Only the very selective, hi-fi specialist will carry them.

You may have to search a bit to find one, but when you do, it'll be music to your ears.

AKAI
The genuine article



please phone our Sales Desk on: 01-897 0951

For more information on the Akai range of products

DON'T MISS NEXT
MONTH'S ISSUE OF

HI-FI CHOICE

PACKED WITH
IN-DEPTH REVIEWS!



30 NEW LOUDSPEAKERS ON TEST

Including the latest from
ACOUSTIC ENERGY, ARISTON, LINN, NAD,
WHARFEDALE and many others
And our Market Survey investigates the dealers'
views on the current state of the loudspeaker
market PLUS IN CAR ENTERTAINMENT AND
PAUL MILLER LOOKS AT CABLES

SUPPORT YOUR HI-FI

YOUR CHANCE TO WIN OVER £1,500 WORTH
OF DESIGNER HI-FI FURNITURE IN OUR
EASY-TO-ENTER COMPETITION

HI-FI CHOICE

JUNE ISSUE ON SALE MAY 13th

BETTER HI-FI

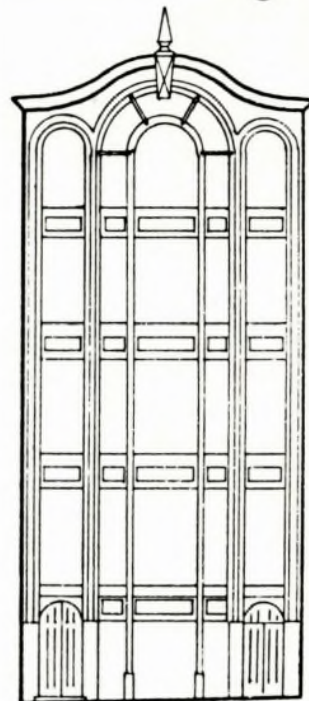
The Essence of Music

16 Cook Street,
Liverpool L2 9RF
Tel: 051-227 5007

No. 16 Cook Street 1866
by Peter Ellis
Restored and refurbished
1987 for Better Hi-Fi

To compliment this
superb listed building we
have carefully selected
our agencies to include:
AR, Denon, Dual, Epos,
Heybrook, Inca Tech,
Linn, Kuzma, Mission,
Monitor Audio, Naim
Audio, QED, Rotel,
Revolver, Roksan, Royd,
Yamaha

Three demonstration rooms
Two Year Guarantee
Free Delivery on All
Equipment
Home Demonstrations by
Appointment



No jacket required

**WE DON'T THINK WE'RE No 1 —
THE CUSTOMER IS**

Pinewood Music

MICRO CD-M2

*“. . . the best compact disc
player I've heard”*

AUSTRALIAN HI-FI

Hear it at Pinewood Music, the
highest end dealer in the South,
together with superlative equipment
from Audio Research, Krell,
Counterpoint, PS Audio, Apogee,
Magneplanar and Sonus Faber.

The Pinewood Music Company

'Martins', Church Lane, Goodworth Clatford,

Andover, Hampshire SP11 7HL

Telephone: Andover (0264) 57536

Pinewood always has the best



READERS WRITE CHOICE ANSWERS

TECHNICS TALK

I have a budget of around £150 to purchase a pair of loudspeakers to go with my Technics system. It comprises *SL-DD33* turntable, *ST-G45AL* tuner, *SL-P720* CD player and *SU-V55A* amplifier. I am considering the Mission 700LEs and the Mordaunt-Short 35Tis and would be interested in your opinion of these two models.

Secondly I want to get a cassette deck and would like to stick to the Technics range for some aesthetic consistency. Your report on their *RS-B705* deck didn't seem very encouraging and I was wondering whether the *RS-B605* is any better.

D. A. DICKINSON,
KINLOSS, MORAYSHIRE.

The Mission 700LE speakers were Recommended by us and would be worth trying in the context of your system, as may well be the Mordaunt-Shorts, judging by this company's good track record, although we haven't tested the 35Tis as yet. A couple of other models worth checking out are JPW AP2s (£145) and Sony APM10ES' (£100) which were both good enough to merit Best Buy status. Whichever you go for it's worth trying to ascertain how they sound with your system, so a home trial should be undertaken if possible.

We included the Technics RS-B605 in last month's Cassette Decks issue where it fared well enough for Recommendation; the reproduction of prerecorded tapes was one of its weaker spots.

B&O FEVER

I am very interested in finding an objective analysis of the Bang and Olufsen systems 3300 and 5500. If you haven't yet reviewed these products perhaps you know of another publication that has. I am particularly interested in B&O and would also be keen to hear about any of their other products.

S. CLAYTON,
RAWCLIFFE, N. HUMBERSIDE.

We did run a fairly comprehensive review of the B&O System 5500 in our last edition of the Collection.

However, demand for that issue was considerably greater than anticipated and we no longer have any copies available. The System 5500 came out pretty well considering its remarkable versatility and very impressive remote control module(s) which can be used to run the system via satellite speakers elsewhere in the house. Sound quality was not perhaps up to the standards available from well matched separates, but the obvious aesthetic qualities and flexibility make this a very desirable system.

DITCH 'EM

Having read your *CD Midi Systems* issue I am thinking about buying the Technics X880 system. But your comments about the need to ditch the loudspeakers leads me to enquire as to which speakers would be worth getting to go with this system.

G. MAZZARELLA,
RUABON, WREXHAM.

Given that the loudspeakers aren't optional in this system you should try them before you find replacements, as they may not seem so undesirable to your ears. But if your findings are similar to our reviewer's then another pair of speakers and preferably stands as well will be necessary. You don't mention a budget but about £150 might be appropriate. That would run to a pair of B&W DM110is (£159) or JPW AP2s (£145) along with some rigid spiked stands (see reviews in this issue).

TUNING IN

I would like to make a request for you to review the Pioneer *F-91* tuner as I am in the process of choosing a tuner to replace my circa 1974 Trio *KT8005*. A test by you of the *F-91* would go into more detail than does the *New Hi-Fi Sound* one I have read and would enable me to make a more enlightened decision. The Sony *ST-S 700ES* had a very good review in issue 55 and I was about to order one when a generally favourable review of the Onix *BWD-1* appeared in *Hi-Fi*

Review. As the Onix is made in the UK and features a tuning knob and digital readout I was interested in hearing it and managed to borrow one to try out at home. It was quite pleasant to use but sound quality was not appreciably better than that of the Trio – this was using the cheaper power supply but generally my findings correspond with your own.

D. T. HARRIS,
BILLERICAY, ESSEX.

*As we won't be covering tuners again for some months, you may be better off trying the Pioneer *F-91* for yourself if that's possible. If not then why not go for the Sony you had originally selected. That your findings with the Onix were similar to ours probably means you will find the 700ES as impressive as we did. If you prefer a proper tuning knob then the cheaper Naim tuner may be worth considering. The British made NAT 101 costs about £400, and if it follows in the footsteps of their excellent NAT 01 model it could give the orientals a run for their money.*

TIME FOR A CHANGE?

Way back in 1975 I purchased a hi-fi system on a limited budget – it consisted a Pioneer *PL12D* turntable, Shure *M75ED* cartridge, Sansui 210 receiver and Amstrad *Acousta 2500* loudspeakers which has served me well since then but I now feel inclined to replace it with something more up to date.

I am interested in the Sony 310 *CD* midi system which received such a glowing review in the January edition of *Hi-Fi Choice*, but it would appear that the loudspeakers leave a little to be desired. I am thinking of using my existing Amstrad speakers with this system and wonder whether this will represent a marked sonic improvement over the Sonys. Perhaps you have reviewed the *Acoustas* in the past and can enlighten me further?

P. WATSON,
WOODTHORPE, YORK.

The Amstrad Acoustas were a little before our time and it is

hard to tell whether they would outperform the little SS-A3 speakers built to go with the Compact 310 system. We'd suggest you take your speakers down to a dealer that stocks the system and try them out using decent stands if possible.

FUTURE CHOICE

Next year I will have amassed sufficient funds to purchase a hi-fi separates system, and in order to get some idea of what is on the market and which equipment is worth listening to I read as many hi-fi magazines as I can lay my hands on. I find *Hi-Fi Choice* by far the most informative, and especially relevant to someone in my position ie that of unfamiliarity with the current state of the market.

Using your magazine as a guide I have shortlisted the following equipment based on what is available from a local specialist dealer; Acoustic Research *EB101* turntable, Marantz *CD75* compact disc player, Sony *TC-K700ES* cassette deck, Sony *ST-700ES* tuner, Marantz *PM5411* amplifier and B&W *DM1600* speakers. Would you recommend this particular line-up of components or do you think that any particular elements could be improved upon at a similar cost?

Secondly I presently own a five year old Sansui *TU-217* tuner and wonder whether I would get a significant improvement in sound quality from the Sony listed above?

J. D. MURRAY,
BARROW-IN-FURNESS, CUMBRIA.

Of the products you've selected, those that we have tested have fared pretty well and represent good sonic value for money. However, the loudspeakers and amplifier have so far escaped our scrutiny, and being fairly crucial components it might be wise to look at some Recommended alternatives from our Directory. One thing that strikes us as odd about your line-up is the amounts of money allowed for the different elements. You have allocated considerably less to primary

sources like the turntable and CD player than the cassette deck. Unless this is your primary source, it would be worthwhile assessing which medium you find the most rewarding and dedicate, in this case, around £500 to an appropriate player. For instance, you may find the sound quality available from a well designed turntable like the Linn Axis, Elite Rock or Manticore Mantra to be preferable to a digital source (many have). Even if you bought both, one would end up being used the most and therefore dictate the choice of software. Why not read the Separates System article in the January issue of Choice (available by mail order), which details dealers' recommended systems at different price brackets with suggested ancillaries, and as such is very relevant to your situation.

Our original review of your Sansui tuner was not particularly enthusiastic, and the Sony you mention would undoubtedly give better reception and sound quality, but whether the expense is worthwhile depends on how much you use the medium. It would be logical to buy the rest of the system first, plus a good quality outdoor aerial, and see whether the standard achieved by the TU217 is good enough.

THE OTHER HALF

I have a half complete system loitering in the back of a cupboard which I am keen to use. At the moment I have a Rega Planar 2 turntable and some Kef Coda 111 loudspeakers but am short of an amplifier and cartridge. Reading your amplifier reviews I was drawn to the QED A240CD II but am still unsure about a suitable cartridge to go with this and the Rega. I expect to spend between £20 and £40 and listen to a selection of House/hip hop, Simple Minds and U2. Please do not refer me to one of my local dealers as 'local' is rather an inappropriate word under the circumstances and transport is a problem. I will have to make my selection and

purchase on the same occasion.
STEPHEN RYAN,
MANCHESTER.

Despite your circumstances you would be unwise to purchase an amplifier and cartridge without first giving them a listen in the shop. The QED is a great amp but tastes inevitably vary and you may find that an alternative has more appeal to your ears. If you make an appointment with a suitable dealer he/she should be able to demonstrate the QED and suitable cartridges. There are quite a few worthwhile cartridges in your price range that will suit the RB250 arm including the Nagaoka MP11 Boron (£35), Goldring G1010 (£34) and A&R C77 (£20) all of which rated Best Buy when last reviewed. Rega's new cartridge, the oddly named Bias (£34), could also be worth listening to although we haven't had a chance to review it yet. The Directory at the back of each issue of Choice contains brief summaries of the cartridges mentioned above and can be used with or instead of auditioning (not always that easy with true expensive cartridges) to help you make a selection.

GRAPHIC INCLINATIONS

I am thinking of buying a new hi-fi system, in particular the Technics X840 plus either an SF-E70 graphic equaliser or the SL-PJ22 compact disc player. At present I only have records and cassettes and wonder if it would be wise to get the graphic equaliser to make the most of these two formats or to get the CD player and start saving for silver discs. Which would you choose? I have a listening room that is 11 by 16 feet and listen to mainly '70s music such as David Bowie.

J. M. SOKS,
SEAHAM, CO. DURHAM.

What would we do? Well, steer clear of the graphic equaliser for a start - the system you are thinking of will give good sonic results without extra circuitry in the signal path, as does any

system. Graphic equalisers are in my opinion overblown tone controls which do more harm than good, assuming fidelity to the original music is the goal.

As regards a CD player, it would seem that the Technics X840 system, comes with one as standard but perhaps you have the option of getting it without. Whether the extra expense of the player and more importantly the discs is worthwhile should depend on how highly you yourself rate the sound quality of the new medium. In the context of the cassette deck and turntable on the X840 system a CD player will undoubtedly sound pretty impressive, and the cost of discs does seem to be coming down, but I don't know if you can get obscure '70s albums on CD yet - probably. If in doubt have a listen and see what you think - after all, you'll be living with it.

ANYTHING BUT BRITISH

I run an English school in Buenos Aires, Argentina where I run a complete audio/video system through one pair of speakers. Whilst I am at home in the UK for a few weeks I would like to update some of my equipment. I am presently using a Pioneer KH-5577 music centre and sound quality on all but FM radio has deteriorated with time, the TV being especially bad.

I would like the equipment to remain essentially portable so a midi system is not really suitable and because of trading conditions cannot buy British made product (nothing like the sinking of the *Belgrano* for ace international relations). I would like to buy a good quality portable stereo radio/cassette player with twin tape decks and a portable compact disc recorder (so would I - JK). I would also like to get an amplifier and speakers to go with my video recorder and TV, I have a budget of £600 for the whole lot - can you help?
G F ASTBURY,
CHELTENHAM, GLOS.

Six hundred pounds is a bit of a keen budget for the equipment you're looking for but it may be possible to get what you want by going for a combined CD player

(CD recorders have not as yet come on the market) and radio/cassette like the 'yuppie blasters' we reviewed in December. Unfortunately none of them could be called very good quality, but some are better than others and a lot feature twin cassette decks and output/input sockets.

The main limitations on sound quality are the rather small amplifiers and loudspeakers that are incorporated, but one with a suitable output could be plugged into your amp and speakers. Of those we tested we can recommend the Sharp WQ-CD15 (£400) and the Hitachi CX-W800 (£300); both feature twin cassette decks FM/AM tuners and compact disc players.

We have never reviewed conventional ghetto blasters (stereo radio/recorders) so can't recommend any particular model but there are a wealth of them out there. Try London's Tottenham Court Road for a truly awesome selection, with prices starting at around £50. In fact this could leave you with just enough for a separate CD player, amp and speakers.

If you are set on a portable CD player there are models available from Sony, Technics and Toshiba though none gained a Choice recommendation when we tested them last year and domestic players around £200 such as models from Denon, Philips and Marantz offer much better sound quality for the money.

As far as amplifiers go the following offer good value for money: Rotel RA820BXII (£150), NAD 3020E (£110) and the Denon PMA-250 (£125).

The non-British restriction is a bit of a nuisance when it comes to loudspeakers as most of the Choice Best Buys are built here, including those sold by companies like Sony and Rotel. However, we have recommended one model of American manufacture in the past. The Boston Acoustics A40 MkII (£109) can usually be found in hi-fi chain stores such as Laskys and Hi-Fi Markets.

NEW

CD STORAGE WITH STYLE



Up to 24 Compact Discs per Unit

Unique SRM System

It's An Open And Shut Case!

Buying the best CD Storage Units is as easy as choosing from the *new* Laserline range. With features including:

- ▶ *Unique* Securing-Release Mechanism (SRM) for easy CD removal and secure storage — all at the touch of a button.
- ▶ The *only* brand with a protective front cover to complement any Hi-Fi system.
- ▶ Designed to hold either 12 or 24 CDs, the Units stack to provide economical storage.

Also available for Audio Cassettes, the *new* Laserline range is at a stockist near you. So return the coupon *now* — and make storage an open and shut case.



POST TODAY!

Please tell me where my nearest Laserline stockist is situated.

Name _____

Address _____

Tel _____

Post to: Bandridge Ltd 1 York Rd London SW19 8TP

Dealer enquiries to: Laserline Sales c/o Bandridge Ltd
Tel: 01-543 3633 Fax: 01-543 3300

LASERLINE™

STORAGE WITH STYLE

Bandridge Ltd 1 York Rd London SW19 8TP Tel: 01-543 3633 Fax: 01-543 3300

Available at all good hi-fi accessory stockists.



ASPIRATIONS

Although a recent convert to the search for audio bliss, 30-year-old City lawyer Charles Mitchley has made up for lost time; his latest foray being into the realm of the Apogee Divas.

AN

Afternoon

WITH THE

Divas

The first things that strike you when you walk into Charles Mitchley's London living-room are the Apogee *Divas*. Standing like monoliths, grey and imposing, four feet away from the rear wall, they are the ultimate uncompromising audiophile statement. In fact as soon as we arrived, photographer Ian Dobbie and I knew this wasn't going to be a 'hi-fi in the home piece' – the 'home' seeming somewhat incidental to the hi-fi itself. Behind the *Divas*, on stands, sit the other protagonists, also forming focal points for the listener's eye.

The seating is all in front of the *Divas* – in the other half of the room, where various African carved wooden and stone ornaments, or the daylight view of the square, offer alternatives to the monochromed equipment framed in an impressively ornate original fireplace.

The room is the largest of a three-bedroom first floor flat in a Georgian town house just out of the West End hum-drum in a square near Marble Arch. Through the long French windows the leafless trees etched a pattern against the February sky.

The practically square listening room with a 15-or-so feet ceiling is slightly disproportionate, the result of the room being shortened during flat conversion in the '50s. The 'rest' of the original drawing-room is now walled off for the kitchen area, but the Georgian decorative corning has been tastefully preserved.

Above a sealed fireplace at head height



Paul Tam, KJ Manager and a few of the ribbons.

Looking like the doors to Narnia these wardrobe-size Apogee ribbon speakers all but hide the hi-fi.







You should see one when it's pregnant: the right hand Diva visually states its case.

Flats in this area of London don't exactly grow on trees and the system didn't walk in on its own either. The front end is the rare Goldmund *Studio Mk IV*, with Airtangent tonearm and (minimally damped) Koetsu *Red Signature* cartridge, all sitting (just) on a RATA *Torlyte* table. Ricardo Franassovici, of Absolute Sounds who imports most of the brands used here, believes there are only three such combinations in the UK. "It makes the Roksan sound like a Dual, the Linn like a Technics and the Pink Triangle like a frisbee", proclaimed Ricardo with his usual aplomb. While not agreeing such blatant propaganda this is undoubtedly the most 'right' part of the system, creating a superb and transparent image with some classical string music from Charles' vinyl collection.

An Audio Research *SP11 II* preamplifier and its power supply then runs into two AR *M300* monoblok power amplifiers which are bi-wired into the *Divas* using Presence Audio's (easy-to-coil) *Vecteur 8120* speaker cable. Also in evidence was some Mandrake silver stranded arm cable which has apparently achieved something of a cult status in the last year or so. Made in Holland, but also using French and English technology it apparently uses the name of the famous magician, to infer a similar ability to recreate 'magical' sounds.

With the exception of the *Studio* all the pieces were on Sicomin isolation platforms, made from Kevlar, with its low mass/high damping properties. Do a few simple sums and the figure mounts to around £30,000 for the working parts of the system alone.

Charles has decided to stick with an analogue source, having tried and failed to fall in love with CD sound. And the *Divas* lived up to their imperial first impression

on the south side a huge mirror brings extra 'air' and space to the room almost doubling the amount of light, both by day and with the hanging chandelier at night. The opposite wall presents quite a wide expanse, broken only by two oil paintings by Tobit Roche, an India-inspired English Artist. And it was to the *Divas*' credit that this wall did not leap out at us with echoes. The sound is fairly 'hard' or 'live' though and could have given a very polite or 'controlled' atmosphere if the ceiling had not been so accommodating. The African relics, collected by Charles' father, give the room a certain colonial character. Arranged on all surfaces they conjure dusty heathen images that are quite at home with the speakers

The *Divas* were actually being borrowed on approval as Charles was keen to upgrade from the Martin Logan electrostatics he considered the weak point in his system. Apogee *Divas* use ribbon transduc-

ers for most of their square-sail-like area and the magnets make them heavy enough to put you on the NHS' hernia waiting list if you try to lift them on your own. Made by hand at the firm's factory in Massachusetts they are the latest in the Jason Bloom/Leo Spiegel design dynasty.



This is the back half of the room from where you watch - and listen to - the hi-fi.



with vinyl, the sheer colour and depth bringing an orchestra or singer well into focus. But they don't grunt much and the bass didn't roll into the gut as one expected from a design inspired by Stonehenge (or similar). Ricardo suggested that Krell amplification might serve them better by providing a few Neanderthal rough edges. But it could also be because in this situation the bass did not have sufficient space to develop, and that the *Divas* really do need a mediaeval manor hall to do them aesthetic and sonic justice.

The system was installed by KJ Leisure-sound, of New Cavendish Street, who first enticed Charles through their portals two years ago. General Manager Paul Tam explained that they had not set up everything properly because Charles is just about to move. When the builders have finished decorating the new flat, KJ plan to do a pukka job of re-installing the hi-fi, with grid-style connections to the electricity supply and generally making everything (except for the *Divas* of course) a trifle less obtrusive. An installation, Tam believes, should be more than just setting up the equipment, and should include the sort of touches where cables are run under floorboards and hi-fi systems are made to look... well, less like hi-fi. However just setting up something like the Studio can take a whole morning, as it did take Roy Gregory, one of Tam's assistants.

The Swedish Airtangent arm uses a fish tank pump for its air supply. (The air is pumped through the arm's transporting

beam and released through a dozen or so tiny jet holes so supporting the arm on air for a near frictionless effect.) I had been warned beforehand that the pump noise could be an intrusion. Whether I had been warned by someone with bats' ears or whether their pump was actually the industrial shark tank version I'm not sure, but in this installation, in a cupboard and damped by a rolled up towel, the pump made zero noise.

This system was enjoyable to listen to, and the *Divas* remain firmly in the mind for some time although their physical proportions must be responsible for this as well as their music reproduction skills.

(Offerings from Goldmund, Audio Research and Russ Andrews patiently await their turn behind the Divas.)

(You do feel as though druids might appear between them at any moment!) However, Charles may have had the same reservations about the bass as well because he was preparing to try out some Wilson Tiny Tots box speakers the next week. *Eheu!* That never ending search for the perfect combination of room and equipment. And let's face it, if you can't change the room you have to make what's in it fit the bill.



The Airtangent air-bearing tonearm glides into the record hub while a wrinkle of silver Mandrake cable steals the music.

AVON
 P CAMPBELL C.S.VEDON 343224
 P CASTLE WESTON SUPER MARE 22006
 COMET BRISTOL 5910 0
 COMET IN DEBENHAMS BRISTOL 279079
 COMET IN DEBENHAMS BRISTOL 394493
 GARDNER & BADMAN NALSEA 652289
 P ROBERTS BRISTOL 429170
 P ROBERTS WESTON SUPER MARE 41422
 RUMBELOWS HOME TECH BRISTOL 51822

BEDFORDSHIRE
 COMET IN DEBENHAMS LUTON 55619
 RADIO HOUSE LUTON 52103

BERKSHIRE
 V.A. CLIMO & SONS MAIDENHEAD 2785
 COMET IN DEBENHAMS READING 505594
 W.G. GRAZEY & CO. LTD HUNGERFORD 82146
 RUMBELOWS READING 57536

CHESHIRE
 COMET CHESTER 31575
 HOUSE OF TEMPERLEY RUNCORN 72518
 PETER MARTIN CONGLINGTON 27206

CLEVELAND
 DIV HIBBERT SALTBURN 2178

DERBYSHIRE
 J.C.C. COOKSON 434
 J.C.C. HEANOR 76580
 RANK SMITH BOLSOVER 62147
 ROY SMITH CHESTERFIELD 84953

DEVON
 BRADDICKS BIDEFORD 27583
 CHELSTON HILL TORQUAY 408663
 FORDS EXETER 218896
 FORDS TORQUAY 213686
 FRAMPTON RADIO PLYMOUTH 66244
 JAMES TV BARNSTABLE 4373
 PLYMOUTH & S DEVON COOP PLYMOUTH 66300
 RADIO SERVICE PLYMOUTH 40189
 RUMBELOWS PLYMOUTH 21188

DORSET
 BEALES BOURNEMOUTH 22022
 DIRECT VISION BOSCOMBE 41243
 DIRECT VISION BOURNEMOUTH 41243
 DIRECT VISION FERNDOWN 43243
 DIRECT VISION POOLE 43243
 ARKS RADIO BOURNEMOUTH 219077
 JARVIS RADIO CHRISTCHURCH 88877

DURHAM
 FORSTERS RADIO & TV CONSETT 502516

DYFED
 BEN EVANS TV & HI-FI CARMARTHEN 23246
 WAUGHANS RADIO HAVERRYDORNEST 3162

ESSEX
 AUDIOTIME BARKINGSIDE 01 550 2856
 W.A. BAKER LTD CLACTON 42545
 COMET DAGENHAM 01 592 091
 COMET IN DEBENHAMS ROMFORD 768865
 CRAIG HI-FI ROMFORD 78920
 ESSEX DISCOUNT ROMFORD 48837
 GODFREYS OF BASILDON BASILDON 280715
 GOLDING & CO COLCHESTER 8610
 HYPERI BARKING 01 59 6981
 JACKSON RADIO DAGENHAM 592 2855
 D.P. LEAKE WOODFORD 01 505 6325
 PARADE RADIO BARKING 01 594 3788
 RUMBELOWS HOME TECH SOUTHEAM 48024
 WILLIAMS & CRIFFIN COLCHESTER 51 2112
 WOOLMANS BASILDON 285922

S. GLAMORGAN
 HONELLS CARDIFF 31055

W. GLAMORGAN
 COMET IN DEBENHAMS SWANSEA 47545

GLOUCESTERSHIRE
 CAVENDISH HOUSE CHELTENHAM 52100
 COMET IN DEBENHAMS GLOUCESTER 331450
 A.R. DANIELS STROLD 79402
 HUTCHINSONS CHELTENHAM 52302

GWENT
 E.J. EDWARDS TREDGAR 2266

HAMPSHIRE
 BROWNS PORTSMOUTH 73631
 COMET FAREHAM 81044
 COMET IN DEBENHAMS SOUTHAMPTON 332454
 PENNINGTON ELECTRONICS LYMINGTON 74887
 TRUFI ALDERSHOT 26390

HEREFORD & WORCESTER
 RALPH HALES LTD MAULVERN LINK 4133
 J & H RUSSELL KIDDERMINSTER 622666

HERTFORDSHIRE
 KEMPTON TV & HI-FI ST ALBANS 36713
 CROXLEY TV & VIDEO ROCKINGWORTH 773987
 CROXLEY TV & VIDEO WATFORD 01 491 4995

HUMBERSIDE
 JOHNS MUSIC SCUNTHORPE 843800

ISLE OF MAN
 WALTON TV MANX LTD DOUGLAS 75310

KENT
 ARMY & NAVY MADSTONE 68331
 COMET ORPINGTON 77979
 COMET ROCHESTER 4917
 TELERAD LTD DOVER 213251

LANCASHIRE
 KOZLA ROCHDALE 42107

LEICESTERSHIRE
 COMET LEICESTER 320276
 KELHAMS LEICESTER 511675

LINCOLNSHIRE
 S.B. BARKER CONNORSBY 42378
 EASTERN TARGETS LINCOLN 25132
 OLDROYD & CO LTD BOSTON 61251
 BETTIS GRANTHAM 63175
 BETTIS SEAFORD 306039
 TOMBLINGS SPALDING 2748
 YATES & GREENOUGH BOSTON 61443

GREATER LONDON
 ANDYS ELECTRONICS NI 01 863 8965
 ARMY & NAVY SE 1 832 432

THE DARING MINI



THE SOPHISTICATED MIDI



FREE 5 YEAR
 GUARANTEE

THE HITACHI SPRING COLLECTION

Sophistication is definitely the watchword for Hitachi's dazzling collection of Midi's for Spring. Each system has been expertly tailored from a range of outstanding separates, with the emphasis as much on aesthetics as it is on superb acoustics.

There's the ultra chic MD 500 and the mind-blowing MD 1200 (featured here) with its massive 120 watts per channel. Both give a whole new meaning to the term 'remote control' because every element, from their volume levels, twin cassette decks and tuner pre-sets right up to the controls for their turntables can be operated from a full-function LCD handset.

Then there's the ultimate in Hitachi technology; the top of the range 007 series. Purchased individually these separates would hold their own in any advanced audiophile system. Purchased collectively, they form a system that's second to none.

Hitachi are confident that the Spring collection is going to be a hit with those who demand lasting quality and style. So confident that they're selling it with their 5 year guarantee, which until June 30th 1988, comes absolutely free.

The collection of separates starts at £179, the complete systems start at £799. Visit any of the listed dealers for a demonstration. Or call 01-200 0200 for further details.

ALL YOU'LL EVER NEED TO CARE FOR YOUR AUDIO, VIDEO AND COMPUTER EQUIPMENT



Remember - prevention is better than cure!

AUDIO CARE SYSTEM CS3
COMPUTER CARE SYSTEM CS4
COMPACT DISC CARE SYSTEM CS2
VIDEO CARE SYSTEM CS1
AUDIO CASSETTE CARE SYSTEM CS5
CAMCORDER CARE SYSTEM CS6



cares...

Available from most video & hi-fi stores.

£12.99
INC. VAT.

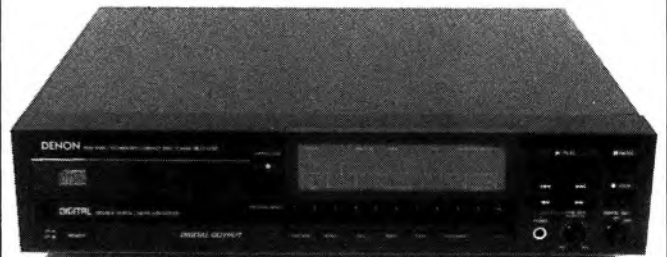


Bib Audio/Video Products Limited

Kelsey House, Wood Lane End, Hemel Hempstead, Hertfordshire HP2 4RQ

Should you have difficulty in obtaining these products send direct including £100 for P&P (UK only)

BEST BUYS IN CHESHIRE



Denon DCD 1700

- ★ MARANTZ 873 ★
- ★ PHILIPS ★
- ★ PIONEER ★
- ★ ROTEL ★

★ **SWIFT** OF WILMSLOW

- A&R • AUDIOLAB
- DUAL • DENON
- MONITOR AUDIO
- ROTEL • PIONEER

ST. ANNS PARADE
 PARSONAGE GREEN
 WILMSLOW
 0625-526213

- FREE INSTALLATION
- 2 YEAR GUARANTEE ON ALL HI-FI
- FREE EASY PARKING OUTSIDE

ARMY & NAVY SW1 834 1234
 ATLANTIC ELECTRICS NW10 451 4798
 BERRYS OF HORNWALL W1 405 6311
 COMET IN DERBENHAMS HARROW W63 6081
 COMET IN DERBENHAMS W1 491 3601
 COSMOS ELECTRONICS N7 272 3940
 CROUCH END HI-FI EDGEWARE W52 3238
 FRANCIS OF STREATHAM SW16 789 0192
 D-H EVANS W1 629 8603
 G10 SOUND & VISION S11 851 5486
 GALAXY AUDIO VISUAL W1 632 2624
 GOODWAVE TV & HI-FI N22 888 0077
 H-WAY HI-FI W1 402 2441
 HOUSE OF FRASER KENSINGTON W8 5432
 JATAJA ELECTRONICS CHISWICK W95 8535
 SUPRE AUDIO SW17 767 2810
 LEADERS HI-FI E1 247 4565
 LIGHT & SOUND E6 472 1373
 MULTIVIDEO SW17 672 7369
 NEWBURY RADIO E7 472 3333
 P.N.R. AUDIO W1 580 9096
 REE JAY TV & AUDIO E11 2491
 SPATIAL AUDIO BARSET 449 4183
 SPATIAL AUDIO W1 437 4702
 T.A.S. RUSSELL MANOR G12 7172
 VIDEO & HI-FI CENTRE W1 580 1977
 WHOMPS CENTRES LTD BEKLEY HEATH W9 8421
GREAT MANCHESTER
 COMET IN DERBENHAMS MANCHESTER B33 0324
 COMET IN DERBENHAMS STOCKPORT 429 0346
 KENDALS MANCHESTER B32 3414
 RUMBELLOWS MANCHESTER B32 4919
MERSEYIDE
 RUMBELLOWS LIVERPOOL 708 656
W. MIDLANDS
 RACKHAMS BIRMINGHAM 236 3333
NORFOLK
 ROCKOCK & SON WATTON B6 242
 MARTINS HI-FI KINGS LYNN 761 6883
 MARTINS HI-FI NORWICH 62170 G
NORTHAMPTONSHIRE
 HI-FI SERVICES NORTHAMPTON 21332
 MARSHALL FERGUSON COBBY 294 70
 MOBILE RADIO WELLS BOBOURGH 27928
 SUPERVISION KETTERING 517042
 SUPERVISION KETTERING 5184
 SUPERVISION NORTHAMPTON 39217
NOTTINGHAMSHIRE
 BELTEREUS NEWARK 2957
 BETTIE'S NEWARK 797 9
OXFORDSHIRE
 V. DELINEO WITNEY 3216
POWYS
 T.H. OLFIELD BRECON 71507
SHROPSHIRE
 MEDICOTT BROS. SHREWSBURY 356
SOMERSET
 CENTRAL RADIO SERVICES BURNHAM 76212
 DENNERS TOWN 7444
 PAUL ROBERTS TAUNTON 27000
SUFFOLK
 W.F. DUDLEY LONG MELFORD 78225
 C.E. MATHIAS NEWBURY 1 & 2
 STANNARDS STOW MARKET 41207
SURREY
 COMET IN DERBENHAMS CROYDON 760 6081
 COMET IN DERBENHAMS STANES 64900
 T.R. P. REDD LUTON 766 28
 VIDEO SOUND SPECIALIST ON 22928
SUSSEX
 CHURCHER AUDIO WORTHING 32258
 MANNING RADIO & TV BRICHTON 50565
 PHASE 3 HI-FI WORTHING 32462
 SOUTH POINT RADIO CROHAMBOURGH 417
TYNE & WEAR
 COMET DUNELM 79318
 RUMBELLOWS NEWCASTLE UPON TYNE 232 9319
WILTSHIRE
 COMET SWINDON 2449
 COMET SWINDON 41674
 BURDEN ELECTRONICS SWINDON 2820
SOUTH YORKSHIRE
 P.E. ADAMS BENTLEY 67425
 GEOFFREY BARNARD BARNESLEY 264572
 COMET IN DERBENHAMS SHEFFIELD 73974
 RAGHAMS SHEFFIELD 2812
WEST YORKSHIRE
 HIRST & SYMONDS LEEDS 64505
 FRANK PLATT WOLVERHAMPTON 66233
SCOTLAND
CENTRAL
 NELSON RADIO STirling 71889
 RADIO & MUSIC STORES BARNOCKBURN 81240
 STEWART BROS. BONNINGROCK 812354
 STEWART BROS. FALKIRK 21945
GRAMPIAN
 COMET ABERDEEN 59029
 R.S. CLUCKSHANK BUCKEE 32094
 TV SERVICES HUNTER 17726
LOTHIAN
 CARL DIXSON SOUND & VISION EDINBURGH 225 6351
 CARL DIXSON SOUND & VISION EDINBURGH 557 2917
 COMET EDINBURGH 554 4454
 PATTERSONS EDINBURGH 554 0355
STRATHCLYDE
 ARNOTTS GLASGOW 246 291
 COMET RENFREW 886 5731
 F.B. CRAIG LARKHALL 881029
 J.H. DONALD KILMARNOCK 26019
 FRASERS GLASGOW 221 3680
 HARRIS SALTCOATS 64330
TAYSIDE
 W.M. COLPAR BARGAINWARE 2436
 W.M. COLPAR DUNDEE 29586
 W.M. COLPAR PERTH 31609
 RITCHIE BRECHIN 4345
 RITCHIE MONTROSE 73765

better buy Hitachi.

HT MD 45. Graphix: Equilizer: HGE 77. Offer lasts from March 1st to June 30th while stocks last.



FOCUS

For every nine hi-fi users who are happy with the standard product, one will want to experiment with tweaks and modifications. Jason Kennedy undertakes some experiments on behalf of this minority.

FOCUS ON

Tweaking

For the purposes of this article at least 'tweaking' is basically the fine tuning of a hi-fi system, without spending much money but often substituting plenty of time. It is a hobby that had its heyday in the post war period before the formal manufacturing industry had developed. With wide availability of ex-WD electronics components in the Tottenham Court Road, it was possible to buy all manner of equipment in kit form. These were most commonly valve amplifiers and tuners, but a lot of loudspeakers were also available as components for DIY cabinet builders and Garrard 301s were supplied as motor units for fitting to a homemade plinth.

Tweaking seems less openly encouraged by manufacturers nowadays, and has become largely the domain of the enthusiast or 'hi-fi nutter' as he is fondly known.

It must not be forgotten, however, that many now commonly accepted audio practices started life as homegrown ideas. For example, the sonic differences between cables and the idea of putting spikes on speaker stands may not have become so popular without experimentation by enthusiasts (reviewers included).

This article sets out how to effect some low cost improvements to your system as well as testing a few of the proprietary tweaking products available on the market. Most of the ideas have been in use to some degree for some time and have proved to be of long term practical benefit.

BI-WIRING

In the *Perspectives* article published last month, Paul Crook explained in detail the sonic advantages to be had from bi-wiring

loudspeakers, a process involving running two sets of cables to each speaker and splitting the crossover. This technique has now become widely accepted as a low cost means of – sometimes dramatically – improving the capabilities of a given loudspeaker, so much so that more and more manufacturers are now incorporating it into their products.

The most obvious sonic benefit is that the loudspeaker becomes that much more capable of turning signal into music. One gets an increase in detail similar to that usually achieved by spending another 50 per cent on the speakers themselves, and one which applies right through the frequency range.

For the purposes of this article we used a couple of pairs of original Wharfedale Diamonds, and thin solid-core cable similar to that produced by DNM. Comparing the standard and bi-wired models revealed a significant increase in clarity especially in the upper mid and treble along with a slight loss of sensitivity (a slight drop in loudness for the same volume setting). Imaging and transparency also improved, imparting a more believable and lifelike feel to acoustic instruments and vocals. The loudspeakers somehow seemed more in touch with the mood and feeling that the artist was trying to create, sounding fast and dramatic with orchestral crescendos or relaxed and in control on a Sonny Rollins saxophone track.

So much for the benefits, what you need to know is how to do it. But before you go and find the soldering iron, remember that this process will probably invalidate any guarantee that the speakers have.

The process requires that the low frequency and high frequency feeds of the crossover are separated by cutting a track through the PCB and re-arranging the signal path, so the individual cable pairs drive the high and low frequency elements of the crossover separately. These four cables are then run to the power amplifier terminals where they will be paralleled, but due to the influence of the crossover filters each cable will most effectively carry current specific to the frequency range that it is driving.



Wanna get tangled up with your turntable? Try rewiring a Rega RB300.



The 'Meitnerised Rock', incorporating disc brake courtesy of Yamaha motorcycles.

In the case of the *Diamonds* the four cables were passed out through the reflex port, but for long term practicality it would be sensible to use 4mm banana sockets fitted into the back of the cabinet or mounting plate. This also permits easy experimentation with different cables. We tried using 1mm solid core house wire for the bass/mid unit only, but this upset the frequency balance making the speakers sound very bright; using the same cable for each driver gave a more even response. However, experimentation with different cables is worthwhile and can often be used to even out our overall frequency imbalances produced by system mismatching and the like.

CROSSOVER REMOVAL

A possibly simpler though aesthetically less tidy alternative to bi-wiring is to remove the complete crossover from the speaker cabinet and place it close to the amplifier. Note that it is fairly important to keep the crossovers for each loudspeaker about six inches apart from one another. As far as we know only the Roksan *Darius* has an external remote crossover intended for such application, though other active/passive convertible speakers (eg Naim Audio) could also be adapted easily enough.

The electronic advantages are that crossover input side leads are as short as possible and output leads between crossover

and driver are dedicated to a specific limited bandwidth. Furthermore, subtly microphonic passive components benefit from being removed from a mechanically 'live' cabinet. There is also the practical benefit that the crossover itself needs no modification, though there may be slight benefits from undertaking a bi-wire conversion.

Soundwise this technique brings further worthwhile benefits along the lines of those achieved by bi-wiring, although not to the same degree. If bi-wiring gives you a notional 10 per cent increase in detail, then the external crossover added another 3-5 per cent with this example. Perhaps more importantly, sensitivity seems to improve to the extent that it is on a par with the standard model. This process gave added life and energy to the *Diamonds*, certainly making them sound like more expensive small box speakers even though low frequency extension is still the limitation that keeps them from imitating larger models.

Another pair of speakers that were transformed by this process are some old Monitor Audio *MA16s*, which went from

sounding mediocre to exciting for the cost of another pair of cables – at a guess you're getting £50 worth of improvement for around a fifth of that.

The most obvious drawback (shared with bi-wiring) is the sight of another pair of cables trailing across or around the living room. And the crossover itself is rarely an object of beauty, so some concealment will be necessary.

CLEANER POWER

The improvements brought about by treating purely power supply related connections with Cramolin inspired me to check further tweaks in this area, one such being the use of solid core mains cables. Although unsightly and inflexible, these are supposed to improve the sound of a system when used to replace conventional stranded leads.

I used some 1mm house wiring flex on the single DNM *Primus* power supply that feeds one of their original pre-amps that I use. Ordinarily the mains lead on this unit is soldered onto a switch, but this was bypassed with the new cable (more recent DNM power supplies have dispensed with this switch altogether). Part of the casing was also left off in order to cut down on the time spent between listening to the test track, which in this case was Glenn Gould playing Bach sonatas.

Playing the same recording after the operation, the piano sounded bolder. More

DENON

Pure Performance!

The DCD 1500 Mk II

“When it came to the listening tests, my mark-sheet soon filled up with superlatives. Every kind of music was reproduced with a rewarding richness of tone and natural balance... very extended but sparkling treble, natural sounding transients and a feeling of real spaciousness.”

Gramophone, March 1988



The DCD 1500 Mk II

“...much more than just another £500 player. It is in fact a potent and thoroughly musical device with very good equipment levels. Players like this don't grow on trees.”

CD Review, December 1987/January 1988



At £499.95 The DCD1500-11 represents the finest value in the CD market today, having been acclaimed worldwide for its brilliant sound quality and superb construction standards. Technical highpoints include Twin hand tuned DA Converters with Four Times Oversampling, Absolute Linear Phase LC-OFC Filters and an Optical Digital Output. The many useful features are topped by a Remote Volume Control that really works. When we say DENON “Pure Performance” we mean it!



**FOR YOUR FREE
COLOUR CATALOGUE**

write to: Hayden Laboratories Limited,
FREEPOST, Chalfont St. Peter, Bucks. SL9 9BS.

ambient information was getting through and the sound even seemed louder despite the unchanged volume setting. It wasn't mind blowing – you couldn't hear the guy breathing or tell exactly what sort of room he was in – but there was an improvement to the extent that attack and decay was just that little bit better defined.

Given this apparent success I decided to have a go somewhere else, and as the power amplifier looked particularly complex to get into I set upon the Roksan turntable's external power supply. In this case I didn't avoid the switch as it's quite useful, but hooked up the solid core in standard fashion. Once again and for the same reason part of the casing was left off (which could have a positive effect on the performance of the electronics). (Incidentally, another factor that could have coloured the results of this experiment was that the amplifier had an extra ten minutes to warm up time.)

However, the sonic effect of this cable was quite unexpectedly great. The sound got considerably crisper, and once again it was possible to hear more ambient information. One experienced a far greater impression of presence in the sound, and the same unlikely increase in volume – from a turntable's power supply! Sounds unlikely I agree, but those cables have a very good chance of staying. Given the time and money required to instigate this changeover, it must rate as something of a Best Buy amongst tweaks.

TURNTABLE ALTERNATIVES

One rather unusual, elaborate and specialised tweak that a friend carried out on his Townshend *Rock* was to change the platter completely. He was inspired by the Meitner turntable which only supports the label area and holds the disc in place with a clamp, the theory being that the vibrations produced by the stylus are transmitted through the vinyl and reflected from the platter back into the disc so causing distortion.

Given the existence of a clamp on the

Rock, he decided to have a go at making up an 80mm diameter acrylic platter, which is a little bigger than the clamp. This had to be turned on a lathe, making it a bit less feasible for the average tweak, but a local engineer could probably do the job quite cheaply. As the *Rock* also features a silicon filled trough, so this new platter needed to be the same thickness as the original gypsum filled one.

The initial trial runs showed some wow, presumably due to the lack of inertia in the rather small platter. Some sort of mass was required to even out any speed fluctuations introduced by the stylus drag – something like a thinner version of a conventional platter. What came to hand was a motorcycle disc brake! – highly unconventional perhaps, but physically well suited to this application. A step was cut in the underside of the acrylic block and the disc rested on the sub platter of the *Rock*. This seemed to be an adaptable cure for the problem and comparisons could commence.

The effect of this apparently radical alteration was surprisingly subtle, though distinct enough to be noticeable on a wide range of records. The most obvious change was that stereo imaging became more solid and three dimensional; extra 'body' was lent to notes right through the range. There also seemed to be more life in the music, tunes became less obscure, yet there was no loss of control or added distortion. Dynamic range also improved as the contrast between loud and soft notes became more noticeable on quite a few tracks.

The degree of improvement did seem to vary between albums and this is probably related to the stiffness of the vinyl. I didn't try any lightweight 12" singles, and they may well prove too flexible for this system. But there don't seem to be any other audible drawbacks so intrepid turntable experimenters could do worse than trying this out.

I have also heard another modified *Rock* turntable sounding quite impressive with a

more conventional full size acrylic platter. (What is it about the *Rock* that inspires this sort of customising?) This version discarded the clamp altogether, and even fitted a new higher torque motor of the sort used on Voyd decks, but unfortunately was not available for comparison. What I heard earlier and in isolation did appear to improve information retrieval.

PIERCE THAT CARPET

The use of carpet piercing spikes on speaker stands and equipment tables is now widespread. However, the type of spike fitted to many supports does not always properly penetrate the carpet and get through to the floorboards, usually because either the carpet, the spike or body are too thick.

In situations where the spikes on equipment supports do not couple rigidly to the floor but rest supported by an intervening carpet it is advisable to locate the spikes on the heads of large crosshead wood screws. I tried out this approach theory using the three-legged Roksan table with *Xerxes* turntable. By pressing down hard on the table frame, indents were created in the carpet surface, allowing accurate drilling of pilot holes for the 25mm long by about 3.5mm wide self-tapping screws. Once securely in the floorboards these can be used to level up the table (but don't take them so far out that they become insecure).

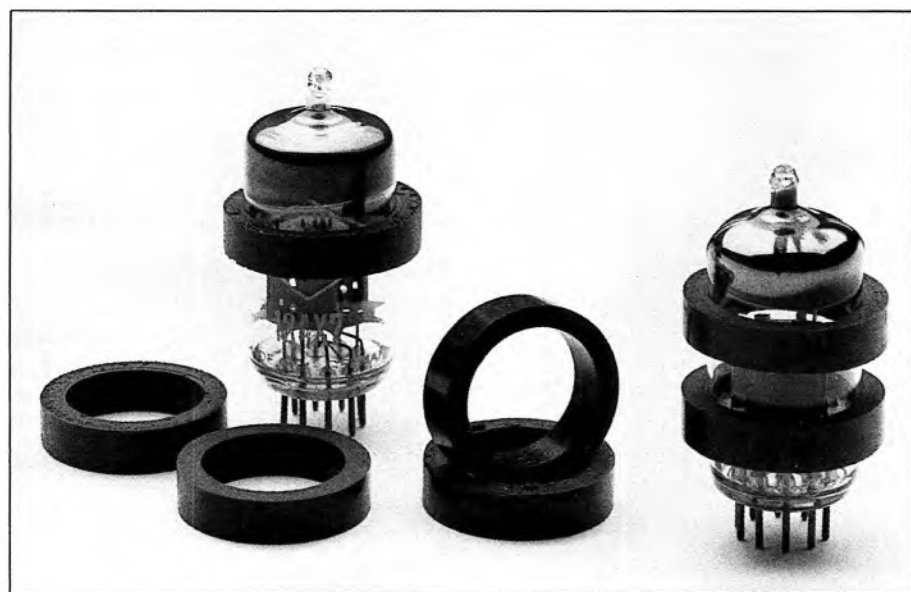
The sonic effects were quite impressive. The most noticeable was a radical improvement in reproduction, which increased in both level and control, providing more of the power that bass instruments display in live situations. Instrumental separation was also improved, leading to a greater sense of space and more three dimensional images.

Suspended subchassis turntables will probably derive even greater benefit from this process than solid plinth designs like the *Xerxes*, but given the simplicity of the experiment it is probably worth trying with any front end. And as long as reasonably narrow screws are used they will not damage most carpets, merely pushing the backing weave apart until such time as the screws are removed and the carpet can retain its shape.

Similar experiments conducted with spiked loudspeaker stands frequently produce similarly positive subjective results.

CONTACT CLEANING

The introduction of *Tweak* contact enhancer focused new interest and attention on the quality of electrical connections in the signal path. Nowadays the advantage of



Keep tubes in check with some of Audiquest's damping rings.



Wharfedale's original Diamond – a prime candidate for bi-wiring.

using low oxidation gold-plated phono plugs for connections carrying low voltage signals has been universally accepted, and even quite inexpensive amplifiers feature gold-plated sockets for vinyl disc (and sometimes CD too) sockets. But even these are prone to the effects of atmospheric pollutants, and audible gains can be achieved by keeping them clean by using some form of contact enhancer. Being an essentially tweaky idea, we decided to try out one of the contact treatment processes for this article.

Russ Andrews, who in the past distributed *Tweak*, recommended we try *Cramolin*, a contact cleaner and enhancer which he supplies for professional as well as domestic use. Said to be used extensively in military and industrial applications, it is supposed to significantly reduce corrosion on electrical contacts thus improving current flow. Besides audio applications, it is suggested that noticeable improvements can be achieved by using it on battery terminals, light bulb bases and guitar strings! Do I detect a touch of the PWBs? (see p. 116).

The kit that we tested contained two bottles of fluid, instructions and a comprehensive selection of cloths and brushes. The red and blue liquids have to be applied and removed from both sides of the connection using the supplied lint free cloths,

which is relatively easy with RCA phonos but rather fiddly with cartridge tags.

Applying this process to the apparently clean plugs and sockets of a phono input did indeed reduce subjective distortion. Instruments sounded more natural and relaxed, and melodies flowed that much more easily. It was a quite subtle effect, but reasonably easy to detect even through the souped up *Diamonds*.

The pre-/power amplifier interconnect was also treated. The stainless steel plugs initially looked dirtier, while the effect on the sound was less distinct than after the previous operation. However, even 'tweaked' *Diamonds* aren't the most revealing transducers around, and although the effect was positive it would probably have been more obvious with better speakers.

The cartridge tags were also tackled, and proved rather fiddly and hard to clean properly – one for the steady-handed only. The results were along the same lines as those achieved with the pre-/power connections, *ie* subtle reduction in distortion,

and perhaps surprisingly, a qualitative improvement in the bass. One might have expected a greater improvement, but in this instance both the cartridge and tags were fairly new and clean which probably reduced the benefit. Alternatively the relationship between signal level and connector type could influence the result. It's possible that a physically small connector is more effective at transferring a low voltage signal than a larger one, so that a tight fitting tag will be working closer to optimum performance than a phono plug carrying the same signal.

Out of interest the mains plugs and power supply connections were also treated. This also had a small effect on the sound giving slightly better instrumental separation and improved definition of dynamic contrast. The sonic changes were quite unlike those introduced by treating the signal carrying connections, as one might expect, encouraging one to delve further into improving the mains supply side of the system.

The cost of the kit or aerosol spray is £15, which as audio upgrades go is quite reasonable. And given the complete treatment, most decent systems should reveal a reduction in distortion which can't be a bad thing. The manufacturers recommend that the process is repeated bi-annually, and the amounts supplied should keep you

going for as long as this particular level of fanaticism lasts. Apparently you can even tune your car with the stuff!

ARM CABLE REPLACEMENT

The biggest subjective improvements in the standard of a system can be achieved by upgrading and fine tuning the front end. In the case of turntables the tonearm is no exception. Most modestly priced tonearms have to make economic concessions in certain areas, and the quality of cable used is often one of them. That is the cable both inside the arm itself and leading out from it, as they are quite different types.

For this project a Rega *RB300* was rewired with van den Hul silver arm cable inside and a thin (0.6mm) solid core cable outside. It is worth noting that this latter cable caused problems with RF interference and coaxial shielded cable is more suitable, but it needs to be quite fine due to the low voltage being carried.

Changing these cables turned out to be a very fiddly job, not for the impatient, but the results were easily worthwhile. The effects were in line with those normally achieved when upgrading cables, but even through unspectacular loudspeakers and amplification the improvement was far greater than expected. Being at such a crucial stage in the signal path, the arm cable influences the sound of a vinyl disc playing system considerably more than the interconnect and speaker cables that follow it.

After the change one could hear a lot more of the information on the vinyl, and clarity of detail was greatly enhanced to the extent that previously obscure lyrics became understandable – a very tangible improvement. Both depth and width of the soundstage were enhanced, creating a better impression of scale and ambience – instruments seemed to have more room to breathe. These effects were noted with the arm fitted to a Roksan *Xerxes*; whether results with a Rega *Planar 3* would be as rewarding is hard to say, but some sonic improvement can definitely be expected.

With the *RB300* it is first necessary to remove the arm from the turntable and the cartridge and counterweight from the arm. Then by loosening the retaining grub screw in the pillar, carefully remove the circular plastic plug in the base. This is where the fine internal cables join the coaxial arm cable, that is until you remove the plug when they break off. Now all you've got to do is get the new wires in.

It is possible to solder the new wires to the originals and pull them through, but it ain't easy. There is a small rubber grommet in the main column of the arm, which the wires pass through, and unless you're very handy with a soldering iron this fouls on the connection and pulls out underneath the main beam.

An easier way is to undo the little Allen bolts which hold the cover over the down-force spring and carefully undo the larger central nut on the other side of the beam.

When removed this will allow the main arm beam to be taken off and the wires can then be passed through the base and rubber grommet separately. Then remove the little rubber plug which holds the wires at the cartridge end of the arm, and use the old wire to pull the new ones through the tube. Return the plug for use with the new wires, but remember to push them through it before soldering on the cartridge clips.

If you want to use the original Rega arm lead then reverse the removal procedure with the plastic plug, but if a new arm lead is to be used a bit of DIY is required. On decks that don't use the arm lead as part of the suspension (*ie* solid rather than sub-chassis types) some sort of cable clamp needs to be fitted to the plinth – something that works like the clamp on a mains plug. This is used to secure the new arm lead on to which the fine internal wires can be soldered, but make sure that there is no



Clean up your 240 volts with single strand mains cable – and it's not nail varnish but Cromolin contact cleaner and enhancer.

danger of them touching accidentally. This system also makes experimentation with arm leads that much more convenient.

Note that changing arm leadout arrangements will have a mechanical effect on the behaviour of subchassis turntables. Predicting the net sonic effect is nearly impossible, as it will vary according to different types of wire and the subchassis decoupling itself.

Note: Shown the section on arm cable replacement, Rega MD Roy Gandy commented that a large proportion of the service problems encountered with *RB250* and *300* tonearms were the result of ill-advised attempts to rewire the arm. In such cases the cost of repair is effectively

the replacement of the tonearm.

One risk is that removal of the plug which joins the internal and external cables will cause the internal wire to break in an inaccessible position.

More seriously, any attempt to remove the large nut or endplate associated with the horizontal bearing in order to try and change the internal wire will irretrievably interfere with the factory-set preloaded bearings.

Rega Research have also conducted extensive experiments with alternative external arm cables. These tend to have higher electrical resistance and consequently reduce the dynamic range of the signal from the cartridge *en route* to the amplifier, as well as affecting the tonal balance.

TUBE TWEAKS

A&R Cambridge have recently introduced the American Audioquest range of products to this country. It includes cartridges, cables and a variety of rubbery damping devices made of sorbothane, a low density rubber which is very soft and slightly 'sticky'. Paul Miller tested out the large sorbothane feet that are designed to support electronic components in his stands review last month, and I have meanwhile been trying out the tube damping rings.

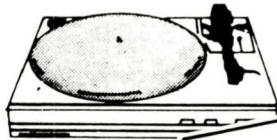
These cost £12 for four, and are designed to reduce hysteresis distortion caused by microphony in valve equipment. They have a nominal internal diameter of 25mm and fit *ECC83* tubes or others of a similar size. However, the accompanying instructions warn that the rings are only suitable for pre-amplifier line and phono stage valves. If used on valves that get too hot – in a power amp's output stage for instance – they will melt and become "a gooey mess".

I tried them out on the four *ECC83s* in an Audio Innovations *1000 series* pre-amp, placing them as suggested near the top of the tube, which minimises interference with radiant cooling. Using a variety of mainly acoustical recordings the effects seemed quite subtle but consistent, the main one being an increase in the amount of high frequency information coming through, in turn giving more body to the sound and improving imaging.

The damping rings were also tried on the twin *ECC83s* featured in the power amplifier, and brought similar but quite subtle improvements in definition and imaging. Encouraged by these results I tried them on some apparently suitable *E182CCs*. These proved too hot, and some of the aforementioned gooey mess was created (but easily removed). In a less revealing system the dampers were tried on the *PC88s* and *ECC83s* of an Audio Innovations *500 series* integrated amplifier. Although the effect was less noticeable here, there did seem to be more treble detail and life in the music.

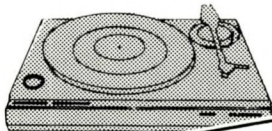
RICHER Sounds

Turntables



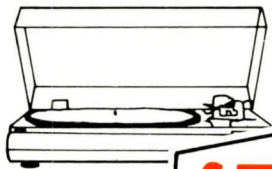
GOODMANS GSP308
 ●Belt drive ●DC motor
 ●Static balance tonearm
 ●W&F 0.1% ●Black finish
 ●345 x 92 x 324
 ●Cart £5 extra.

£34



TENSAI TS505 ●Belt drive ●straight tonearm
 ●fully auto ●Black finish
 ●350 x 103 x 340 ●Cart £5 extra.

£39



TRIO/KENWOOD KD36R ●Belt drive ●DC servo motor ●straight tonearm ●W&F 0.05% ●Black finish ●420 x 103 x 365 ●Cart £5 extra.

£54

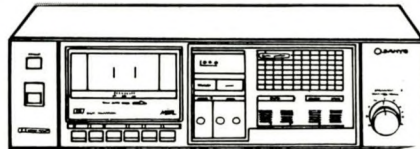
STOP PRESS....
 Dual CS2110 £74 plus cart. £5

HALF PRICE SPEAKERS!

(For Hi-Fi Choice readers only)
 Buy a system comprising of any three different components (eg: turntable/amp/tuner, cassette deck/amp/tuner, turntable/cassette deck/receiver) from the following brands: Rotel, Yamaha, NAD, Sansui, Dual turntables, Onkyo
 And we'll give you the speakers of your choice at Half Price!
 (Must be speakers sold in stock at time of purchase at our normal in-store price)

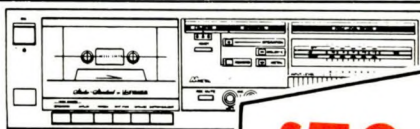
We Welcome Access, Visa, Cheques and Part Exchange. Also VAT export (handling charge £2.50). All goods brand new in sealed boxes unless otherwise stated, inc. VAT. Guaranteed 1yr. MAIL ORDER Free of Charge for items over £50, please phone or write to our Stockport branch. **The above hi-fi prices are slightly cheaper to Hi-Fi Choice readers than our in-store prices so quote this ad!** E&OE
 Browsers are definitely welcome!

Cassette Decks



SANYO RD220 ●Dolby B NR ●W&F 0.05%
 ●Freq resp 40Hz-17kHz
 ●Metal facility ●Silver/Black finish ●Softtouch
 ●420 x 110 x 220

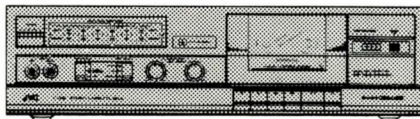
£39



FISHER CR-58 ●Dolby B&C NR ●W&F 0.06%
 ●Freq resp 30-15kHz
 ●S/N 61/70db ●Metal facility.

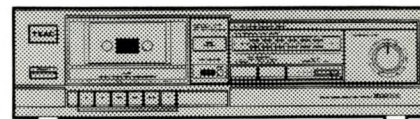
£59

LARGE RANGE OF SPEAKERS IN STOCK!



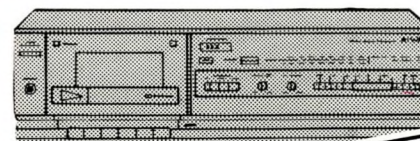
JVC TDX102 ●Dolby B NR ●LED peak meters
 ●Metal tape facility
 ●Excellent finish
 ●Black finish ●435 x 115 x 237 (Also TDX202 with Dolby C £79)

£59

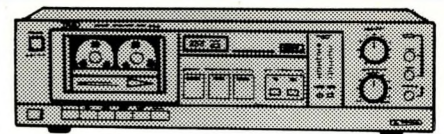


TEAC V200 ●Dolby B NR ●S/N 65dB ●W&F 0.095% ●Freq resp 30Hz-16kHz ●Black finish ●Metal ●435 x 120 x 215

£59

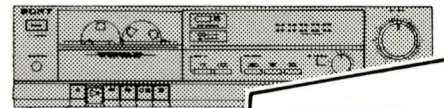


AIWA ADF260 ●Dolby B&C NR ●LED meters ●W&F 0.09% ●Freq resp 20-17,000Hz ●Black ●Metal ●S/N 65/78dB ●softtouch ●420 x 116 x 278. (Also ADF360)



TRIO/KENWOOD KX54 ●Dolby B&C NR
 ●Soft touch ●DPSS skip/repeat system
 ●W&F 0.09% ●Freq resp 20Hz-16kHz
 ●Black finish ●Metal
 ●420 x 123 x 269 (Also KX56CW £119)

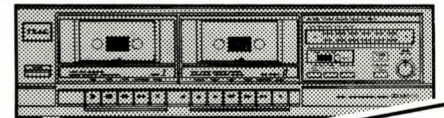
£79



SONY TCFX150B
 ●Dolby B&C NR ●S/N 68dB ●W&F 0.12%
 ●Freq resp 30Hz-15kHz ●Black finish
 ●Metal ●430 x 115 x 250

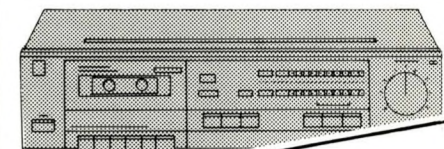
£79

Don't forget: If you see our hi-fi cheaper anywhere else within 75 miles of your local branch, we'll happily beat that price on the spot by £3. (Must be in stock elsewhere at a cheaper price at time of purchase)



TEAC W300 ●Twin decks ●Dolby B NR ●S/N 65dB ●W&F 0.095% ●Freq resp 30Hz-16kHz ●Black ●Metal ●435 x 120 x 215 (Also W310 £109)

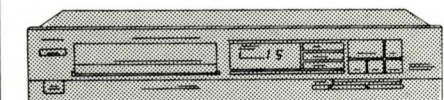
£89



DUAL CC8010 ●Dolby B & C NR ●Soft touch ●W&F 0.08% ●Freq resp 25Hz-15kHz ●Black ●440x 117x 245. (Also CC8020 £199, CC8050 £299)

£109

Compact Discs

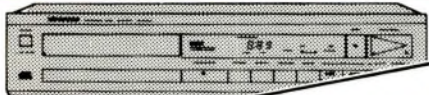


TEAC PD-135 ●Digital display ●16 random prog memory ●16 bit linear ●3 way repeat ●Black finish ●435 x 85 x 290

£129

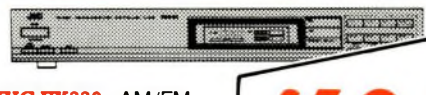
BEST BUYS

phone 01 403 5488
(24hrs) for FREE
16 page news / price list



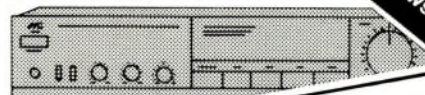
TRIO/KENWOOD DP460 ●Digital ●15-track random memory ●Freq resp 20Hz-20kHz ●THD 0.01% ●Black finish ●420 x 95 x 260. (Also DP310 £149)

£139



JVC FX330 ●AM/FM ●Digital display ●16 presets ●THD 0.15% ●Separation 40dB ●S/N 73dB ●Black finish ●435 x 61 x 235.

£69



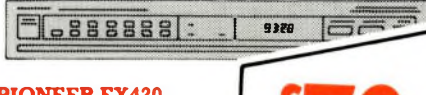
JVC AX220 ●40 watts per channel ●THD 0.003% ●Dynamic Super-A power ●Black finish ●435 x 92 x 252. (Also AX330 £99)

£69



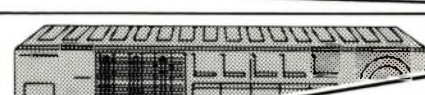
FISHER AD815 ●Infra red remote control ●Digital display ●16 prog memory ●Skip/Pause ●Scan/ repeat ●Black finish ●440 width

£159



PIONEER FX420 ●AM/FM ●Digital display ●24 station presets ●Separation 40dB ●S/N 66dB ●Black finish ●360 x 96 x 384

£79



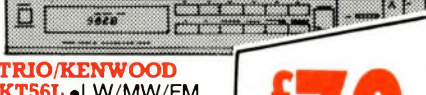
MARANTZ PM26 ●30 watts per channel ●S/N 86dB ●Low impedance drive ●Black finish ●420 x 100 x 260

£89



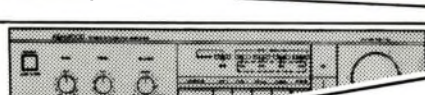
MARANTZ CD273SE ●Digital display ●4 times oversampling ●20 track programming ●THD 0.0015% ●Black finish ●320 x 86 x 312 (Also in stock CD873 £189)

£159



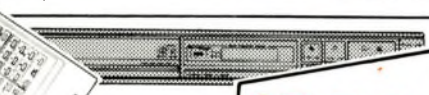
TRIO/KENWOOD KT56L ●LW/MW/FM ●Digital ●16 random presets ●auto & manual tuning ●S/N 76dB ●Black finish ●420 x 74 x 267

£79



TRIO/KENWOOD KA56 ●50 wpc ●THD 0.004% ●S/N 81dB ●Two way dubbing ●Black ●420 x 110 x 277

£89



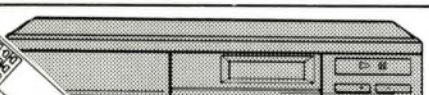
TOSHIBA XR9027 ●Remote control ●Digital display ●16 bit linear ●Fast forward/rev ●THD 0.004% ●Black finish ●420 x 66 x 312

£169



MARANTZ ST26 ●AM/FM stereo ●Digital display ●8 Presets ●S/N 73dB ●Sensitivity 1.0% ●Black finish ●420 x 60 x 200

£89



SONY CDP-M30 ●Digital ●Remote control ●Shuffle play ●16-bit linear conversion ●Repeat ●Auto play ●355 x 80 x 275.

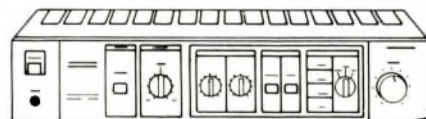
£169



YAMAHA TX300 ●AM/FM ●Digital display ●16 presets ●S/N 76dB ●Black finish ●435 x 72 x 237

£109

Amplifiers



SANYO JA220 ●20 watts per channel ●THD 0.9% ●Freq resp 20Hz-20,000Hz ●Silver/black finish ●420 x 80 x 220

£39

Tuners



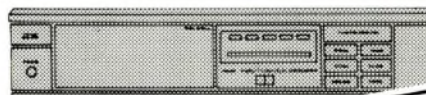
GOODMANS GST5200 ●LW/AM/FM stereo ●Digital ●Presets ●S/N 70dB ●Separation 40dB ●Black finish ●345 x 65 x 278

£49



FISHER FMM27 ●LW/MW/ FM stereo ●Digital display ●16 presets ●Separation 45dB ●Sensitivity 1.2uV ●S/N 74dB ●Black finish

£59



GOODMANS GSA5200 ●35 watts per channel ●High filter button ●Frequency response 10-30kHz ●Black finish ●345 x 83 x 273

£49

THE RICHER CHARTER

★ **BEWARE OF THE COMPETITION!** We have established our own code of practice over the years giving you, the customer, a far deal. Even though our advertising expenditure is considerable in a recent survey over 50% of our customers were regulars or coming to us thru' word of mouth recommendation.

★ **Our policy of fair play includes:**

- Stating if goods aren't perfect new products if this is the case
- Not advertising items long sold out or never expected
- Not using one off loss leaders to entice customers to our stores and then swap selling
- Explaining that items are D.C. voltage or what they are compatible with, if not standard connection
- Maintaining an honourable refund/ exchange policy for faulty goods
- Running an efficient service department in case of problems. And a full 1yr guarantee on everything
- Treating customers as human beings!
- Accountability, if you haven't been treated right, ask to speak to the Manager or write to Mr Richer. We want to know, and we really do care

★ **PRICES:** We believe our prices are the lowest available anywhere. We keep them that way through minimal overheads and careful bulk buying. We are also the most established and by far the largest outlet for discontinued products, used by all the major Japanese distributors for clearing their shelves. This enables us to sell many goods at below even trade prices, giving you, the customer an even better deal!

★ **We are an equal opportunity employer**

BIRMINGHAM: 10/12 Smallbrook Queensway Tel: 021 643 1516 In front of the Albany Hotel on main ring road
BRISTOL: 20 Cotham Hill Tel: 0272 734397 50yds Clifton Down Shopping Centre Opposite 'Crookers' Pub.
CARDIFF: 5 Central Square Tel: 0222 383311 Near the train and bus stations
EDINBURGH: 1b Chambers Street Tel: 031 2263544 Near the Royal Scottish Museum
GLASGOW: 24 Gordon Street Tel: 041 221 9147 Near the central station
LEEDS: 55 The Headrow Tel: 0532 455717 Opposite Lewis's dept. store
LIVERPOOL: 69B Church St. Tel: 051 708 7484 Corner of Parker St
LONDON: 2 London Bridge Walk, SE1 Tel: 01 403 1201 (10 lines) 403 4710 On the walkway (not in A-Z) over Duke St: Hill
STOCKPORT: 4 Wellington St. Tel: 061 480 1700 100yds Stockport Station (opp Station Approach) 10yds off the A6
YORK: 6 Feasegate Tel: 0904 645535 30yds St Sampson Square
ALL SHOPS OPEN 10-6pm MON-FRI, 10-5pm SATS (excl. London Open 10-7pm Mon-Fri, 10-5 Sat)

IALIST HI-FI RETAILER!

If you think these reviews are over the top complete the coupon below.



ARCAM ALPHA+ AMPLIFIER

"In certain respects it is the best of all the amplifiers tested, it has the sweetest and, in many ways, most natural and unforced delivery. There is virtually no sense in which it points to itself in circuit, it is self-effacing to the last, while the system it powers just sings.

I'm very impressed by what has been achieved by A&R".

ALVIN GOLD, WHAT HIFI, APRIL 1985.



ARCAM ALPHA TUNER

"The Alpha impresses not by being seductive or feature-laden, but by giving a very pleasing sound quality".

JOHN SEABURY, WHAT HIFI, MARCH 1986.



A60+ AMPLIFIER

"England's classic low cost, high performance amplifier that just goes on getting better".

NEW HIFI SOUND, AUG 1986.



T21 TUNER

"The A&R T21 is an FM only tuner complete with the minimum facilities but a superbly smooth sound quality. Exceptionally easy to use and available in four different finishes, it remains one of our favourite hi-fi tuners".

WHAT HIFI AWARDS 1986.



ARCAM DELTA 90 AMPLIFIER

"From the outset the amplifier showed itself capable of a very solid dynamic performance. It also took and kept a grip on the subtleties of the stereo signal ...

The amp looks well set for as long and honourable a life on the hi-fi market as the A60 has had".

DAVID PRAKEL, NEW HIFI SOUND, DEC 1986.



ARCAM DELTA 80 TUNER

"The tuner performed well and was simple to use. With strong FM signals it gave a clean and detailed stereo sound ...

The Delta 80 is thoroughly competitive and can be recommended as good value for money".

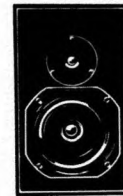
JOHN SEABURY, WHAT HIFI, MAR 1987.



ARCAM ONE LOUDSPEAKER

"A&R have a convincing performer in this fine loudspeaker. The sound was clear and open, with fine musical detail & accurate stereo presentation."

MARTIN COLLOMS
HIFI CHOICE LOUDSPEAKERS.



ARCAM TWO LOUDSPEAKER

"The Arcam Two is a superbly subtle and informative design that pleases the more it is listened to. As a speaker to live with and enjoy it has few superiors".

JIMMY HUGHES HIFI ANSWERS OCT 86.



ARCAM THREE LOUDSPEAKER

"Of the budget plus group of speakers the Arcam 3 made a strong impression with its stereo resolution and imaging abilities. It is definitely a speaker for the smaller room system".

NEW HIFI SOUND, OCT 1986.



MG SERIES CARTRIDGES

"A&R have done their job right. I'm sure these cartridges will quietly establish themselves and proceed to sell forever more ..."

ALVIN GOLD HIFI ANSWERS JAN 87.



DELTA 70 COMPACT DISC PLAYER

"The Arcam Delta is Britain's latest and most significant compact disc product."

GRAHAM S. MAYOR, WHICH COMPACT DISC, JULY 1987.

Here are a few examples of the accolades we've garnered from the press.

If you can handle a whole wodge of glowing reviews and technical information, feel free to send in the coupon.

We'll also send you a list of dealers so you can hear for yourself what all the fuss is about.

ARCAM
audiophile products
from A&R Cambridge

A&R CAMBRIDGE LIMITED, DENNY INDUSTRIAL CENTRE, WATERBEACH, CAMBRIDGE CB5 9PB, ENGLAND. TELEPHONE: (0223) 861550. TELEX: 817345.

Please help keep my postman fit: send me my wodge of rave reviews and technical information.

Name _____ Address _____

MARKET RESPONSE

This month our exclusive market survey summarises dealers' opinions on the current state of the compact disc player market, looking at factors such as consistency and reliability.

The CD medium is still the latest and best thing to hit the hi-fi industry whatever might be said about DAT. And the medium, now five years old, with its compact, carry-home qualities and free-from-pops sound, is fast establishing itself as the way to musical reproduction in the future.

CD has boosted the whole hi-fi market too, just as Punk rock once tweaked the tail of a constipated and nearly dormant record industry, so CD has breathed new life into the hardware side of things. Whatever the grave and cognisant experts say about the soundstage capabilities of this sound-from-light medium it is here to stay, and has raised hi-fi consciousness in the public mind (forgive the Californian turn of phrase).

In this market survey, *Choice* researches what dealers think about CD at the moment. We have a list of best sellers and comments on reliability, sound quality consistency and recommendations for cleaning the software or simple improvement tweaks.

Market Response complements the main review topic each month in a distillation of dealers' comments from all over the UK. In the main, reviewing methods only look at a given piece of equipment, scrutinise it and conclude upon it. This feature relays retailers' experiences with manufacturers and their products over the last six months or so.

AGB figures for 1987 show three CD players sold for every one turntable, whereas the ratio was below 2:1 in 1986. At the same time the value of each market is increasing at around 35 per cent per annum, the inference being that the average price of CD players is slipping while that of turntables has risen substantially.

Most of the business is at the bottom end of the market and several dealers told us that here the CD sound was much better than from turntables of comparable cost. Like all other pieces of electrical wizardry they

have come down in price significantly. In 1985 a CD player under £300 was a rare find, but now they are approaching the £100 mark. Gary Thompson, of Bartlett's Hi-fi, Islington said the next (imminent) step was the psychologically significant £99 machine. All this will boost sales further but another dealer, Julian Richer told us that people were actually waiting for the prices to keep coming down before purchasing. Mr. Richer cited Marantz bringing down the price of the CD 873 from £229, to £219, to £199 in two months. If you see that sort of downward price spiral it makes sense to wait another month to save £20.

One problem here concerns the secondhand CD player market. Brian Peaston of Holborn Hi-Fi explained: "people are coming in to part-exchange their early CD players but can't understand when they're only worth £100. Of course it's very difficult for us selling a secondhand one even for £100 when you can get a new guaranteed one for £160." The secondhand market is further hampered as no-one really knows how long CD players last; it's difficult for dealers to say (with a knowing nod): 'you'll get a good few miles out of her yet'.

Whether cheap CD players are any good is debatable and we heard "you get what you pay for" from several dealers. Reliability suffers with the natural cost-cutting involved and this is a worry to dealers who are in the front line and have to pick up the pieces. But the pressure is on them to sell the cheap models and the fact that customers return to upgrade their equipment makes it economic sense to serve them from the start. Only two thirds of the dealers we asked said they sold more CD players than turntables. This implies that most of the CD market is accounted for by the multiple retail outlets in either separate or midi-system form.

Over the £400 price mark most dealers said that analogue gave better results than digital and enthused about the still more natural sound to be had from

vinyl. "There's a slight coarseness with CD, the soundstage is shallow and a bit cold," was the sort of comment we heard. One dealer at the Bristol show claimed that people were tensing up when he switched to CD after vinyl. They then relaxed with the vinyl sound when he switched back. This was with a £700 CD player and £1,600 vinyl front end system, so one could expect some difference, but the point this retailer made was 'CD doesn't wipe the floor with vinyl'.

And in spite of the hassles of installing record decks at this price or above (a CD player is just plugged in) many dealers were still selling analogue systems on sound quality after comparison with CD. So for some CD has a long way to go. However, most dealers felt CD would eventually take over from vinyl and said many were buying CD as a second source to cater for an eventual demise of the black disc.

Our vendors envisaged a bleak landscape where only 20 to 40 shops would sell high-end analogue systems, and records would be sold by specialist stores, each dealing with a subject like jazz, say, or chamber music. Already vinyl is being dropped by many High Street outlets as being an expansive and slow moving stock which is very much secondary to the now popular CDs which have usurped its shelves. It was surprising to hear this from several dealers but time periods from around five to twenty years were given for the takeover.

CD has its fans in the high end though and the medium has already produced the 'CD Junky' according to Steve Watkins at Image Hi-Fi in Leeds. The CD junky, it appears, is the high-tech equivalent of his (often bearded and bespectacled) vinyl counterpart. He wants the best and will talk dealers into the ground on the various merits of this or that. The fact that there are people versed in tweak lore relating to CD players surely indicates raw enthusiasm for the medium and not just preference for its user friendly nature?

RELIABILITY

CD players are not the most reliable machines we have come across while surveying the product types. We found that 5.15 per cent arrive from the manufacturer as faulty. (This compares with 2.16 per cent from our survey on turntables.) A couple of lucky dealers gave us the rounded answer of 'zero' while one unlucky shop experienced 30 per cent send-back rate (honesty pays - Ed). Gilson Audio in Cleveland told us: "CD players have the worst fault rate (*cf* equipment) since cassette decks 20 years ago."

It was also pointed out that often problems occurred with a whole batch of CD players, implying that a robot had gone berserk one afternoon, inserting a load of duff diodes or whatever. However, quality controllers are employed to check on products leaving the conveyor belt and one cannot argue that the people who deliver CD players to the shops are more loutish than those who deliver say, cassette decks. But faults were found across the board and there appears to be no Achilles heel with the CD player.

When faults are found, about a third of the dealers could repair them themselves. But due to the level of technology involved some dealers did not have access to a qualified engineer and also some manufacturers will not allow dealers to repair their machines. If your machine breaks down we calculate that on average you can get it back in 3.15 weeks - about 22 days. If the dealer can repair it, then the time is significantly less - only 1.85 weeks on average and some will lend you a shop model while it's being repaired so it is worth asking.

Of course there are upsets and dealers mentioned long waits for parts from Japan, but turnaround generally appears smooth. There were some complaints relating to old CD players though, and it was suggested that it was difficult to get replacement parts from Philips. However Meridian, who use Philips components said they had a large stock and there was no hold-up. But see what you

come and hear the excellent Nakamichi OMS-1E



The famous casual stance as the world knows and loves him.

ALPHASON, AUDIO TECHNICA, CAMBRIDGE AUDIO,
CANTON, COUNTERPOINT, D.N.M., EPOS, GOODMAN,
HARMAN KARDON, HELIUS, KOETSU, MANTICORE,
MONITOR AUDIO, MYST, MORDAUNT-SHORT, NAGAOKA,
NAKAMICHI, ONIX, ORANGE AUDIO, ORTOFON, P.S. AUDIO,
REGA, ROKSAN, ROYD, S.M.E. NAIM, SUPEX, VAN DEN HUL,
WHARFEDALE, YAMAHA,

w e c a n h e l p

the cornflake shop

37 WINDMILL ST LONDON W1P 1HH 01-631 0472

make about this comment from Howard Popeck of Subjective Audio: "big manufacturers have a contempt for the customer; they think they're immune from customer reaction. They will often reduce you to tears of frustration before accepting a product back for repair".

Obviously not everything in the garden is lovely for everyone (and maybe small *is* beautiful).

The most reliable brands were calculated as Denon (102 points), Marantz (50 pts), Technics (41 pts), Sony (40 pts) and Yamaha (35 pts). Less reliable manufacturers according to our dealers are: Philips (-67 pts), Cambridge Audio (-27 pts), Marantz (-21 pts), Technics (-19 pts) and Aiwa (-18 pts). Of course Marantz and Technics have featured on both ends of the scale and this shows how personal the survey is. Some dealers will see a brand as unreliable while others see the opposite. This could also relate to the number of players a dealer sells; the more he sells, the more likely he is to find examples of unreliability. Some dealers take this into account when talking to us - some may not. We found the same, subjective reaction when calculating the fast and slow manufacturers for repair times. Some dealers listed three weeks, for instance, as a fast repair time while others said this was slow. Where speed was concerned the fastest manufacturers for getting repair items back to dealers were given as: Cambridge (immediately), Technics (a week or so), Mission (also about a week), NAD, Aiwa and Nakamichi (under two weeks). The slow ones were quoted as Philips, Sony and Denon, in that order.

(IN)CONSISTENCY

Consistency of sound demonstrates an exactness in the manufacturing process which reflects the manufacturer's commitment to his product and good name. Of course even if you put a CD player through the same amplifier and speakers it is unlikely it will sound the same in a different room... but that doesn't mean the CD player should sound different! We asked dealers to give us their opinions on consistent and inconsistent CD players. About a third of them declined to reply or said there was no or negligible difference.

The most consistent sounding CD players are made by: Denon (63 pts), Marantz (56 pts), Sony (28 pts) and Technics (27 pts). However Marantz, Sony and Technics all got a mention for

inconsistency. The only salient inconsistent manufacturer was cited by ten dealers as Philips. (Although two dealers said that Philips was consistent.) It should be mentioned that even fewer dealers were prepared to comment on inconsistency and we only got replies from 14.

NOTHING SEEDY

"Nuthin' seedy luv," says the backward bod in the advert when a shopgirl offers him this 'new and revelatory' medium's software. Of course this was always given as one of the brilliant aspects of the colourful little discs; there was supposed to be nothing about them with which dirt could associate. Analogue enthusiasts (defenders of the faith) then crowed about promotional lies being spun over 'perfect CD' when a host of cleaning gadgets came on to the market. "It's just like vinyl, it gets dirty, it's no better," they chortled.

So we asked dealers to recommend a cleaning method for CD discs, and were surprised to hear "a soft cloth" from over half of them. If a customer insists on gadgetry then dealers were divided in what they might sell him. Allsop's cleaner was recommended most, with mentions for Trackmate and Discwasher. Many dealers sounded very upset about being asked and commented that the thing shouldn't have got dirty in the first place! "CD is easy to look after and we have very few complaints," was a typical answer. But when prodded, "just breathe on it and wipe it with a clean soft cloth," was a common reply.

Daring to gall that particular analogue argument, it still seems there is nothing seedy about CD in common use. However, it is best not to touch.

THE TWEAK

The best tweak for a CD player is to get a decent interconnect for it (the piece that takes the CD player's line source into the pre-amplifier, or power amplifier if it has volume control). Here we enter cable territory and encounter fierce division and loyalties. The main thing though is GET ONE! All dealers asked said an interconnecting cable can produce dramatic differences in sound quality and many recommended it as the first step in upgrading. Sounds Exclusive, of Cranleigh in Surrey, told us: "a CD is only as good as its interconnect." To cablists this is all old hat but many people find paying 30 spondoolies for a bit of jumped-up flex a bit much. The

best bet is to try it and see; if you're lucky enough to hear no difference than you've saved yourself some cash. If you do hear a difference then you could be stepping out on the rocky road to perfection; there are lots of variations.

One favourite type of interconnect is the linear crystal oxygen free copper type made by Vecteur or Sony. Several dealers mentioned the Vecteur cable which retails at £49 a pair with gold plated terminals. To give an idea of this cable's diversity it is also used in the French Mirage fighter jet for its 'ability to maintain phase information over a wide bandwidth'. Other cables getting mentions were from the Chord company, Siltech, MIT and Monster. Denon are also reported to be working on a fibre optic cable which will use cable technology of the Cable and Wireless kind.

Another important tweak according to several dealers was the Interface CD mats. These, simple to use, clear mats can be stuck onto the CD and are said to 'damp' the resonances that can occur as the disc spins round. Basically the CD's outer edge can start juddering and this sets up resonances which can then force the laser in and out of focus and overwork the oversampling mechanism. The clear mats are the same size as the CD and some dealers even use them on both sides of the disc. The sound was said to improve and become more 'airy'. Ten mats cost £4.99 and are marketed by Presence Audio, Horsham.

THE BEST SELLERS

Our survey gave dealers three price points in which to list their top selling CD players and we asked for their top three models in each category. The results were calculated on a points system - 5 for the top seller, 4 for the second and three for the third.

Budget, below £200

- | | |
|-----------------------------|----|
| 1) Marantz <i>CD 273 SE</i> | 57 |
| 2) Technics <i>SLP 111K</i> | 48 |
| 3) Yamaha <i>CDX 5</i> | 42 |
| 4) Marantz <i>CD 273</i> | 29 |

Mid Price £210-£400

- | | |
|----------------------------|----|
| 1) Marantz <i>CD 75</i> | 74 |
| 2) Denon <i>DCD 800</i> | 61 |
| 3) Denon <i>DCD 600</i> | 47 |
| 4) Denon <i>DCD 300</i> | 45 |
| 5) Mission <i>PCM 7000</i> | 43 |

Top price, Over £400

- | | |
|----------------------------|----|
| 1) Denon <i>DCD 1500II</i> | 70 |
| 2) A&R <i>Delta</i> | 42 |
| 3) Meridian <i>207</i> | 37 |
| 4) Denon <i>1700</i> | 37 |
| 5) Sony <i>ES £22</i> | 34 |

The results of this market survey are only as representative as the comments from 43 dealers

around the country can be. We don't pretend this is an exact picture or that the best sellers' list is totally accurate. The survey is a poll and relies upon its mostly random approach to give results which are coherent with the market situation; of course some of the smaller brands do not feature highly because they are not stocked by so many dealers. It is therefore very much a common survey on common products.

PARTICIPATING DEALERS

Our thanks to the following dealers for helping us compile this market survey:

- Acoustic Arts, Watford, Herts.
- Active Audio, The Spot, Derby.
- Aerco Ltd, Woking, Surrey.
- A. Fanthorpe Ltd, Hull, Humberside.
- Analogue Audio, North Finchley, London.
- Andrew Thomson, Kirkcaldy, Fife.
- Aston Audio, Alderley Edge, Cheshire.
- Audio Insight, Stony Stratford, Bucks.
- Bartletts Hi-Fi, Islington, London.
- Billy Vee Sound System, Lewisham, London.
- Bowers and Wilkins, Worthing, W. Sussex.
- Brentwood Music and Hi-Fi Centre, Essex.
- Cambridge Hi-Fi, Cambridge.
- Chichester Hi-Fi, W. Sussex.
- Doug Brady Hi-Fi, Liverpool, Warrington and London.
- Gilson Audio Ltd, Middlesbrough, Cleveland.
- Golding and Co, Colchester, Essex.
- Grahams Hi-Fi Ltd, London N1.
- Holborn Hi-Fi, Aberdeen.
- Horns, Summertown, Oxford.
- Image Hi-Fi, Leeds.
- John Marley Hi-Fi, Canterbury, Kent.
- KJ Leisuresound, London W1.
- Lafayette Hi-Fi, Dublin.
- Le Set, Brompton Cross, London.
- Lyon Audio, Stanway, Colchester.
- Norman Audio, Preston, Lancashire.
- Paul Green Hi-Fi, Bath, Avon.
- Peter Russell's Hi-Fi Attic, Plymouth.
- Pinewood Music Co, Goodworth, Clatford, Hants.
- Richer Sounds, 12 shops around UK.
- Robert Ritchie Hi-Fi, Montrose, Scotland.
- Searle Audio, Barrow in Furness, Cumbria.
- Sounds Exclusive, Cranleigh, Surrey.
- Subjective Audio, N. London.
- Swift of Wilmslow, Wilmslow, Cheshire.
- The Audio File, Bishops Stortford, Herts.
- The Cornflake Shop, Windmill St, London.
- Tru-Fi Ltd, Aldershot, Hants.
- Truro Hi-Fi, Truro, Cornwall.
- Watts Radio, Somerton, Somerset.
- West Midlands Audio, Worcester.
- Zeus Audio, Belfast and Donaghmore, N. Ireland.

NB Any hi-fi dealer who feels aggrieved he is not on this list, and who would like to be consulted in the future, either regularly or intermittently, please write to us at 39 Goodge Street, London W1P 1FD, or telephone 01-631 1433.

There's nowhere like it for Hi-Fi!



HI-FI, TV & VIDEO

- Huge selection of products from the world's leading names
- Comprehensive demonstration facilities
- Total after sales care
- Best price promise
- Open till 7.30pm each weekday and 6.00pm on Saturday

**NOW YOU'VE
READ THE
REVIEWS
COME TO US
FOR THE BEST
DEAL ON ANY
CD PLAYER**



COMPACT DISC

- The largest selection of CD players and discs in the UK
- Home demonstration service
- Discount card scheme to save you big money on discs
- Free life membership with each CD player - worth £50
- We guarantee the best deal in the UK on any CD player from stock

Licensed credit brokers -

written details on request

PAUL ROBERTS

Sci-Fi Hi-Fi - at down to earth prices

OPENING HOURS MON-FRI 9.30am-7.30pm. Sat 9.30am-6.00pm

31-33 GLOUCESTER ROAD, BRISTOL (0272) 429370. 32 NORTH STREET, TAUNTON (0823) 270000

203 MILTON ROAD, WESTON-SUPER-MARE (0934) 414423

65 HIGH STREET, BRIDGWATER (0278) 421234.



CHOOSING AND USING . . . CD PLAYERS

CD players are now the most popular component in the hi-fi chain and while prices slip gently downwards, quality moves up steadily.

Compact disc has come a long way in five years, and is now starting to represent a significant percentage of hardware and disc sales (particularly by value). Rather surprisingly, the UK has proved one of the slower growing markets, though this partly reflects a greater difference in price between a CD and its LP or musicassette equivalent than in some overseas markets. Whereas disc prices have only recently started to slip, player prices have dropped to a third of those charged when the system was first launched. £200 is now a typical budget price, some machines cost as little as £150, and cheap mechanisms are built into systems and portables. Yet at the same time there is a healthy demand for upmarket players offering improved sound quality and/or unusual features.

The arrival of CD has been a great stimulus to the hi-fi trade, not only by creating substantial sales of CD players themselves, but also in re-focusing attention on the various other parts of the hi-fi system. Visiting a hi-fi shop for the first time in years perhaps, customers are appreciating the steady advances which have taken place on all fronts, and are taking the opportunity for a general system upgrade. Even LP record players are selling well, sometimes after direct comparison with the new medium, as customers recognise the major investment they already have in vinyl discs and appreciate the fine quality now available from vinyl. Indeed, CD credibility was not helped by early claims for 'perfect sound forever', a perfection which has often fallen far short of the expectations of many hi-fi enthusiasts.

CD certainly has a number of advantages over its rivals. It is inherently rugged and unaffected by playing, free of surface and background noise and wow and flutter effects, while signals kept in digital form are theoretically immune from degradation. The

addition of data channels allows complex pre-programming and accessing, and future CD applications under development include adding video (CD Video), interactive A/V (CD-I), and the CD-ROM computer software format. In-car, portable and personal players are in the shops, though there is still the nagging doubt that tape is inherently more immune to the shock and vibration of such applications, while the wide dynamic range and inaudible background noise can be almost an embarrassment in a noisy environment.

Doubters notwithstanding, the format clearly is here to stay, which is an achievement in itself when one notes the enormous historic difficulties encountered by those trying to create a successful new domestic format, not to mention the current problems facing DAT, touted as the tape equivalent to CD.

THE DISCS

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

An equivalent to the vinyl 45rpm 'single' known as CD Video, containing a mixture of audio and video on a standard size disc, is about to be launched, and a 3 inch diameter audio only CD single has also been proposed.

For record companies in particular, establishing a brand new format is an exceedingly difficult task, in view of the vast inventory needed to represent a play-only format effectively, and in this instance the technical problems of pressing with necessarily great precision. Inevitably there was a learning curve in the disc manufacturing

processes, and full quality potential is still not reached in many cases. However, the range of titles now available on CD has grown spectacularly, particularly in the classical and jazz fields, emphasising the commitment of the record companies to the new format. And considerable extra disc production capacity just coming on stream should help bring prices down somewhat.

From the general consumer's point of view, price will still be a key factor. While early CD users were clearly prepared to pay a 100 per cent premium, it remains to be seen what sort of long term price premium compact discs can command over LP and musicassette rivals. History has shown that the broad base of recorded music sales is very price sensitive but not especially quality conscious – musicassette purchasers who were attracted by the convenience of that medium were not deterred by quality substantially inferior to LP.

THE PLAYERS

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

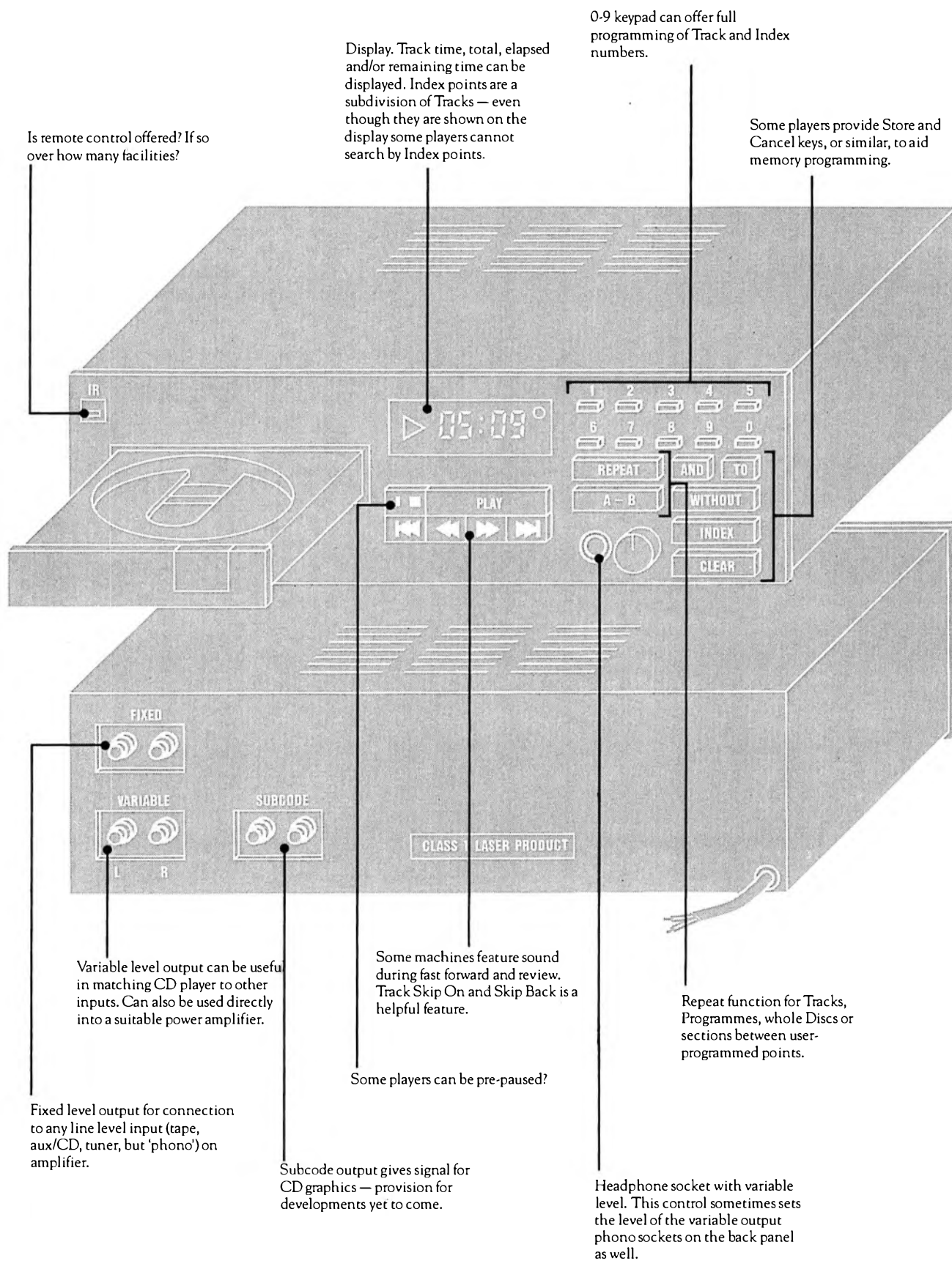
There is also a mild risk that a CD user will find his amplifier no longer seems to go as loud. The reason for this is that the digital CD medium is better at preserving the high loudness peaks in music which analogue systems 'squash' downwards. Consequently for the same peak

output, the mean (average) output from CD with the same recording will be slightly lower than before. One can of course compensate by cranking up the volume, but if an amplifier is already being used close to its limits, the CD peaks could cause premature 'clipping', for which the only solution is a bigger amplifier.

The prospective purchaser faces a wide range of choice at wildly varying prices, starting below £200 and going up to around £2,000. Players are available for in-car use, are incorporated in large portables, and exist as tiny personals, with some doubling as unconventional domestic machines. The mains models can be manual or remote controlled, and simple or complicated in terms of ergonomics and programmability. Autochanger variations can accept and play from a caddy of half a dozen discs, selected and programmed remotely.

Despite protestations of 'perfect' sound, CD players show significant audible and measurement differences, and these are discussed in detail in our reviews. That said, most machines measure very competently, showing occasional weakness at the cheapest end of the market and among low voltage portable machines. Though correlation with measurement still proves elusive, listening tests proved quite capable of consistently distinguishing between the different decks. While the poorer examples can make the new medium sound quite unpleasant, the best can provide eminently satisfactory results with refreshing repeatability and the promise of longevity. However, we would certainly advise any potential purchasers to make sure they themselves like the sound of CD before embarking upon a substantial commitment to new hardware and software.

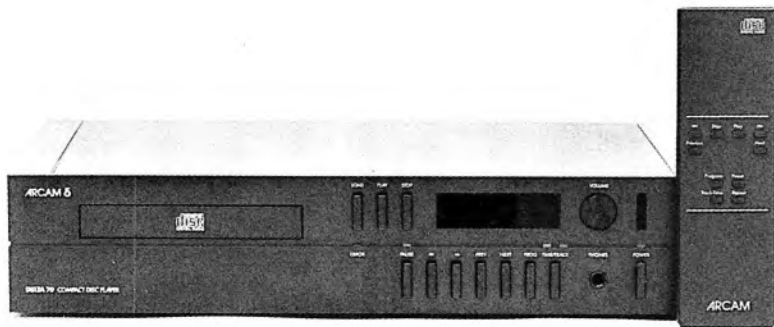
ANATOMY OF A COMPACT DISC PLAYER



A&R ARCAM DELTA 70

A&R CAMBRIDGE LTD., DENNY INDUSTRIAL ESTATE, WATERBEACH, CAMBRIDGE CB5 9PD. TEL: (0223) 861550.

RECOMMENDED



Not content to badge-engineer a simple Philips clone, A&R deliberately took their time over entering the CD player market, and the result is very much their own creation, albeit relying on various Philips-sourced 'building blocks'. The unit is clearly an *Arcam* - 'blacker' than most and attractively minimalist in presentation, it makes a refreshing change amongst the tacky vulgarity that adorns the fascias of much imported product. Presentation and ergonomics are mildly unconventional, but also unusually rational and intuitive, unencumbered with front panel sales propaganda.

That said, £500 doesn't buy a great deal in terms of feature count. The remote control unit is physically quite large, but only covers simple operational functions. The display is simple too - deliberately so, according to the brochure - and is assisted by LED telltales that are sited sensibly next to the pushbuttons themselves. The solid metal box feels substantial and well built, though the base and lid are a touch rattly. A real volume control for the headphone socket and variable output option adds an attractive and distinctive touch.

Based heavily on Philips technology, using that company's latest standard transport/drawer mechanism, the *Delta 70* nevertheless has its own PCB for discrete component output and filter stages, and shows evidence of care in engineering the power supplies that feed specific components. Construction is neat, tidy and to a high standard, with a reasonable sized transformer. The D/A converters are selected A-grade Philips *TDA1514s*, providing accurate 16-bit resolution with 4x oversampling.

LAB REPORT

This normal phase player showed good ringing suppression on the impulse test. Channel balance was perfect, and although separa-

tion was fairly typical in the midband, the 20kHz figure was actually 2dB better; a fine result. Total harmonic distortion was unexceptional but generally respectable, the -80dB figure of -15dB being a little high.

The -90dB resolution test signal was almost nonexistent; the best was 14dB too low, rather worse than the normal Philips *TDA1541* even though AR use an "A" designated device, and the Delta made no real attempt at recreating a sine wave here. Surprisingly, the left channel was worse than the right, the converse of the normal measured result.

Intermodulation products were sufficiently low if not among the best, but the downband products of the 20kHz tone were consistently absent. The frequency responses were identical and flat to 5kHz from whence they exhibited a tailored droop to finish 0.75dB down at 20kHz. As expected the de-emphasis and error correction circuits functioned faithfully.

Resistance to shock and vibration was considered very good indeed, mechanical noise was not a problem, and track access time was the typical Philips 3.5 seconds. The 2.2V full level output level is slightly greater than standard, from a low 125ohms source impedance. Some ultrasonic artefacts were present but these were sufficiently low not to cause problems, and measured background noise was impeccably quiet.

SOUND QUALITY

Comfortably in the very good category, the *Delta* goes a fair way towards justifying its highish pricetag with a committed and gutsy sound. Stereo showed fine depth and perspectives, and is clearly significantly improved over the earlier samples of this model. There was a hint of coarseness in the upper mid, and slight image forwardness in the extreme treble, but bass showed good

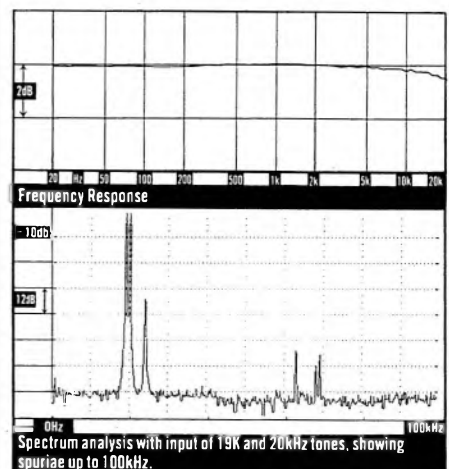
slam and extension, with very slight softening and a mildly 'wooden' character. Fine presence and dynamics accompanied a pleasingly detailed and unforced treble, while the sound as a whole is inherently open and 'airy'.

CONCLUSIONS

A&R's CD player has matured nicely since its introduction last year, and may be Recommended by virtue of sound and build quality that justifies its price, alongside a particularly neat line in presentation.

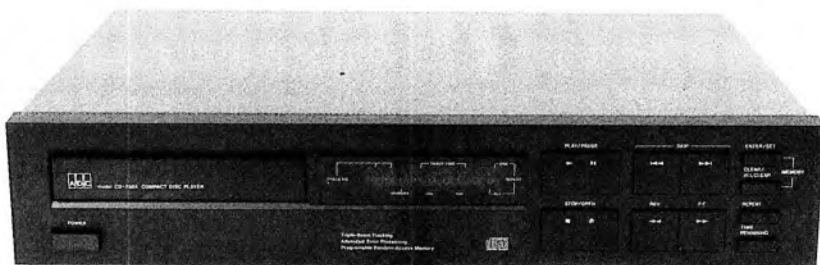
TEST RESULTS

	20Hz	1kHz	20kHz
Channel balance	0.02dB	0.01dB	0.03dB
Stereo separation	87dB	90dB	92dB
Channel phase difference	0°	0°	0°
Total harmonic dist, 0dB	-83dB	-86dB	-86dB
Total harmonic dist, -10dB	—	-82dB	—
Total harmonic dist, -60dB	—	-43dB	—
Total harmonic dist, -80dB	—	-15dB	—
Intermodulation, 19kHz/20kHz, 0dB	—	—	-81dB
Intermodulation, 19kHz/20kHz, -10dB	—	—	-82dB
Frequency response, left channel	0.01dB	0	-0.76dB
Frequency response, right channel	0.01dB	0	-0.75dB
Signal-to-noise, 20Hz-20kHz unweighted	—	—	108/109dB
Signal-to-noise, CCIR/ARM, 1kHz ref	—	—	104/105dB
Output level, 0dB, left/right	—	—	2.2V
Output impedance	—	—	125ohms
De-emphasis 1kHz, -0.37dB; 5kHz, -4.60dB; 16kHz, -9.29dB	—	—	—
Track access time	—	—	3.5 secs
Error correction capability	>900µm gap,	>800µm dot	—
Mechanical noise	—	—	low
Spuriae up to 100kHz	—	—	-87dB
Resolution at -90dB	—	—	-107.26/-104dB
Headphone socket	—	—	230ohms
Dimensions (w x d x h)	—	—	43 x 27.5 x 8.9cm
Estimated typical purchase price	—	—	£500



ADC CD-250X

SOUNDTEC MARKETING, UNIT 9, BELFONTE TRADING EST, MUCKLOW HILL, HALESOWEN, W. MIDS. B62 8DR. TEL: (021) 550 7387



The long established American cartridge manufacturer ADC have previously sourced some of their products in Japan, so it comes as no surprise that this is the origin of the CD-250X. They also market a range of sound shapers/equalisers and mixing desks, should your interests take you in that direction.

This particular player is a full sized manual model, though a 250XR remote version is available, albeit at a higher price. Built into a solid steel two piece case and utilising single board construction it has attractive, clean, square, styling. The large control pushbuttons are sized with respect to their relative importance and are easy to use. Play and pause share one button while stop and open/close another. Other functions available are the normal skip and search and the less important programme and repeat. The programme mode allows 16 tracks to be randomly accessed, and the repeat facility operates on any single track, the programmed tracks, or the entire disc.

The green display informs about the player's current status (such as open, close, focus and play), as well as the more normal track number and elapsed or remaining times. A flag indicates which repeat facility is in use. Furthermore, ADC claim that their D/A converter reduces distortion at critical frequencies to a tenth of that from conventional DACs.

LAB REPORT

Distortion measured particularly well at both full level and all the way down to -80dB. However, the down-band products of a full level 20kHz signal could have been better suppressed, and there was some clipping on a full level white noise signal. Intermodulation distortion products of the 19kHz and 20kHz tones were very low, particularly at -10dB. The frequency response showed a rise of 0.8dB at 18kHz, but was within 0.1dB

below 10kHz; the bass roll-off shown on the graph is caused by interaction with the input impedance of the measuring instrument.

Channel balance was reasonable, deviating somewhat at high frequencies. Channel separation was good up to 1kHz, but worsened as frequency increased. Output level was a little high, and the output impedance will not cause any matching problems. De-emphasis and error correction circuits worked as they should, and ultrasonic spurious were well suppressed. The signal-to-noise ratio will not win any prizes, but will not bother anyone. Low level resolution was an exceptional 15.9 bits, and the ADC produced one of the best -90dB sine waves I have encountered from any CD player. Mechanical noise was low, resistance to shock and vibration very good, but the track access time of five seconds is a little slow.

SOUND QUALITY

Liked immediately for its detailed and fairly neutral midrange and treble, the 250 lacked a little bass 'slam'. It managed to remain tuneful with some 'air' and 'sparkle' throughout most of the band. Further listening revealed good treble clarity; open and lively, if not a bit bright at times, it was not harsh or fatiguing.

Dynamics were quite good, but on some material the midrange could sound slightly 'thin', noticeably on trumpet, though well liked on stringed instruments such as violin. The bass was a little softened but had good extension, while the soundstage was well presented with good width, average depth and reasonable imaging.

CONCLUSIONS

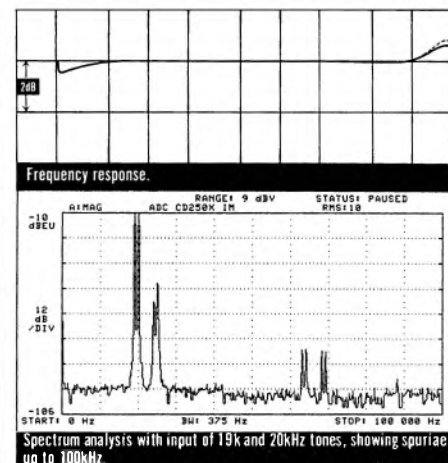
The very fine lab performance tends to support ADCs' claim that they are using special DAC chips. If they could uprate to 4X oversampling and dispense with some of the out-

put filtering, they would probably have an exceptional player on their hands, but I suspect that there are some good reasons for not following this path. As it stands, the 250X is good technically, fair sonically, easy to use, and quite well made.

TEST RESULTS

	20Hz	1kHz	20kHz
Channel balance	0.16dB	0.12dB	0.29dB
Stereo separation	111dB	95dB	68dB
Channel phase difference	0°	5°	77°
Total harmonic dist, 0dB	-95dB	-97dB	-76dB
Total harmonic dist, -10dB	—	-82dB	—
Total harmonic dist, -60dB	—	-42dB	—
Total harmonic dist, -80dB	—	-27dB	—
Intermodulation, 19kHz/20kHz, 0dB			-94dB
Intermodulation, 19kHz/20kHz, -10dB			-98dB
Frequency response, left channel	0.1dB	0	0.36dB
Frequency response, right channel	0.1dB	0	0.23dB
Signal-to-noise, 20Hz-20kHz unweighted			95/99dB
Signal-to-noise, CCIR/ARM, 1kHz ref			90/94dB
Output level, 0dB, left/right			2.19V
Output impedance			670ohms
De-emphasis 1kHz, -0.23dB; 5kHz, -4.17dB; 16kHz, -8.6dB			
Track access time			5 secs
Error correction capability	>900µm gap, >800µm dot		
Mechanical noise			low
Spuriae up to 100kHz			-95dB
Resolution at -90dB			-90.6dB
Headphone socket			no
Dimensions (w x d x h)			43 x 31 x 8.6cms
Estimated typical purchase price			£230

Reassessed and reprinted from issue No. 53.



AIWA CD001

AIWA (UK) LTD., UNIT 2, DUKES ESTATE, WESTERN AVENUE, LONDON W3 0SY. TEL: (01) 993 1672.



Aiwa has been owned by Sony for a number of years, but has nevertheless been allowed to develop its entirely separate identity. Its major strength is in cassette decks which dominate the budget price sector in particular, but the company is also active in midi systems, personal stereos, and of course CD players. Current plans involve moving further into more upmarket hi-fi separates.

This nicely styled full width 'middleweight' has a sensible fascia layout that separates major and minor operating buttons without recourse to hinged flaps or whatever. The main controls take their usual place on the right hand side, falling neatly to the hand of the dextrous 80 per cent of the population. A central area of the fascia – just about the size of a cassette loading tray, which is no coincidence I am sure – consists of a separate panel with the comprehensive display, direct track entry buttons, plus all the others whose legends puzzle even the initiated: auto pause, blank, time, repeat, check, memory, delete – in short the Uncle Tom Cobleys.

Remote control comes with the price territory of course, and the '001 handset provides ten direct track entry buttons (mirroring those on the fascia), plus remote control over the variable output sockets. There's also an extra pair of audio in/outputs, allowing direct connection to a tape recorder – for maximum recording quality the manual admits disingenuously.

Sitting on real feet, the '001 uses a copper plated steel chassis, alloy front panel and damped U-section steel cover. The high quality linear tracking disc drive has a decoupled steel subchassis, with plastic loading drawer and damped disc clamp. The analogue and digital circuitry are effectively on separate high quality printed circuit boards, using good quality components throughout, though the internal wiring and complex board interconnections look a little untidy.

LAB REPORT

The CD001 delivered a respectable enough lab performance, though there are mild weaknesses nonetheless. The frequency responses show a 0.2dB high frequency dip which is a characteristic of Japan-sourced Aiwas. And although the high frequency inter-channel phase difference is modest enough, one might have expected double DACs to eliminate this at these prices. The channel imbalance of around 0.15dB is a mild criticism too, though stereo separation is fine, harmonic distortion low. Intermodulation products might have been lower at the full 0dB signal level, though still give no cause for concern.

Output level is sufficiently above the CD standard to risk fooling the ear in A/B comparisons, while the source impedance is a highish 1kohm. Signal-to-noise ratios are pretty good, de-emphasis is accurate, and error correction worked properly. But the machine could have been mechanically quieter and track access was fairly leisurely. Ultrasonic spurious were very well suppressed, but the -90dB tone was reproduced at nearer 85dB, so low level linearity also leaves room for improvement.

SOUND QUALITY

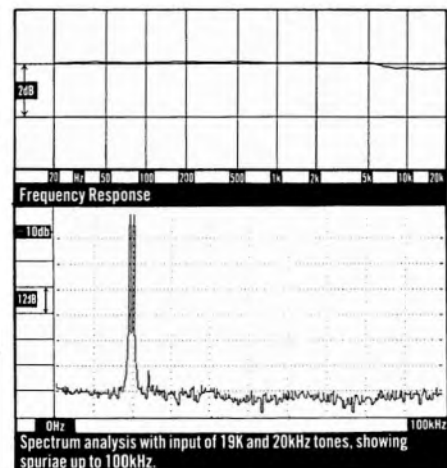
This mid-priced player scored a solid good rating on overall sound quality, which suggests respectable enough value for money. Punchy and well detailed with articulate vocal presentation, bass was a touch light, though clear and quick in qualitative terms. Stereo imaging lacked full depth resolution but was nevertheless well ordered and convincing within its limitations. The treble was slightly forward and over-explicit, though not in an untidy sense, and there was mild defocusing of central images. But the sound as a whole held nicely together.

CONCLUSIONS

The CD-001 came pretty close to Recommendation, delivering a respectable sound quality and lab performance from an ergonomically attractive package. But ultimately it failed to excel in any particular respect in relation to a near average price.

TEST RESULTS

	20Hz	1kHz	20kHz
Channel balance	0.14dB	0.15dB	0.10dB
Stereo separation	91dB	92dB	80dB
Channel phase difference	0°	1°	20°
Total harmonic dist, 0dB	-85dB	-87dB	-87dB
Total harmonic dist, -10dB	—	-76dB	—
Total harmonic dist, -60dB	—	-37.5dB	—
Total harmonic dist, -80dB	—	-17dB	—
Intermodulation, 19kHz/20kHz, 0dB			-82dB
Intermodulation, 19kHz/20kHz, -10dB			-94dB
Frequency response, left channel	0.01dB	0	-0.28dB
Frequency response, right channel	0.01dB	0	-0.24dB
Signal-to-noise, 20Hz-20kHz unweighted			164/108dB
Signal-to-noise, CCI1/ARM, 1kHz ref			98/102dB
Output level, 0dB, left/right			2.244V
Output impedance			1kohms
De-emphasis 1kHz, -0.37dB; 5kHz, -4.57dB; 16kHz, -9.06dB			
Track access time			5 secs
Error correction capability			>900µm gap, >800µm dot
Mechanical noise			average
Spurious up to 100kHz			-104dB
Resolution at -90dB			-84.2/-85.6dB
Headphone socket			56ohms
Dimensions (w x d x h)			43 x 30.5 x 8.9cm
Estimated typical purchase price			£349



AKAI CD93

AKAI (UK) LTD., UNIT 12, HASLEMERE HEATHROW ESTATE, SILVER JUBILEE WAY, HOUNSLOW, MIDDLESEX. TEL: (01) 897 6388.



Akai is a specialist hi-fi company traditionally known for its open reel and cassette tape recorders, but also active in other areas, notably systems and CD players. A marketing decision to move downmarket in the early 'eighties was not too successful, so the company is returning to its specialist roots by getting back into top quality separates. The launch of the £700 CD93 is a major early salvo in this campaign.

Struggling to extract the unit from its packaging, one mistakenly assumes that Akai have sent a power amplifier by mistake. So solid and chunky is the overall build, prospective purchasers should make sure their supporting furniture can handle the weight. The panels all feel substantial and well damped – the base being particularly 'dead' – and the large feet do appear to be a little more than just decorative.

Appearance is classy too, enhanced by (removable) black lacquer-finish end cheeks and discrete front panel graphics. The control layout is unconventional but logical nonetheless, and the display elaborate and informative. The keypad remote handset is pretty complicated too, though it doesn't provide volume adjustment.

The luxury presentation extends under the glossy exterior, with extensive use of die-castings for both the base and the substantial, smooth-acting disc drive, which incorporates a large metal/plastic composite disc damper. Separate transformers supply power to the analogue and digital circuitry on physically separated boards, the former using a discrete component output amplifier, the latter optical coupling before the D/A conversion. A number of selected European capacitors are used to improve subjective performance, but internal layout was a little messy, suggesting some post-production modifications – something which will presumably settle down as production gets under way.

LAB REPORT

Basically flat and smooth, the response does show a mild rise at very high frequencies. Channel balance is exceptionally good, but stereo separation falls somewhat short of the best. There is no high frequency inter-channel phase shift, confirming the separate DACs. Harmonic distortion is competent enough, though with some variation between the channels at low level, while intermodulation products are generally very low – the spectrogram is particularly clean – though the 0dB downband product could have been better.

Output level is accurate and source impedance low. Noise figures are all low, and the machine is mechanically quiet. De-emphasis is accurate, errors were corrected without problems, and ultrasonic spurs were well suppressed. The low level (–90dB) tone was not read too accurately, however, one channel showing a resolution error of nearly 18dB. Taken as a whole these are very competent lab results, though not perhaps the exceptional performance that might have been expected from such an elaborately crafted machine.

SOUND QUALITY

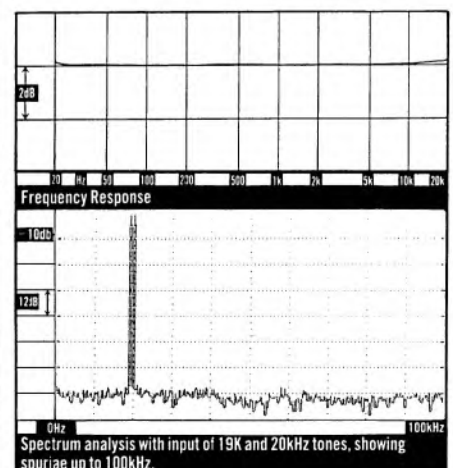
Happily this expensive player also delivered a very good overall sound quality, sufficient to justify its pretensions and elaborations. It sounded strong and authoritative and was essentially articulate with good 'drive' and well defined bass. The midband was sweet and well focused – forceful yet not exaggerated. Treble lost a little 'air' but was pleasantly relaxed with very little audible distortion. Detail resolution, dynamics and stereo depth were all highly regarded, though the image was a trifle 'narrowed'. Focus and differentiation in the stereo soundstage was particularly liked.

CONCLUSIONS

This is undoubtedly a CD player with real class, in terms of build, presentation, lab performance and sound quality. But it is also expensive, and in our view a shade too expensive for formal Recommendation, though that's not to dissuade lovers of black lacquer wood finish.

TEST RESULTS

	20Hz	1kHz	20kHz
Channel balance	0.01dB	0.01dB	0.0dB
Stereo separation	95dB	93dB	72dB
Channel phase difference	0°	0°	0°
Total harmonic dist, 0dB	–90dB	–91dB	–88dB
Total harmonic dist, –10dB	—	–85dB	—
Total harmonic dist, –60dB	—	–37/45dB	—
Total harmonic dist, –80dB	—	–13/23dB	—
Intermodulation, 19kHz/20kHz, 0dB			–87dB
Intermodulation, 19kHz/20kHz, –10dB			–100dB
Frequency response, left channel	0.10dB	0	–0.34dB
Frequency response, right channel	0.10dB	0	–0.34dB
Signal-to-noise, 20Hz–20kHz unweighted			101/103dB
Signal-to-noise, CCIR/ARM, 1kHz ref			98/102dB
Output level, 0dB, left/right			2.1V
Output impedance			280ohms
De-emphasis 1kHz, –0.37dB, 5kHz, –4.57dB, 16kHz, –9.10dB			
Track access time			3 secs
Error correction capability		>900µm gap, >800µm dot	
Mechanical noise			low
Spuriae up to 100kHz			–106dB
Resolution at –90dB			–107.8/–94.4dB
Headphone socket			75ohms
Dimensions (w x d x h)			45 x 34.5 x 11.2cm
Estimated typical purchase price			£700



CAMBRIDGE CD2

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

RECOMMENDED



Though Cambridge Audio (in their current incarnation) are a comparatively new and small British company, designer Stan Curtis has shown considerable ingenuity and imagination in advancing CD player technology ahead of the multinationals. The expensive two-box *CD1*, for example, used six 14-bit DACs to achieve a theoretical 20-bit resolution with oversampling, and the about-to-be-launched *CD1 Series 2* claims 32-bit with 16x oversampling.

Even the rather more humble £600 *CD2*, subject of this review, beats allcomers in the numbers game with its 16-bit, 16x oversampling – said information thankfully representing the sum total of front panel propaganda. It is a simple enough player, with nice graphics and neat square buttons that look attractive but are physically indistinguishable from one another. The layout of controls is unconventional (though by no means illogical), so operation is not intuitively obvious. Furthermore, the track selection system requires a touch of patience, over-rapid input causing rejection. The display consists of two fairly small 4 digit readouts, plus four telltales, while all the normal operational modes are available, and duplicated on the remote handset.

Construction is sturdy though undamped, with alloy front and back, steel top and bottom and plastic at the sides. The interior layout is neat and tidy, with ribbon cabling between the several boards. Though Cambridge use many Philips components, such as their latest disc drive and DACs, all the printed circuit boards are Cambridge's own, as is their unique 16x oversampling application of four *TDA1541* DACs. The analogue and digital circuitry are kept on separate boards, the power supply has a substantial transformer, and decent quality components are used, with polystyrene and polycarbonate capacitors in critical locations.

LAB REPORT

The frequency response shows the familiar slight high frequency 'wobble' characteristic of the latest Philips chips, plus a very slight rolloff at the frequency extremes. Channel balance is very close, and stereo separation pretty good, though reducing somewhat at high frequencies. Harmonic distortion measures well enough, but intermodulation distortion is comparatively poor in-band, while the spectrogram shows a certain amount of ultrasonic activity besides.

Output level is significantly above the CD standard, so some compensation will need to be made to avoid misleading results if comparing this player with rivals. Signal-to-noise ratios are very good, de-emphasis is accurate, error correction works fine, but ultrasonic spurs could have been better suppressed. Mechanical noise is very low, shock and vibration immunity excellent, and track access speed about average. As is so often the case with Philips-based machines, the –90dB resolution is rather weak, in this case nearly 18dB out on the right channel.

SOUND QUALITY

Given the remarkable reference setting performance still being established by the original *CD1*, we perhaps inevitably hoped the *CD2* would match its performance at a third of the price. This regrettably proved unrealised, though this mid-price Cambridge contender nevertheless delivers a very good all round sound quality.

The midrange in fact sounds truly exceptional – in this respect delivering a new standard for naturalness and neutrality that beats allcomers, big brother included. The treble was very nearly as good, with delicate detailing and virtually no 'grain'. But there was also criticism of a 'softness' on transients, of stereo focus and depth that fell

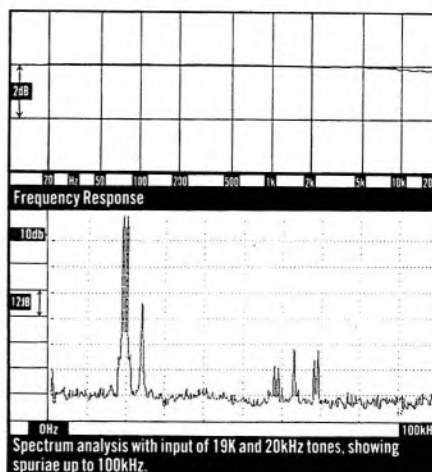
short of the best, and of a slightly 'spongy' bass quality, lacking speed and 'slam', which held the overall rating back a little.

CONCLUSIONS

The finest midrange in digital audio is sufficient grounds for Recommendation, though there remains a tinge of disappointment that the *CD2* didn't get closer to big brother elsewhere, notably in the bass.

TEST RESULTS

	20Hz	1kHz	20kHz
Channel balance	0.04dB	0.04dB	0.04dB
Stereo separation	114dB	99dB	70dB
Channel phase difference	0°	0°	0°
Total harmonic dist, 0dB	–93dB	–89dB	–80dB
Total harmonic dist, –10dB	—	–80dB	—
Total harmonic dist, –60dB	—	–44dB	—
Total harmonic dist, –80dB	—	–17/14dB	—
Intermodulation, 19kHz/20kHz, 0dB			–65dB
Intermodulation, 19kHz/20kHz, –10dB			–69dB
Frequency response, left channel	0dB	0	–0.31dB
Frequency response, right channel	0dB	0	–0.32dB
Signal-to-noise, 20Hz-20kHz unweighted			101/102dB
Signal-to-noise, CCIR/ARM, 1kHz ref			111/112dB
Output level, 0dB, left/right			2.53V
Output impedance			515ohms
De-emphasis 1kHz, –0.34dB; 5kHz, –4.37dB; 16kHz, –9.12dB			
Track access time			3.5 secs
Error correction capability		>900µm gap, >800µm dot	
Mechanical noise			very low
Spuriae up to 100kHz			–86dB
Resolution at –90dB			–95.76/–107.12dB
Headphone socket			n/a
Dimensions (w x d x h)			44 x 27.5 x 8.3cm
Estimated typical purchase price			£599



Would you like a permanent 25% discount off all Compact Discs* from now on?

Our efficient discount mail order disc service is at your disposal. Full written details on how the service operates are available on request. As soon as you purchase a new or slightly used compact disc player from us you immediately become a lifetime member of the Subjective Audio **CD discount club**. Eligibility to this club is by purchasing any of the following machines:-

Accuphase
California Audio Labs Tempest
Kinegetics - KCD/30
Marantz - CD/94
Meridian - 207
Micro - seki CD/M2
Nakamichi - Any model
Revox - B/226 MK2
S.A.E. - D/102
Shure - CD/6000
Stax

We have all of these magnificent machines available for demonstration along with a selection of slightly used models, (including the legendary Meridian MCD/Pro). Don't forget that the average CD owner purchases at least 40 discs a year and once you are a member of this exclusive club you're getting **25% off every disc ***

* Subject to availability

Contact us for full details – Today!

All major credit cards accepted.
Worldwide Export facilities.
24hr answering machine



SUBJECTIVE AUDIO LTD
12 Park Avenue, Palmers Green,
London N13 5PF, England.

Tel: (01) 882 4975
(01) 886 2650

Demonstrations by appointment only.
Tuesday to Friday 10am until late
Saturday 9am until 5pm

dbx DX5

SOUNDTEC MARKETING, UNIT 9, BELFONTRADING EST., MUCKLOW HILL, HALESOWEN, W. MIDS B62 8DR. TEL: (021) 550 7387.



Self-consciously lower case, dbx are an East Coast US pro-audio company, specialising in noise reduction and similar signal processing devices that are popular in recording studios.

For once the legends that festoon the front panel have rather more purpose than merely duplicating publicity handouts. "Digital Audio Impact Recovery", "Variable Over Easy Compression" and "Ambience Control" all have an enticingly saucy ring to them, and are clearly explained in an unusually good manual: their effects are discussed later. For the rest, the casework is metal and the lid a bit rattly, though the soft feet do offer some vibration decoupling. Despite the complexity, the ergonomics are well thought out and the control knobs and buttons have a reassuringly solid 'pro' feel. The comprehensive remote control handset is also nicely laid out, covering volume, track entry and switching the processors in and out. The display is a little small, though backed with a number of telltales and LED bargraphs relating to the processing.

The steel case is undamped, while the plastic disc drive has a decoupled steel sub-chassis and disc clamp damped with foam. A single transformer feeds separate supplies for the two main boards, the bottom one being fairly standard CD player stuff, the upper one providing the extensive analogue processing that is a feature of this player. Construction and wiring is very neat and tidy with ribbon cable for board interconnection, though there is no evidence of audiophile-oriented componentry. The oversampling digital/analogue conversion uses two Burr Brown PCM56Ps.

LAB REPORT

Frequency response measures very flat, with the merest trace of a ripple at high frequencies. Stereo separation is pretty good too, if reducing somewhat at high frequencies, but

channel balance on our sample showed a 0.4dB discrepancy – this was at least consistent with frequency, but will probably require permanent correction with the amplifier balance control. Harmonic distortion is fine, while IM distortion is also pretty low, albeit with some stress indicated on one channel at full level.

Output closely follows the CD standard, from a sensibly low source impedance. Signal-to-noise ratios are respectable enough, and de-emphasis is accurately specified. Accessing tracks took a little longer than some, but error correction was fine and mechanical noise low. Ultrasonic spurious were very well suppressed, but a –90dB signal was reproduced at nearer –98dB, showing some limitation in low level resolution.

SOUND QUALITY

Even with the various elaborate processing capabilities of this machine out of circuit, this dbx player only rated poor, while the various additions obscured the musical qualities that might have been on offer still further – even though they may have some usefulness in preparing tape dubs for in-car and suchlike applications. The treble was forward and brittle-sounding, the midrange possessed a mild 'honky' coloration while the bass was 'softened' verging on 'boomy', with poor extension. Focus seemed level dependent, dynamics were muted and depth only adequate. The overall sound had a 'sharpness' that could be mistaken for extra detail, but which sounds rather electronic and processed by today's standards.

The effects of the processors were unfortunately all too obvious. The ambience enhancement falsifies the soundfield decay, bringing up the rear wall too close and compressing depth, while the unlimiting adds a 'zing' and brilliance to transient edges that was again considered unnecessary and alien

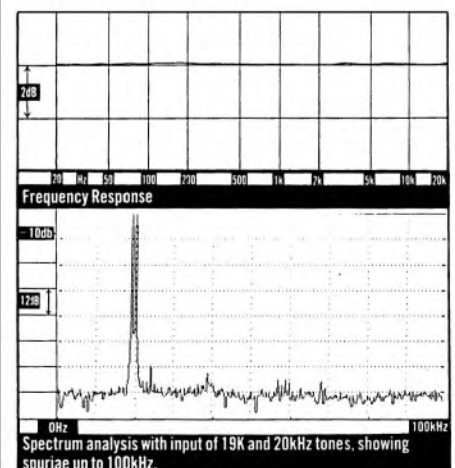
to fidelity. To the purist listener, this player proved something of an affront.

CONCLUSIONS

Assessed as a direct competitor to other standalone CD players, the DX5 is a signal disappointment. Although it looks suspiciously like a throwback to the days when graphic equalisers and quadraphonic matrix decoders stalked the earth, before extinction in a deluge of improved sound quality sources, this dbx is refreshingly unique in providing semi-pro post-production facilities that some users will undoubtedly relish.

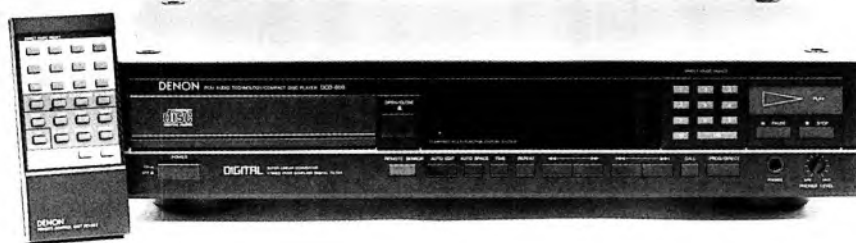
TEST RESULTS

	20Hz	1kHz	20kHz
Channel balance	0.38dB	0.41dB	0.34dB
Stereo separation	105dB	100dB	71dB
Channel phase difference	0°	0°	0°
Total harmonic dist, 0dB	–92dB	–89dB	–86dB
Total harmonic dist, –10dB	—	–82dB	—
Total harmonic dist, –60dB	—	–38dB	—
Total harmonic dist, –80dB	—	–14.5dB	—
Intermodulation, 19kHz/20kHz, 0dB			–99/85dB
Intermodulation, 19kHz/20kHz, –10dB			–102dB
Frequency response:			
left channel	0.02dB	0	–0.01dB
right channel	0.03dB	0	–0.06dB
Signal-to-noise, 20Hz-20kHz unweighted			104/106dB
Signal-to-noise, CCIR/ARM, 1kHz ref			97/98dB
Output level, 0dB, left/right			1.99V
Output impedance			320ohms
De-emphasis	1kHz, –0.33dB; 5kHz, –4.4dB; 16kHz, –9.3dB		
Track access time			3.5 secs
Error correction capability			>900µm gap, >800µm dot
Mechanical noise			low
Spuriae up to 100kHz			–102dB
Resolution at –90dB			–98.24/–98.49dB
Headphone socket			120ohms
Dimensions (w x d x h)			48.4 x 31 x 9.5cm
Estimated typical purchase price			£640



DENON DCD800

HAYDEN LABORATORIES, HAYDEN HOUSE, CHILTERN HILL, CHALFONT ST PETER, BUCKS. TEL: (0753) 888447.



Almost unknown in the UK a decade ago, Denon have profited by filling the niche for good quality, reliable hi-fi separates that was created when some of the larger Japanese multinationals turned their attention towards videorecorders and midi systems. Meanwhile the brand goes from strength to strength, its success founded on a fine range of cassette decks but bolstered by competitive amplifiers, tuners, and most important CD players.

Their leading contender for the important mid price market, the £300 *DCD800* is a full size middleweight, incorporating full feature remote control including volume adjustment. Ergonomics are nice and simple, with discrete gold and white graphics, yet the front panel still manages to incorporate a keypad for direct track entry, plus a large and comprehensive display. Finish and build are both good, albeit based on petroleum rather than ferrous ores: largely cosmetic feet might help to provide some environmental isolation for a basically plastic chassis and case (ribbed for added rigidity) and a not too rattly metal base and top.

Their normally good taste does not extend to removing unnecessary front panel propaganda: "super linear converter, 4x oversampling digital filter" is surely enough; adding "PCM audio technology" and "computed multifunction display system" gets a bit tedious. In fact the latter is very comprehensive and informative, with a 20-track menu, though the main digits are on the small side for easy remote control operation. Extensive facilities glory under such pet names as auto edit, auto space, time, repeat, call, prog/direct, all of which presumably have their place in the cosmic scheme of things. Variable and fixed outputs are available, but no digital bitstream socket for possible future upgrades.

Inside, the plastic disc drive mechanism

sits on a decoupled pressed steel subchassis. The single PCB is neatly laid out, using a Sony digital filter, normal commercial grade components and a simple power supply. The Burr Brown *PCM56P* converter is run at 4x oversampling speed and time-shared between channels, with sample and hold circuitry to avoid high frequency phase shifting.

LAB REPORT

The frequency responses are pretty flat, showing a mild droop and ripple over the final two treble octaves. The sample/hold system is effective in preventing HF phase shifts between channels. Channel balance is quite close, and stereo separation good enough, though well behind the *1500II*. Harmonic and intermodulation distortions are both respectable enough, though the IM spectrogram does show some 25kHz beat activity.

Output matches the standard well, from a highish 1.1kohms source impedance. Signal-to-noise ratios are pretty good, and ultrasonics adequately suppressed. Mechanically very quiet, and showing good immunity from shock and vibration, track selection speed was average, and error correction effective. De-emphasis could have been more accurate, and the low level resolution is 8.9dB out on both channels. Even so, this is a sound enough overall technical performance.

SOUND QUALITY

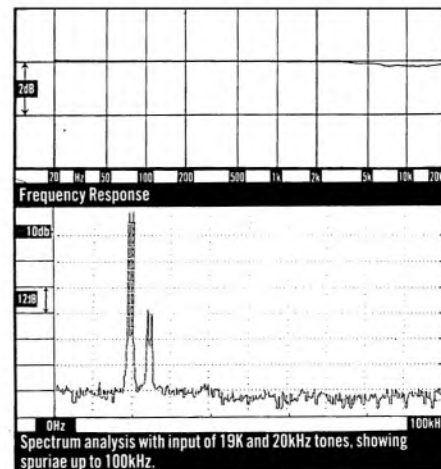
On the borderline between good and fair, the sound was characteristically Denon, with decent definition and dynamics creating a pleasantly 'snappy' delivery. Bass performance was articulate, creating a convincing melodic foundation, while the midrange sounded rich and pleasant, with attractive string tone. The treble was essentially tidy and unforced, while the stereo image was generally convincing, if not particularly exceptional in presentation.

CONCLUSIONS

Taking into account the generally good subjective and objective performance, a comprehensive range of remote controllable facilities plus Denon's good reputation for build quality and field reliability, the *DCD800* just manages Recommendation.

TEST RESULTS

	20Hz	1kHz	20kHz
Channel balance	0.1dB	0.11dB	0.1dB
Stereo separation	85dB	89dB	75dB
Channel phase difference	0°	0°	4°
Total harmonic dist, 0dB	-91dB	-90dB	-86.5dB
Total harmonic dist, -10dB	—	-82dB	—
Total harmonic dist, -60dB	—	-35dB	—
Total harmonic dist, -80dB	—	-15.5dB	—
Intermodulation, 19kHz/20kHz, 0dB	—	—	-88dB
Intermodulation, 19kHz/20kHz, -10dB	—	—	-93dB
Frequency response,			
left channel	0.09dB	0	-0.02dB
Frequency response,			
right channel	0.08dB	0	-0.0dB
Signal-to-noise, 20Hz-20kHz unweighted			96/100dB
Signal-to-noise, CCIR/ARM, 1kHz ref			91/95dB
Output level, 0dB, left/right			2.013V
Output impedance			1.1kohms
De-emphasis 1kHz, -0.20dB; 5kHz, -3.89dB; 16kHz, -8.91dB			
Track access time			3 secs
Error correction capability		>900µm gap, >800µm dot	
Mechanical noise			very low
Spuriae up to 100kHz			-90dB
Resolution at -90dB			-81.90/-81.52dB
Headphone socket			100ohms
Dimensions (w x d x h)			43.4 x 31.5 x 9.7cm
Estimated typical purchase price			£300



DENON DCD-1500II

HAYDEN LABORATORIES, HAYDEN HOUSE, CHILTERN HILL, CHALFONT ST PETER, BUCKS. TEL: (0753) 888447.

RECOMMENDED



After many years of desultory representation in Britain, Japanese audio specialist Denon is hitting the jackpot, together with UK distributor Hayden Labs, thanks to a range of fine cassette decks backed by other good quality electronics including CD players. Timing could not have been better, as several bigger and less specialist manufacturers turned their attention towards microwave ovens and midi systems in the mid-eighties. Marketing presented some attractive dealer incentives, while the product range itself provides unusual coherence and consistency alongside traditionally good reliability.

Clearly a luxury model in presentation, it's built like a tank, using well damped metal for top, sides and base, along with a high quality extruded front panel, the whole package weighing in at two and a bit '800s and sitting on proper feet that should afford some environmental isolation.

Clearly aimed at the more discerning linguaphile, an instruction manual in Svenska, Italiano, and Espanol (as distinct from the more prosaic English, Deutsche, Francais of the more humdrum '800) was a particularly challenging innovation - knowing the UK hi-fi trade, I don't really see this idea catching on. That aside, ergonomics are pretty good, if decorated with propaganda. The main control keypad is neater and better integrated, the same (comprehensive) display is used, and there are a few extra buttons along the front: to auto edit, auto space, time, call and prog/direct, add three varieties of repeat plus index and clear. The back panel provides optical or electrical digital outputs, switched from the front panel.

It has a basically plastic chassis with damped steel panels. The plastic drive mechanism with damped disc clamp sits on a pressed steel subchassis. 16-bit and 4x oversampling, digital conversion is handled by a pair of Burr Brown *PCM56Ps*, feeding an

NE5532 output filter with linear crystal windings. The single board layout and wiring is neat, with normal commercial grade componentry throughout. A sizeable transformer supplies power, but internal mains are not shrouded and on our sample a dry joint was found at the neutral/PCB junction.

LAB REPORT

The frequency responses are pretty flat, while showing a slightly rising LF trend and mild ripple over the final two octaves of treble. Channel balance is very close, and stereo separation very good indeed, with no inter-channel phase shift. Harmonic and intermodulation distortions are all well controlled, though the IM spectrogram does show some 25kHz beat products.

Output matches the standard well, from a reasonable 580ohms source impedance. Signal-to-noise ratios are pretty good, while the spectrogram shows only a couple of visible spikes above a very low noise floor. Mechanically very quiet with good rejection of external shock and vibration, track selection speed is only just better than average - shaving a half second (less than 20%) from the '800s performance on our test hardly seems to warrant making a fuss about high speed access on the drawer mechanism. Error correction is effective, de-emphasis accurate enough, but the low level resolution could have been closer - a 5dB error at -90dB is rather larger than one might expect at this price level. However, taken overall this is a good technical performance which exceeds that of the '800 in every respect.

SOUND QUALITY

This quite expensive Denon managed to justify its price with a very good overall rating for sound quality, sounding nicely transparent throughout, with good stereo staging

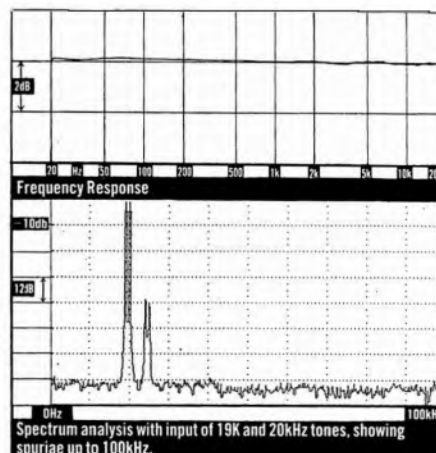
and precision. The bass was full and articulate, albeit a touch 'softened', the midband sounded a touch 'grainy' and 'electronic' but was informative, nicely detailed and well balanced. The treble sounded lively and open with delicate detailing.

CONCLUSIONS

Sounding significantly better than its stablemate, the *1500II* clearly justifies its elaborate construction. Close attention to detail has resulted in a fine lab performance besides, and the range of features is comprehensive, yet nicely presented. Recommendation is obviously appropriate.

TEST RESULTS

	20Hz	1kHz	20kHz
Channel balance	0.05dB	0.04dB	0dB
Stereo separation	118dB	119dB	93dB
Channel phase difference	0°	0°	0°
Total harmonic dist, 0dB	-90dB	-86dB	-87dB
Total harmonic dist, -10dB	—	-82dB	—
Total harmonic dist, -60dB	—	-37dB	—
Total harmonic dist, -80dB	—	-17dB	—
Intermodulation, 19kHz/20kHz, 0dB	—	—	-99dB
Intermodulation, 19kHz/20kHz, -10dB	—	—	-102dB
Frequency response, left channel	0.13dB	0	-0.01dB
Frequency response, right channel	0.13dB	0	-0.04dB
Signal-to-noise, 20Hz-20kHz unweighted	—	—	99/100dB
Signal-to-noise, CCIR/ARM, 1kHz ref	—	—	97/100dB
Output level, 0dB, left/right	—	—	2.154V
Output impedance	—	—	580ohms
De-emphasis 1kHz, -0.27dB; 5kHz, -4.48dB; 16kHz, -8.95dB	—	—	—
Track access time	—	—	2.5 secs
Error correction capability	>900µm gap, >800µm dot	—	—
Mechanical noise	—	—	very low
Spuriae up to 100kHz	—	—	-85dB
Resolution at -90dB	—	—	-84.3/-85.5dB
Headphone socket	—	—	100ohms
Dimensions (w x d x h)	—	—	43.4 x 33 x 10.2cm
Estimated typical purchase price	—	—	£500



DENON DCD 1700

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



Denon grade their machines carefully, ringing the changes from a comparatively small but high quality range of options. The 1700 therefore inherits the more elaborate display with three numeric displays and disc calendar, and adds extra build quality, component tolerancing and under the skin engineering features – special dual DACs and construction to immunise against vibration etc.

The standard of finish and presentation matches the high price. But despite the complexity ergonomics remain good and the machine is still easy to drive, assisted by full remote control operation. The main drive controls are nicely grouped, with skip and scan beneath play and beside stop, while the subsidiary functions run along beneath a direct entry keypad that assists quick pre-programming. The usual display and memory functions are supplemented by 'time search' and 'auto space' (neither of vital significance, frankly). The headphone socket and a set of line output sockets have a shared front panel volume control, and an additional switch provides direct digital output through an additional single coaxial phono socket.

LAB REPORT

The 1700 uses advanced dual 16-bit high precision DACs, with compensation circuit for 'zero cross' distortion, plus oversampling and both digital and analogue filtering. The frequency response shows a family similarity to the 1500 model introduced in 1986 – essentially flat but with a very mild downtilt from bass to treble – while the dual DACs ensure close phase correspondence between channels. Channel separation is very good, albeit deteriorating somewhat at high frequencies.

Harmonic distortion measured particularly well at low levels, and intermodulation was likewise very good – the spectrogram showing virtually no unwanted components in or out of band up to 100kHz.

Mechanically quiet and with good shock and vibration rejection, Denon's top models now have linear motor optics drive, giving a fast track access time of 2 seconds. Error correction and tracking tests gave no problems. Unlike cheaper Denon models the 0dB white noise test was unclipped, and signal-to-noise ratios were impeccable. Ultrasonic spurious were well suppressed, and a good figure of around 15.6 bits was recorded for low level linearity.

SOUND QUALITY

Getting into the very good class does much to justify the highish price of this player, not to mention the elaborate technology and engineering. Dynamics were particularly striking, while the treble was exceptionally clear if a touch 'clinical'. The midband was a touch 'lean' tonally, but with fine resolution, while the bass was very good, giving a sense of scale and power. The stereo image showed fine width and focus, and the sound overall was strong and coherent, approaching reference standards, with just very slight muddling on loud complex sections.

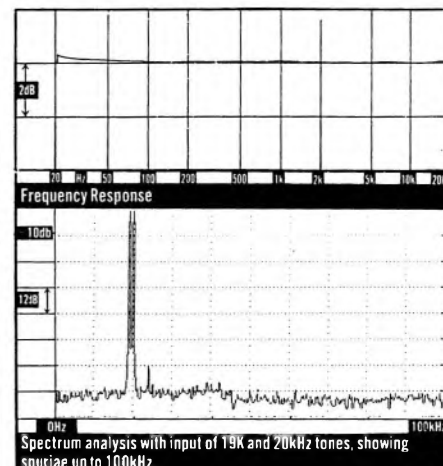
CONCLUSIONS

The DCD 1700 is a very impressive CD player in every respect. The presentation and engineering are both to the highest standards, with evidence of careful quality control, and the sound quality is fully competitive. Clearly recommendation is entirely appropriate.

TEST RESULTS

	20Hz	1kHz	20kHz
Channel balance	0.02dB	0.01dB	0.03dB
Stereo separation	109dB	115dB	76dB
Channel phase difference	0°	0°	0°
Total harmonic dist, 0dB	-99dB	-94dB	-84dB
Total harmonic dist, -10dB	—	-81dB	—
Total harmonic dist, -60dB	—	-40.4dB	—
Total harmonic dist, -80dB	—	32dB	—
Intermodulation, 19kHz/20kHz, 0dB	—	—	-85dB
Intermodulation, 19kHz/20kHz, -10dB	—	—	-98dB
Frequency response,			
left channel	0.32dB	0	-0.03dB
right channel	0.32dB	0	-0.03dB
Signal-to-noise, 20Hz-20kHz unweighted			104/108dB
Signal-to-noise, CCIR/ARM, 1kHz ref			99/103dB
Output level, 0dB, left/right			2,10V
Output impedance			150ohms
De-emphasis 1kHz, -0.15dB; 5kHz, -4.09dB; 16kHz, -8.89dB			
Track access time			2.0 secs
Error correction capability			>900µm gap, >800µm dot
Mechanical noise			very low
Spurious up to 100kHz			-104dB
Resolution at -90dB			-87/-87.7dB
Headphone socket			yes (variable output) 1ohm
Dimensions (w x d x h)			43.3 x 35 x 10.5cm
Estimated typical purchase price			£650

Reassessed and reprinted from issue No. 51.



HITACHI DA-7000

HITACHI SALES (UK) LTD, HITACHI HOUSE, STATION RD, HAYES, MIDDX UB3 4DR. TEL: 01-848 8787

RECOMMENDED



The hi-fi division of Hitachi produce everything from semiconductors and wire to complete sound systems, and although one of the first to launch a compact disc player, they seem to have kept a fairly low profile of late. This particular player is at the bottom end of our price group; although not the cheapest available, it is one of the cheapest we have tested. Made in Taiwan, this is a simple device without remote control, but retains both memory and repeat facilities as well as the basics.

Apart from the transport open/close button which is sited by the drawer, all the other controls are situated at the opposite, right hand end, of the player. Ergonomic in use, the buttons are sized in order of their importance, with the larger play/pause and stop buttons above skip and search.

A little austere with its satin black finish, dull gold lettering, and red LED display, it is attractively understated. Construction is neat and tidy, with the boards and mechanism contained within a reasonably substantial steel case. The loading drawer also performed very smoothly and quietly. One facility I did miss was the ability to time tracks and get a running display of playing time and time remaining, which I have always found useful.

LAB REPORT

Like most of the earlier CD players, this uses a linear 16-bit shared D/A converter. This results in a 90° phase shift at high frequencies, and the impulse test showed the expected ringing due to the output filtering required with this type of converter.

Channel separation was adequate, falling slightly at 20kHz, while channel balance was unexceptionally within 0.5dB until high frequencies were reached. The frequency response differed slightly between the channels, there was a rise of 0.4dB at high fre-

quencies, and a 0.15dB shelf below 100Hz.

Output impedance was a presentable 470ohms, and output level lower than most, but no problems should be incurred in use. The de-emphasis circuits functioned efficiently, and the error correction tests exposed no problems. Signal-to-noise ratio was not that good, but stayed within reasonable limits. Mechanical noise was low and resistance to shock and vibration were above average. Low level resolution was around 15 bits, and spurious above 20kHz were well suppressed.

At 0dB harmonic distortion was respectable at 20Hz and 1kHz, but the downband products of a 20kHz signal were a little too strong at only -63dB. At lower levels the distortion deteriorated, and were unremarkable at -60dB and -80dB. The 1kHz products of the 19kHz intermodulation tone were well suppressed, particularly so with a -10dB signal.

SOUND QUALITY

Now scoring somewhat below average this cheap Hitachi manages a fair level of performance for the price. Our sample had good width and depth, but also a tendency to sound slightly 'defocused' on more difficult pieces. The general sound was nice enough but needed more 'bite' and 'speed'. Treble was civilised, but lacked ultimate 'air' and 'sparkle' and showed a loss of transparency. The midrange compressed dynamics somewhat, though clarity and detail were well portrayed. The upper mid showed some coarseness on strings, and the bass was inclined to be boomy, but the latter was not considered too serious. Generally competent, there was nothing we found particularly unpleasant or fatiguing.

CONCLUSIONS

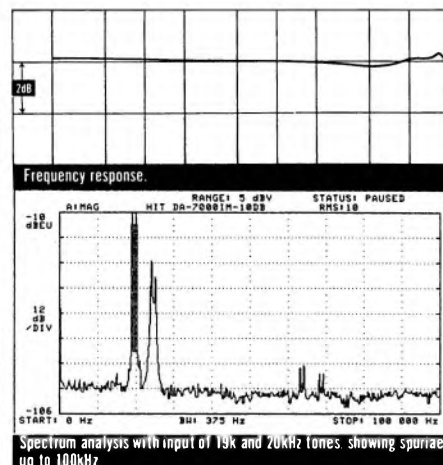
Not a bad CD player then, considering the

price. Although lacking some facilities, the decent construction, reasonable styling and fair sound quality create an interesting package for those on a tight budget. Given the level of attainment reached together with the low asking price the 7000 qualifies for a Recommendation.

TEST RESULTS

	20Hz	1kHz	20kHz
Channel balance	0.47dB	0.48dB	0.78dB
Stereo separation	87dB	88dB	77dB
Channel phase difference	0°	5°	92°
Total harmonic dist, 0dB	-87dB	-91dB	-63dB
Total harmonic dist, -10dB	—	-83dB	—
Total harmonic dist, -60dB	—	-33dB	—
Total harmonic dist, -80dB	—	-15dB	—
Intermodulation, 19kHz/20kHz, 0dB			-91dB
Intermodulation, 19kHz/20kHz, -10dB			-92dB
Frequency response,			
left channel	0.15dB	0dB	0.23dB
Frequency response,			
right channel	0.15dB	0dB	-0.08dB
Signal-to-noise, 20Hz-20kHz unweighted			92/96dB
Signal-to-noise, CCIR/ARM, 1kHz ref			86/91B
Output level, 0dB, left/right			1.78V
Output impedance			470ohms
De-emphasis 1kHz, -0.22dB; 5kHz, -4.45dB; 16kHz, -8.23dB			
Track access time			2.5 secs
Error correction capability	>900µm gap,	>800µm dot	
Mechanical noise			low
Spurious up to 100kHz			-99dB
Resolution at -90dB			-85.5dB
Headphone socket			no
Dimensions (w x d x h)			37 x 27 x 7.2cms
Estimated typical purchase price			£180

Reassessed and reprinted from issue No. 53.



SUBSCRIBE NOW TO HI-FI CHOICE

By the time you've read through this copy of *Hi-Fi Choice* we're positive you won't want to miss a single issue. By subscribing now, you can guarantee to be one of the first to see *Hi-Fi Choice*. And should you have any doubt, just remember our money back guarantee. If, at any time, you are not satisfied with *Hi-Fi Choice*, just tell us. Without question or fuss, we'll refund the unused portion of your subscription immediately.

Please fill in your details on the coupon below.

Subscription/Back Issues Order Form

BACK ISSUES:

Please tick issues you require

CD Midi Systems (Special Ed.)	Nov 86 <input type="checkbox"/>	Loudspeakers (53)	Dec 87 <input type="checkbox"/>
Turntables, Arms, Cartridges (48)	Dec 86 <input type="checkbox"/>	CD Based Midi Systems (54)	Jan 88 <input type="checkbox"/>
The Best Buy Guide (Special Ed.)	Oct 87 <input type="checkbox"/>	Turntables & Arms (55)	Jan 88 <input type="checkbox"/>
Amplifiers & Tuners (50)	April 87 <input type="checkbox"/>	Amplifiers (56)	March 88 <input type="checkbox"/>
Compact Disc Players (51)	June 87 <input type="checkbox"/>	Cassette Decks (57)	April 88 <input type="checkbox"/>
Cassette Decks & Tapes (52)	Aug 87 <input type="checkbox"/>	CD Players (58)	May 88 <input type="checkbox"/>

Individual issues including postage and packing: UK £3.50, rest of the world £4.25 (air service)

SUBSCRIPTIONS

Please tick appropriate boxes:

- Please start my subscription £42 (UK) (£50 overseas) from the next available issue.
- Please start my subscription £42 (UK) (£50 overseas) from issue no.

PAYMENT

- I enclose my cheque/Post Order made payable to *Dennis Publishing Ltd.*
- Please charge my Access/Barclaycard/American Express/Diners Mastercharge (delete as appropriate)

Credit card number _____ Expiry date _____

Name _____ Address _____

Postcode _____

(58)

Please send order form and payment to:

Hi-Fi Choice, Mail Order, P.O. Box 320, London N21 2NB.

Or ring our 24 hour answer phone (subscriptions only) leaving your Name, Address, Tel. No., credit card No., expiry date and start date for subscription. No. 01-363 6693

HITACHI DA-009

HITACHI SALES (UK) LTD., HITACHI HOUSE, STATION ROAD, HAYES, MIDDLESEX UB3 4DR. TEL: (01) 848 8787.



Though better known these days for more mainstream products like portables, VCRs and TV sets, not to mention a wide range of midi systems, Hitachi have recently been making new efforts to get back into the hi-fi separates market proper, and are planning a major marketing push that could put them back on to the map.

The 009 is a conventional £300 full width remote control player, built in Japan with the fairly elaborate roster of operating features necessary to justify its price point, including random and something Hitachi engagingly dub 'roulette' play modes. The casework is metal, the panels a bit rattly, and there is no foot isolation. Both machine and remote unit include a direct track entry keypad, while the former also has a detailed and informative menu-style display.

The nicely engineered and finished front panel is already busy enough with buttons, and is therefore not enhanced by a variety of slogans proclaiming features of dubious relevance to any but the engineer responsible. Besides pinpointing the front panel location of the remote control sensor, we are also informed of the "D/A separate converter", the "3spot laser pickup servo system" an "over sampling digital filter", and "vibration cut mechanism". Pretty much yer standard middle market product from Japan Inc.

No surprises inside either, the DA009 resembling other Hitachi models as a very ordinary, though nonetheless perfectly adequate commercial package. Whatever the meaning of 'D/A separate converter', this function is performed by a single time-shared 16-bit linear DAC.

LAB REPORT

With an output impedance of 460ohms and a maximum level of 1.83V, this unit will sound quieter than most on A/B comparisons, though in the normal domestic environment

this is of no consequence. De-emphasis was a little slow to start, but the circuits gave the correct response by 5kHz and were thereafter consistent and correct.

Channel balance was admirable through the midrange, showing some slight divergence at high frequency due to output filter imbalance; separation was respectable throughout. The high-frequency interchannel phase difference is typical of a shared DAC, and the filter misalignment was again apparent at high frequencies. THD was good enough at both full level and -10dB, but mediocre at low levels; -16dB distortion for -80dB signal is no longer impressive. IM distortion was sufficient at full level and improved as signal levels were reduced.

The frequency response was similar on both channels, with a 0.2dB boost from bass through lower mid and some high frequency aberrations, with one channel up 0.4dB at 10kHz. The noise performance was not brilliant by current CD standards, but in practice should be adequate nonetheless. Error correction was fine, mechanical noise was inaudible at the listening position, and shock and vibration resistance was passable. Ultrasonic spurious were consistently suppressed, but low level linearity was uneven between channels; linearity was estimated at 15-bit.

SOUND QUALITY

The overall listening rating placed this player on the borderline between poor and fair, the sound quality mirroring the technology in being distinctly undistinguished in relation to many of today's players. The bass verged on sogginess and boominess, lacking both impact and detail, while the midband was distinctly, albeit acceptably, hardened, with a mild 'steely' coloration. The treble quality was only average, with some loss of the fine detail that adds delicacy to musical performances. The sound balance was

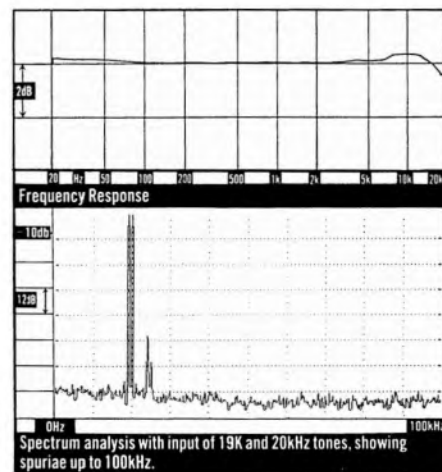
reasonably open, but depth and focus were both muted, dynamics and stereo width likewise. In all, this did not provide a particularly memorable subjective experience, even though there were no particularly glaring flaws.

CONCLUSIONS

Despite a pretty clean bill of technical health, not to mention an extensive range of facilities, the 009 failed to inspire the sort of subjective enthusiasm needed for recommendation at its £300 price level.

TEST RESULTS

	20Hz	1kHz	20kHz
Channel balance	0.08dB	0.08dB	0.28dB
Stereo separation	97dB	99dB	72dB
Channel phase difference	0°	3°	52°
Total harmonic dist, 0dB	-87dB	-89dB	-85dB
Total harmonic dist, -10dB	—	-82dB	—
Total harmonic dist, -60dB	—	-36dB	—
Total harmonic dist, -80dB	—	-16dB	—
Intermodulation, 19kHz/20kHz, 0dB	—	—	-80dB
Intermodulation, 19kHz/20kHz, -10dB	—	—	-90dB
Frequency response, left channel	0.19dB	0	-0.83dB
Frequency response, right channel	0.18dB	0	-0.51dB
Signal-to-noise, 20Hz-20kHz unweighted	—	—	92/93dB
Signal-to-noise, CCIR/ARM, 1kHz ref	—	—	89/94dB
Output level, 0dB, left/right	—	—	1.83V
Output impedance	—	—	460ohms
De-emphasis 1kHz, -0.15dB; 5kHz, -4.20dB; 16kHz, -9.15dB	—	—	—
Track access time	—	—	3.5 secs
Error correction capability	>900µm gap, >800µm dot	—	—
Mechanical noise	—	—	average
Spurious up to 100kHz	—	—	-100dB
Resolution at -90dB	—	—	-84.51/-88.83dB
Headphone socket	—	—	58ohms
Dimensions (w x d x h)	—	—	43.5 x 28 x 8.2cm
Estimated typical purchase price	—	—	£300



HITACHI DA-7200

HITACHI SALES (UK) LTD., HITACHI HOUSE, STATION ROAD, HAYES, MIDDLESEX UB3 4DR. TEL: (01) 848 8787.



Hitachi are a major electrical/electronic engineering multinational with interests that range from power stations to elevators, from mainframe computers to consumer electronics products. Though they have been in the UK hi-fi market for a decade or more, their familiar logo nowadays seems more often found adorning a microwave oven, VCR or TV set, while they are major players in the midi system and portable audio sectors. However, that is due to change, and Hitachi are planning to reassert themselves in separates, with CD players, cassette decks and amplifiers alongside their highly regarded tuners.

The CD-7200 is a £220 'budget' player, and as such is inevitably a little light on build and features, though a simple functional infrared remote control does enhance the overall value of the package. The chassis and fascia are resolutely plastic, though well enough finished and housed in a fairly lightweight metal box. Ergonomics are pretty good, thanks to the simplicity, but the fascia presentation is hardly enhanced by propagandising some pretty prosaic technology, and the admittedly informative display is very small. All the usual operational features are provided.

Construction standards are neat but the ingredients are nothing special and the ensemble seems slightly old fashioned, resembling earlier generations of players. The steel case is undamped, and the plastic disc drive sits on a decoupled steel subchassis.

LAB REPORT

The channel phase difference at high frequencies is indicative of a non-oversampled player with time-shared DAC, a set-up used by fewer and fewer machines as 'separates' for each channel and multiple oversampling rates are now easily achieved. Stereo separa-

tion held up quite well as frequency increased, and channel balance was held within reasonable bounds, with some high frequency discrepancy.

Full level THD was OK, but the downband products of a full level 20kHz tone were a little strong. Results were generally competent at lower levels and IM distortion was fine. Frequency response showed a very slight downtilt from bass to treble, with some high frequency rise and unevenness above 8kHz.

Output level and impedance were both on the low side; in the main these will only manifest themselves on A/B comparison tests. Like the 009 the de-emphasis circuits were a little deviant and could have been better engineered. Track access time was fairly fast, mechanical noise wasn't too bad and resistance to shock and vibration rather above average. The error correction circuits could not be faulted, ultrasonic spurious were low, and signal-to-noise ratios were unimpressive but probably adequate. Low level linearity was commendable at -90dB, reproducing a recognisable sine wave, but general DAC linearity was not a strong point: -80dB was produced with too much strength, -70dB was too weak. The impulse test revealed some filter ringing but no phase inversion.

SOUND QUALITY

Rating fair enough but nothing special on the listening tests, the 7200 was considered slightly better than its 009 stablemate assessed at the same time. Though not unpleasant, the midband balance sounded slightly 'thin' and 'hard', with some loss of clarity besides. The treble again sounded quite well controlled, but with some grainy effects and mild 'spitchiness' on sibilants. Focus was respectable enough, but depth was somewhat curtailed and dynamics sounded a little muted. Bass too fell a little

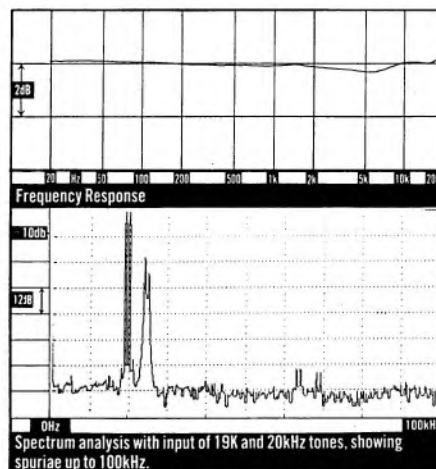
short of currently expected standards, with some softening and slight 'boom'. In all, there was little serious complaint, but little to excite particular enthusiasm either.

CONCLUSIONS

Although the 7200 is a distinctly more competitive proposition than the 009 reviewed at the same time, it remains undistinguished in the current state of compact disc technology.

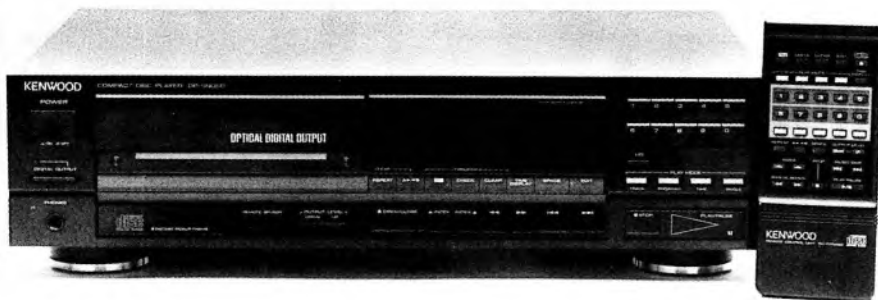
TEST RESULTS

	20Hz	1kHz	20kHz
Channel balance	0.33dB	0.36dB	0.5dB
Stereo separation	100dB	97dB	81dB
Channel phase difference	0°	4°	8.3°
Total harmonic dist, 0dB	-88dB	-85dB	-60dB
Total harmonic dist, -10dB	—	-84dB	—
Total harmonic dist, -60dB	—	-35dB	—
Total harmonic dist, -80dB	—	-17dB	—
Intermodulation, 19kHz/20kHz, 0dB	—	—	-86dB
Intermodulation, 19kHz/20kHz, -10dB	—	—	-88dB
Frequency response, left channel	0.13dB	0	-0.11dB
Frequency response, right channel	0.13dB	0	-0.15dB
Signal-to-noise, 20Hz-20kHz unweighted	—	—	90/93dB
Signal-to-noise, CCIR/ARM, 1kHzref	—	—	86/90dB
Output level, 0dB, left/right	—	—	1.75V
Output impedance	—	—	475ohms
De-emphasis 1kHz, -0.21dB; 5kHz, -4.49dB; 16kHz, -8.45dB	—	—	—
Track access time	—	—	3 secs
Error correction capability	—	—	>900µm gap, >800µm dot
Mechanical noise	—	—	average
Spuriae up to 100kHz	—	—	-100dB
Resolution at -90dB	—	—	-88.22/-91.04dB
Headphone socket	—	—	n/a
Dimensions (w x d x h)	—	—	37 x 28 x 7cm
Estimated typical purchase price	—	—	£220



KENWOOD DP990SG

TRIO KENWOOD UK LTD, 17 BRISTOL ROAD, METROPOLITAN CENTRE, GREENFORD, MIDDX UB6 8UP. TEL: (01) 575 6030.



Kenwood, née Trio, are steadily working their way back into the UK hi-fi separates market after recent changes in name and distribution, plus a little help for the parent company in Japan from electronics multinational Toshiba. A year or so ago we favourably reviewed their £300 *990D* CD player, but this year's £400 *990SG* is no straight replacement; rather it is a distinctly more upmarket package, particularly in build quality.

Decidedly heavy, it sits on very elaborate lever spring feet that probably represent the only really serious attempt to combat environmental vibration amongst the thirty or more machines covered in this latest project. The front is an alloy extrusion, and the casework's steel panels are all well damped, the unit as a whole standing quite high.

Features are elaborate, as is the remote control handset which includes volume adjustment, but the fascia is neatly laid out with graphics that are for the most part sane, and ergonomics that are for the most part good. The rear panel carries both optical and electrical digital output sockets, and can interface directly with Kenwood's digital amplifier.

The smooth-acting drawer mechanism and disc drive is damped. The digital analogue sections are on separate boards, each fed from its own separate supply. Components are good quality, construction generally neat and tidy, but some post production modifications were evident on our sample. Twin Burr Brown *PCM56P* DACs are used, and both optical and electrical digital outputs are provided.

LAB REPORT

The frequency response is textbook flat, and channel balance is held tightly as well. Stereo separation measured close to the best, and was commendably maintained at high frequencies to boot. Harmonic and

intermodulation distortion figures were again excellent, the IM spectrogram showing merely the two test tones rising from a low noise background.

Output level met the standard from a comfortably low source impedance. Signal-to-noise ratios are fine, de-emphasis is just a little strong, and error correction works. Background mechanical noise is very low, and as might be expected resistance to shock and external vibration is very good indeed. Track access speed is average, but twice as fast as Kenwood's *DP990D*. Ultrasonic spurious are all down at the noise floor, and low level resolution is within 2dB of the -90dB target - a fine result. In all, the *990SG* returns an impeccable set of test results that must justify the elaborate build quality, and which beat our findings for the *990D* by a comfortable margin on all parameters.

SOUND QUALITY

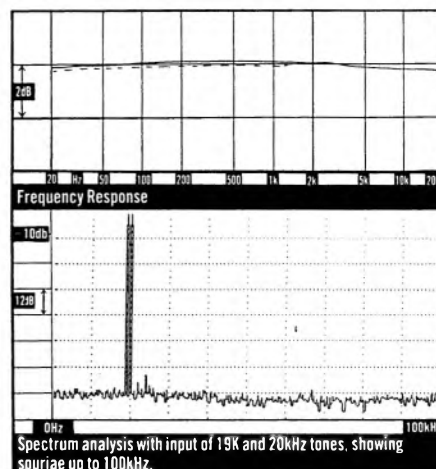
This luxury model delivered a solid 'good' overall rating for sound quality, sufficient to justify the price and standard of construction. The bass sounded generous and slightly 'rounded', with slight loss of speed but good articulation. The midrange was tonally slightly 'lean' but with good basic transparency, while the treble was attractively discreet, yet detailed nonetheless. Dynamics and stereo width were both very good, though focus could have been sharper and depth, er... deeper. Above all, this was an easy sound to live with.

CONCLUSIONS

Though the *990SG* falls just short of the required subjective standard for Recommendation at this price level, it is a doughty player nonetheless, with a build quality and technical performance that arguably justifies its premium price point.

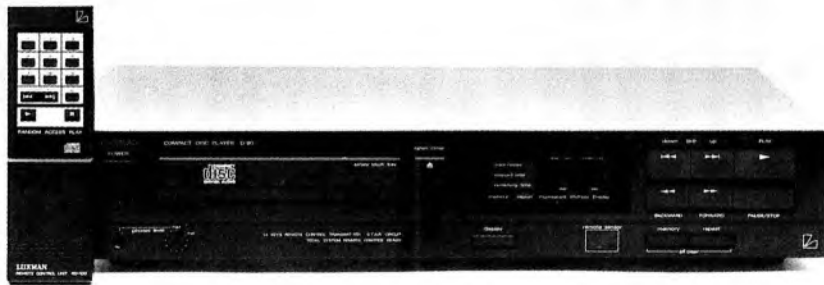
TEST RESULTS

	20Hz	1kHz	20kHz
Channel balance	0.09dB	0.02dB	0.03dB
Stereo separation	119dB	115dB	105dB
Channel phase difference	0°	0°	0°
Total harmonic dist, 0dB	-94dB	-90dB	-87dB
Total harmonic dist, -10dB	—	-84dB	—
Total harmonic dist, -60dB	—	-46dB	—
Total harmonic dist, -80dB	—	-23dB	—
Intermodulation, 19kHz/20kHz, 0dB	—	—	-103dB
Intermodulation, 19kHz/20kHz, -10dB	—	—	-98dB
Frequency response, left channel	0.08dB	0	-0.60dB
Frequency response, right channel	0.01dB	0	-0.63dB
Signal-to-noise, 20Hz-20kHz unweighted	—	—	103/104dB
Signal-to-noise, CCI/ARM, 1kHz ref	—	—	99/100dB
Output level, 0dB, left/right	—	—	2.01V
Output impedance	—	—	110ohms
De-emphasis 1kHz, -0.41dB; 5kHz, -4.84dB; 16kHz, -9.38dB	—	—	—
Track access time	—	—	3 secs
Error correction capability	—	>900µm gap, >800µm dot	—
Mechanical noise	—	—	very low
Spuriae up to 100kHz	—	—	-103dB
Resolution at -90dB	—	—	-89.0/-91.8dB
Headphone socket	—	—	35ohms
Dimensions (w x d x h)	—	—	44 x 36 x 12.3cm
Estimated typical purchase price	—	—	£400



LUXMAN D-90

HW INTERNATIONAL LTD., 3-5 EDEN GROVE, LONDON N7 8EQ. TEL: (01) 607 2717.



A long established Japanese specialist hi-fi company known particularly for luxury electronics, including valve amplifiers on the home market, Luxman ran into difficulties a few years ago and is now part of the Alps operation, which has extensive interests in electronic components and car hi-fi. One result is that the brand still commands a price premium, but is now better able to compete effectively in the middle price sector of the market.

The *D-90* is a case in point. It is an essentially simple £300 player, tastefully presented with good finish and ergonomics, partly because it is not overburdened with frills and fripperies – even the front panel graphics seem to have evaded the worst excesses of the advertising department. One particularly intelligent simplification is not to attempt to duplicate every function on both player and remote handset. This considerably cuts down the confusion of buttons that plague so many CD players. Both have play, pause and skip, but only the player has scan, memory and repeat; only the handset has direct track entry keys.

It's a fairly lightweight affair, albeit with steel case and alloy front panel, a 'made in Japan' sticker, and feet that might (or on the other hand might not) assist in environmental isolation. Continuing the simplicity theme, the display is a single readout affair, backed by a handful of telltales. Outputs are audio only, though a DIN-style socket provides remote control integration in a Luxman complete system.

The digital electronics are based on fairly early Toshiba technology for the DAC and filtering chips, with all circuitry mounted on a single PCB. The steel case is undamped, while the disc drive mechanism is moulded from mineral-loaded plastic and mounted on a steel chassis. Most audio circuitry components are of standard commercial grades, but

with extra quality provided at the important output coupling capacitors.

LAB REPORT

The response trace shows a characteristic not unlike some good quality cartridges, with a broad dip through the mid treble followed by a peak just before final rolloff. Channel balance is pretty consistent – consistently requiring a 0.2dB compensation that is – while stereo separation is adequate, albeit with significant channel variation at high frequencies. There is a substantial phase shift here too, confirming the use of a single time-shared DAC. Harmonic distortion is low enough, though less good at low levels and towards the frequency extremes, while IM distortion is fair enough in-band, if a bit ultrasonically dirty (see spectrogram).

Output level matches the standard closely, albeit from a highish source impedance. Signal-to-noise ratios are rather below average, leaving no room beyond the theoretical resolution of the player, though in fact the –90dB tone was reproduced some 7dB too high – tolerable but unexceptional. Ultrasonic spurious are pretty low, but the IM spectrogram does show significant beat products at around 25kHz. Mechanical noise is low, error correction works, but de-emphasis might have been more accurately set. In all this is a competent though hardly inspiring set of measured results.

SOUND QUALITY

This is a budget player by Luxman standards, yet it managed to achieve a very respectable 'good' rating on overall sound quality, succeeding more on the grounds of its competent allround performance and absence of weaknesses than any particular strengths. Bass was firm and extended, with reasonable articulation, the midband sounded tonally well balanced and clear, but the treble fell a

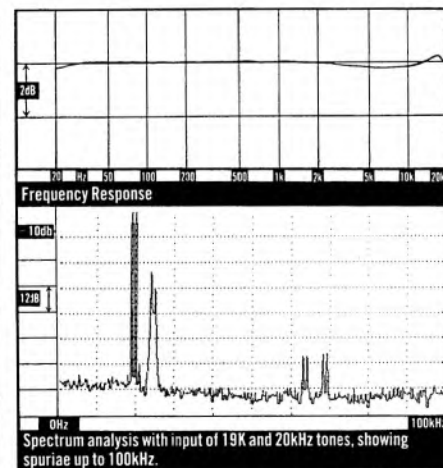
little short, with a touch of 'tizz' and 'forwardness'. Focus was pretty good, while the depth, ambience recovery and width of the sound stage were all reasonable enough.

CONCLUSIONS

Despite technological ingredients that do not seem particularly inspiring, this is a nicely judged package that is ergonomically neater than most. A sound quality which is more than good enough for the price combines with distinctive finish and presentation to ensure Recommendation.

TEST RESULTS

	20Hz	1kHz	20kHz
Channel balance	0.21dB	0.20dB	0.22dB
Stereo separation	87dB	85dB	67/107dB
Channel phase difference	0°	5°	80°
Total harmonic dist, 0dB	–70dB	–87dB	–71dB
Total harmonic dist, –10dB	—	–87dB	—
Total harmonic dist, –60dB	—	–37dB	—
Total harmonic dist, –80dB	—	–16dB	—
Intermodulation, 19kHz/20kHz, 0dB	—	—	–86dB
Intermodulation, 19kHz/20kHz, –10dB	—	—	–86dB
Frequency response, left channel	0.02dB	0	–0.57dB
Frequency response, right channel	0.02dB	0	–0.62dB
Signal-to-noise, 20Hz–20kHz unweighted	—	—	91/93dB
Signal-to-noise, CCIR/ARM, 1kHz ref	—	—	86/91dB
Output level, 0dB, left/right	—	—	2.054V
Output impedance	—	—	1.2kohms
De-emphasis 1kHz, –0.46dB, 5kHz, –4.78dB, 16kHz, –8.94dB	—	—	n/a
Track access time	—	—	n/a
Error correction capability	—	—	>900µm gap, >800µm dot
Mechanical noise	—	—	low
Spurious up to 100kHz	—	—	–102dB
Resolution at –90dB	—	—	–83.17/–82.32dB
Headphone socket	—	—	48ohms
Dimensions (w x d x h)	—	—	44 x 31 x 8.5cm
Estimated typical purchase price	—	—	£299



MARANTZ CD873LE

MARANTZ AUDIO (UK) LTD., 15-16 SAXON WAY IND. EST., MOOR LANE, HARMONDSWORTH, MIDDX UB7 0LW. TEL: (01) 897 6633.

BEST BUY



As a long established specialist hi-fi brand, Marantz have benefitted enormously from compact disc, and their close association with parent company Philips. The machines come out of the same factory in Hasselt, Belgium (and the ex-Marantz factory in Japan for the top models), but Marantz have also developed a particular brand identity with a series of circuit 'tweaks', and more recently 'Limited Edition' models like the one featured here, carrying a premium price by virtue of audiophile grade componentry.

Superficially effectively the same as the standard 873 examined last Autumn, this £250 mid-size player has a plastic chassis with metal wrap, and is clearly a budget model by virtue of determinedly lightweight build, and the now almost unusual absence of remote control. The shiny front panel makes no secret of its carboniferous origins, but styling is discreet by any standards, let alone some of Marantz' historic horrors.

At first sight the player is largely featureless, with only the very basic operational switches on view. A little rummaging reveals a hinged flap which thoughtfully tidies and prevents dust gathering about the less necessary control functions, even though it makes access a little more awkward. The range of features is pretty standard, the display and construction adequate, albeit with no attempt to offer any environmental isolation through the feet.

Internally, the 873 is based on the standard Philips 873 printed circuit board, omitting the FTS circuitry and changing/uprating certain other details. The good quality power supply uses capacitors selected for their favourable sound quality attributes, and all the important signal line capacitors are high quality ELNA Ceralines. A JRC5532 IC is connected straight to the output in place of the LM833, with the digital bitstream output socket deliberately disconnected in the

interests of maximising sound quality (it may be reconnected by an engineer if needed in the future).

LAB REPORT

The response is as flat as any pancake I've been involved with, with the mild yet characteristic Philips HF ripple. Channel balance could have been more tightly trimmed, but separation is good at all frequencies and exceptional at the bass end, while dual DACs ensure no inter-channel phase shifts. Harmonic and intermodulation distortions are all well controlled in-band, with a smattering of ultrasonics on the IM spectrogram.

Output level matches the standard, from a nice low source impedance. Signal-to-noise ratios are very good and ultrasonic spurious were generally pretty low. De-emphasis is accurate, error correction effective, mechanical noise low, but track access is on the slow side. The one repetitive weakness with Philips DACs seems to lie in the low level linearity, one channel here being some 6dB, the other 18dB out. That apart – and the evidence would indicate it has little effect upon sound quality – this Marantz delivers a fine lab performance, though without any objective evidence of improvement wrought by the *Limited Edition* tweaks.

SOUND QUALITY

Despite costing little more than many budget competitors, the 873LE just made it into the excellent rankings on sound quality – a remarkable feat that must ensure its commercial success if there is any justice. The sound was truly top class, with lively yet unforced dynamics, excellent stereo staging with fine layering, and proper ambience recovery and positioning through an unusually transparent midrange. The bass was very slightly light, but fast and articulate, driving along nicely with a very strong sound,

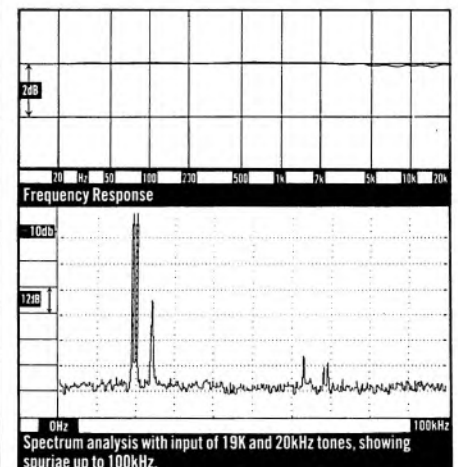
while a high treble that might have been a shade sweeter was perhaps only noticed by virtue of the strengths elsewhere.

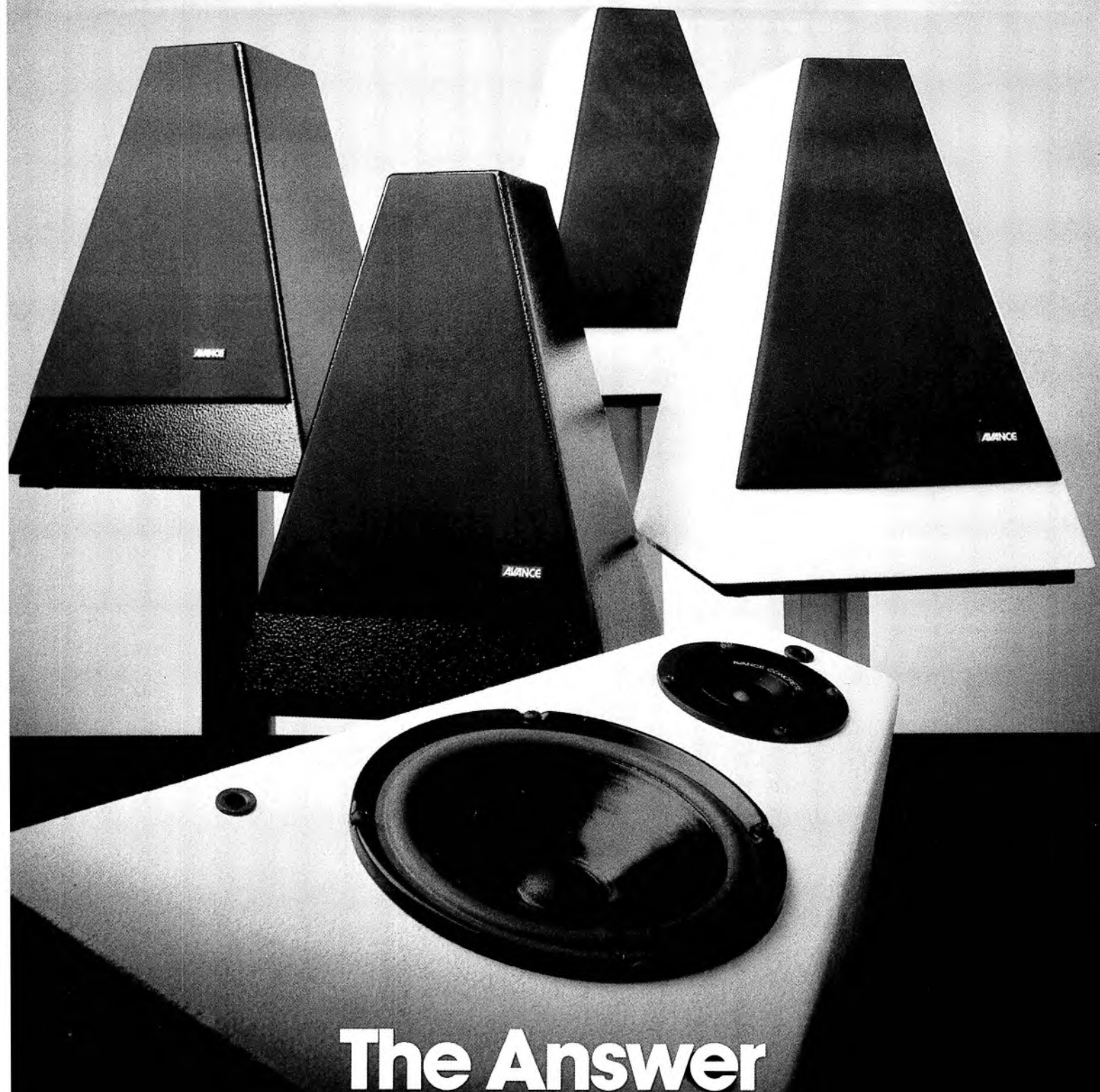
CONCLUSIONS

If there's just one outstanding sound quality bargain in this entire review project it must be the 873LE. An obvious Best Buy, any further comment is superfluous.

TEST RESULTS

	20Hz	1kHz	20kHz
Channel balance	0.14dB	0.14dB	0.14dB
Stereo separation	124dB	108dB	94dB
Channel phase difference	0°	0°	0°
Total harmonic dist, 0dB	-94dB	-90dB	-87dB
Total harmonic dist, -10dB	—	-80dB	—
Total harmonic dist, -60dB	—	-46dB	—
Total harmonic dist, -80dB	—	-17dB	—
Intermodulation, 19kHz/20kHz, 0dB			-98dB
Intermodulation, 19kHz/20kHz, -10dB			-94dB
Frequency response,			
left channel	0.01dB	0	-0.02dB
Frequency response,			
right channel	0.01dB	0	-0.02dB
Signal-to-noise, 20Hz-20kHz unweighted			102/103dB
Signal-to-noise, CCIR/ARM, 1kHz ref			97/99dB
Output level, 0dB, left/right			2.1V
Output impedance			200ohms
De-emphasis 1kHz, -0.38dB; 5kHz, -4.63dB; 16kHz, -9.10dB			
Track access time			3.5 secs
Error correction capability			>900µm gap, >800µm dot
Mechanical noise			low
Spurious up to 100kHz			-87dB
Resolution at -90dB			-95.9/108dB
Headphone socket			n/a
Dimensions (w x d x h)			36 x 30 x 8cm
Estimated typical purchase price			£249





The Answer in Black and White



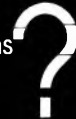
Which speakers are built in concrete to eliminate the inherent resonance of wood



Which speakers are designed with angled sides to eliminate the internal reflections found in square speakers



Which speakers are finished in black or white to match the majority of current Hi-Fi systems



Which speakers give superb sound quality associated with larger speakers yet are only 12" high



AVANCE concrete pyramide120

To: HW International, 3-5 Eden Grove, London N7 8EQ. Tel: 01-607 2717 Please send me literature on the full range of Avance concrete speakers

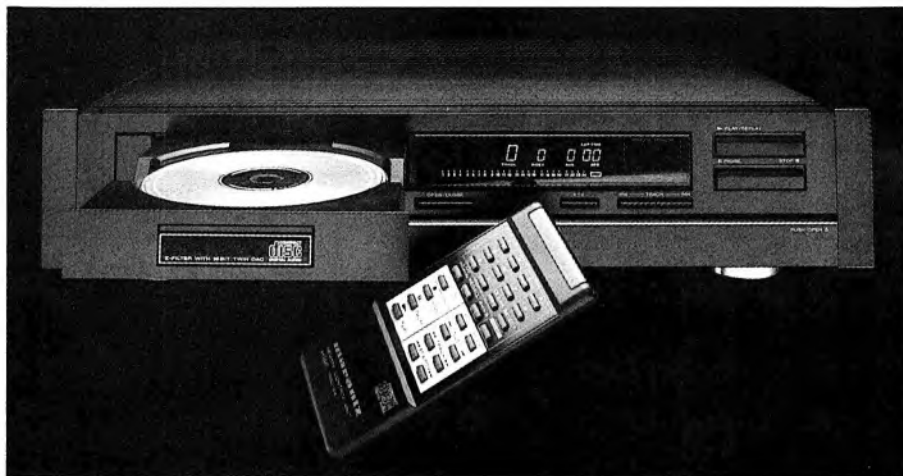
Name

Address

MARANTZ CD94

MARANTZ AUDIO (UK) LTD., 15-16 SAXON WAY IND. EST., MOOR LANE, HARMONDSWORTH, MIDDX UB7 0LW. TEL: (01) 897 6633.

RECOMMENDED



The prestige £800 94 is completely different in appearance, construction and price from previous Marantz CD players, though the technology at its heart is still fundamentally familiar. It is manufactured in Japan (in what was a Marantz factory before the Philips takeover) and offers deluxe build quality and certain features designed to enhance sound quality. Much of the reason behind the pricetag can be identified by lifting the carton: it is much heavier than other current models because it incorporates a number of expensive metal diecastings in place of the plastics mouldings used extensively in the Hasselt range.

The styling has been carefully arranged to promote ease of use, separating the controls into two groups. The main operational controls (play, stop/pause, skip, open/close, plus FTS select) are to the right and below the quite elaborate display. Subsidiary facilities including a 10-digit keypad and headphone socket are tucked behind a hinged cover, permitting audible scan, repeat, display mode, programming, etc. 'Favourite track selection' (FTS) is a useful feature which enables the machine to store and automatically play pre-programmed track selections from up to 150 or so discs in a collection. The rear panel has sockets for optical and electronic digital data outputs besides normal stereo audio, and the full remote control can be interlinked with other compatible system components.

The extra build quality undoubtedly promotes confidence in use. The main frame and the disc playing chassis are both substantial metal die-castings, with the latter spring-decoupled for vibration suppression. The top cover has been damped and the heatsink at the rear likewise designed to be inherently non-resonant.

LAB REPORT

The internal technology is the familiar Phi-

lips 16-bit 4× oversampling, with separate DACs, powerful error correction and digital filtering. Additional attention here is paid to power supplies and audio circuitry, with extra internal screening. The frequency response was ruler flat, with the merest suggestion of HF ripples under our large scale magnification. Channel phase difference was zero due to the twin DACs, while channel balance was held to normal commercial tolerances. Separation and distortion figures were truly outstanding, though the IM spectrogram does show some ultrasonic spurious.

Error correction was very good on all tests, and resistance to shock or vibration likewise. Mechanical noise was very low, and track access times about average. The output level met the format specification, from a usefully low source impedance. Electrical noise levels were state-of-the-art, but the 0dB white noise test showed slight rounding at the top of the waveform, ultrasonic spurious could have been lower, and the practical low level resolution was only 15 bits, a rather average result for an expensive machine.

SOUND QUALITY

The efforts that have gone into creating this machine have not been wasted, the expense being substantially vindicated by a very good sound quality rating. Retaining the fundamentally fine character of this 16-bit 4× oversampling chip set and losing nothing in dynamics, drama and bass drive, the 94 is also clearly more restrained, refined and good mannered. Giving a dependable sound that is easy to listen to, stereo perspectives were very good and the midband notably neutral, though there was a hint of laziness in the bass and treble.

CONCLUSIONS

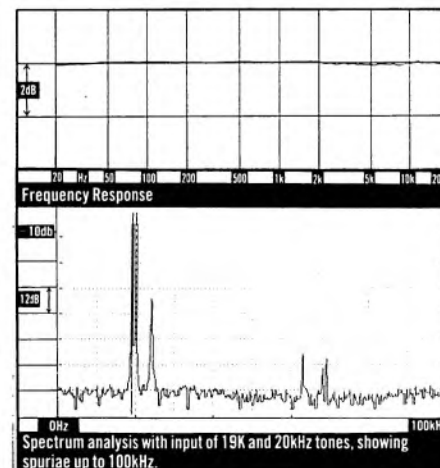
The CD 94's high build quality and good objective and subjective performance

obviously deserve confident recommendation. The value for money is perhaps not quite in the 873LE league, but it is fair to suggest that the far higher build quality of the mechanism in particular should result in a more consistent performance over time and from sample to sample.

TEST RESULTS

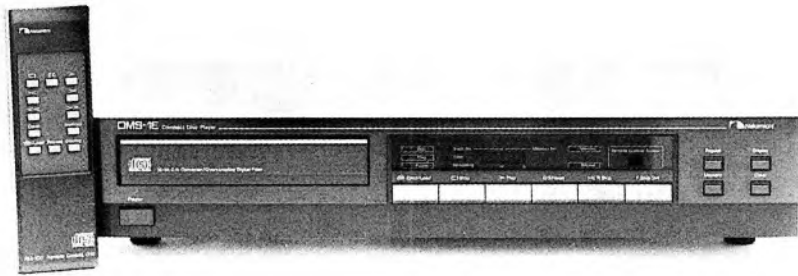
	20Hz	1kHz	20kHz
Channel balance	0.16dB	0.16dB	0.14dB
Stereo separation	101.3dB	111.5dB	112.6dB
Channel phase difference	0°	0°	0°
Total harmonic dist, 0dB	-92.7dB	-88.7dB	-90dB
Total harmonic dist, -10dB	—	-84dB	—
Total harmonic dist, -60dB	—	-50.4dB	—
Total harmonic dist, -80dB	—	-20.4dB	—
Intermodulation, 19kHz/20kHz, 0dB			-91.6dB
Intermodulation, 19kHz/20kHz, -10dB			-91dB
Frequency response, left channel	+0.01dB	0	-0.2dB
Frequency response, right channel	0dB	0	-0.18dB
Signal-to-noise, 20Hz-20kHz unweighted			109/108dB
Signal-to-noise, CCIR/ARM, 1kHz ref			108/106dB
Output level, 0dB, left/right			2V
Output impedance			56ohms
De-emphasis	1kHz, 0.4dB; 5kHz, 4.6dB; 16kHz, 9.3dB		
Track access time			3.5 secs
Error correction capability			>900µm gap, >800µm dot
Mechanical noise			very low
Spurious up to 100kHz			-87.1dB
Resolution at -90dB			-102/-104dB
Headphone socket			yes (variable output) 207ohms
Dimensions (w x d x h)			46 x 36 x 10.5cm
Estimated typical purchase price			£800

Reassessed and reprinted from issue No. 51.



NAKAMICHI OMS-1E

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



Cassette deck specialist Nakamichi have for many years offered similarly luxurious amplifiers, tuners, and more recently some six CD players. We tested some of the upmarket models a year or so ago, and now come to the cheapest in the range, the £400 *OMS-1*. Whereas the cassette decks and top CD players establish benchmarks for substantial, even over-engineered build quality, pulling the *OMS-1* out of its box was something of a surprise.

This simple, almost lightweight machine looks superficially hard pushed to justify a £400 pricetag, though simplicity has its own virtues and the brochure makes claims for advanced under-the-skin circuitry and techniques. Slim and neat, it is also basic and simple in terms of facilities, so ergonomics are consequently good. The panels are metal, there is no real isolation through the feet, the display is quite small, and the remote handset covers basic operations only.

Build is solid enough, if not quite in the Nakamichi tradition. The case is steel and so is the rubber mounted chassis that supports the plastic transport/drawer mechanism, with its pressed steel disc clamp arm. The single board construction incorporates carefully chosen capacitors in strategic places, but D/A conversion is handled by a single time-shared Burr Brown *PCM56P*. Internal mains leads are shrouded, and the casework has some mechanical damping applied. Active 3 stage output filters use a multiple op. amp chip.

LAB REPORT

The *1E* was fitted with a good quality DAC that showed little low level error, but harmonic distortion at -80dB was only average. Non-inverting, an exceptionally clean pulse was achieved, but the time-shared converter produced an inter-channel phase error of 42° at 20kHz . Ultrasonic filtering was weaker

than usual, but nonetheless unlikely to be a problem.

Frequency response was essentially flat up to 5kHz , measured -0.2dB at 15kHz , and then fell almost 2dB by 20kHz mark. Channel balance was impeccable, channel separation respectable. Both high and low level distortion figures were pretty good, but the -55dB downband products of the 20kHz tone were rather high, and full level intermodulation distortion was also higher than most, improving at lower levels.

The output level was well above standard at 2.5V – watch out on A/B comparisons with other players. De-emphasis was correct, but mechanical noise was higher than many, and shock and vibration susceptibility was below the group average. Track access speed was nothing special, no clipping was noted on the white noise test, and as usual there was no trouble with error correction. Electrical noise levels were on the high side, the CCIR/ARM figure measuring -96dB (emphasis off); in fairness this isn't bad, it's just that many others perform rather better.

SOUND QUALITY

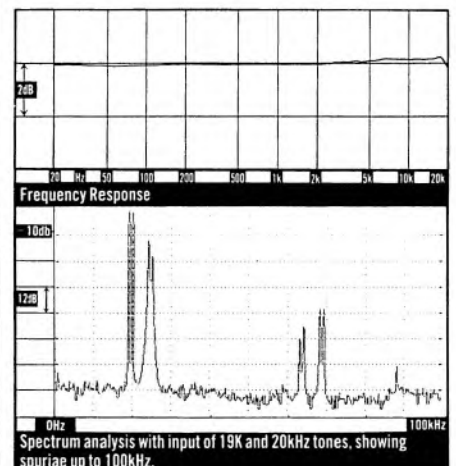
Subjectively rated a straight 'good' overall, this must be regarded as a mild disappointment in view of Nakamichi's overall track record, not to mention the slightly above average price of this player. The treble in particular lacked precise focus on more complex material, and possessed a slightly 'phsey' quality. However, the midband possessed fine focus and definition, with good clarity and detailing, while the bass had plenty of drive and 'speed'. The soundstage was good and wide, with plenty of scale, while presentation was a touch 'upfront' and 'forward', lending a hint of acidity to string tone. In all this is a good modern player with an up to date sound, but does not excel considering its pedigree or price.

CONCLUSIONS

This is a neat enough player with attractive presentation and ergonomics, but it doesn't really follow one Nakamichi tradition of providing exceptional sound quality while at the same time perpetuating another of selling at an above average price.

TEST RESULTS

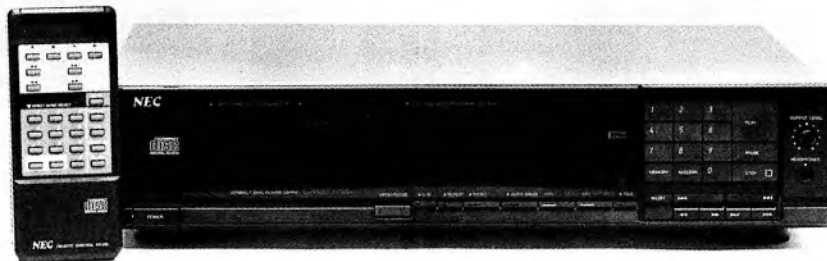
	20Hz	1kHz	20kHz
Channel balance	0.02dB	0dB	0.08dB
Stereo separation	104dB	99dB	80dB
Channel phase difference	0°	2°	42°
Total harmonic dist, 0dB	-84dB	-87dB	-55dB
Total harmonic dist, -10dB	—	-81dB	—
Total harmonic dist, -60dB	—	-40dB	—
Total harmonic dist, -80dB	—	-19dB	—
Intermodulation, 19kHz/20kHz, 0dB	—	—	-63dB
Intermodulation, 19kHz/20kHz, -10dB	—	—	-77dB
Frequency response, left channel	0.02dB	0	-1.7dB
Frequency response, right channel	0.02dB	0	-1.7dB
Signal-to-noise, 20Hz-20kHz unweighted	—	—	97/101dB
Signal-to-noise, CCIR/ARM, 1kHz ref	—	—	90/96dB
Output level, 0dB, left/right	—	—	2.54V
Output impedance	—	—	460ohms
De-emphasis 1kHz, -0.4dB ; 5kHz, -4.6dB ; 16kHz, -9dB	—	—	0 secs
Track access time	—	—	0 secs
Error correction capability	—	—	$>900\mu\text{m}$ gap, $>800\mu\text{m}$ dot
Mechanical noise	—	—	average
Spurious up to 100kHz	—	—	-90dB
Resolution at -90dB	—	—	$-91.3/-88.9\text{dB}$
Headphone socket	—	—	n/a
Dimensions (w x d x h)	—	—	43 x 28 x 8.7cm
Estimated typical purchase price	—	—	£400



NEC CD610

NEC HOUSE, HOME ELECTRONICS DEPT., 1 VICTORIA RD., LONDON W3 6UL. TEL: (01) 993 8111.

BEST BUY



This major electronics multinational, one of the largest semiconductor manufacturers in the world, is a key player in the business machines market, and successfully markets consumer electronics in Japan and the US. They therefore have the products, but UK marketing efforts have hitherto been very low key, with little more than a clutch of CD players to compete in the hi-fi separates market.

The £250 '610 is nevertheless a nicely substantial looking player that looks pretty fair value for money on facilities and build quality. The NEC fascia style is an attractive blend of metal extrusion with perspex, the latter covering an elaborate display, while the 10-key track entry pad will be appreciated by those with big fingers or poor eyesight.

Build may be less substantial than the '810, but is heavier than most in its class, though the top plate rattles a bit. The usual operation functions are supplemented by some record/editing facilities. The remote control carries a direct track entry keypad but no volume adjustment, though the machine itself has a variable output option.

The internals are pretty much the standard recipe: plastic disc drive mechanism fitted to a decoupled pressed steel subchassis; a single main PCB (whose wiring could have been neater); an average size transformer with unshrouded mains; and standard commercial quality components. The single time-shared Burr Brown PCM54HP DAC feeds an NEC digital filter.

LAB REPORT

A healthy output level of 2.46V is (misleadingly?) higher than most - watch out on A/B comparisons - and this was accompanied by a clipped white noise signal which defeats the object somewhat. The total harmonic distortion figures show no cause for complaint

at 20Hz and 1kHz, but the downband products of the 20kHz signal are too high, with the worst only 52dB down. Surprisingly perhaps in the light of these results, intermodulation products are well suppressed and the harmonic distortion figures at lower levels were respectable too. Ultrasonic spurs were praiseworthy by their absence, and the only blemish on the frequency response was a 0.4dB excursion above 10kHz (not uncommon at this price level).

The de-emphasis circuits worked correctly, but noise performance both with and without emphasis was mediocre. Track access time was a tardy 5 seconds, but resistance to shock and vibration was sufficiently good.

The player mechanism was a little noisy by current standards, and this could distract on quiet passages. The impulse response showed some quite well damped ringing, but this is normal with the type of circuitry being used here. The player does maintain absolute phase, and the -90dB tone was reproduced at an accurate level, though noise dominated the picture when the resultant 1kHz sine wave was viewed on an oscilloscope.

SOUND QUALITY

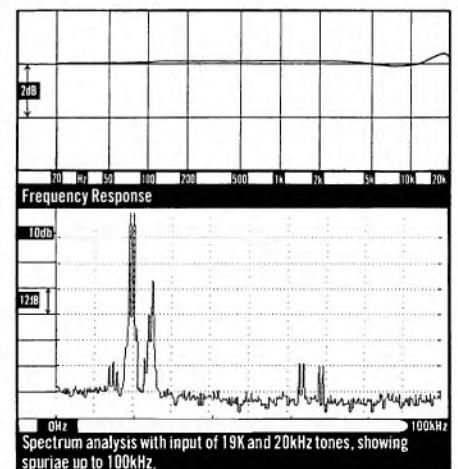
This player edges close to the very good class, despite our slight suspicions regarding the error correction circuitry operation on the sample concerned, which is a fine result considering the modest price. There was a slight brashness and forwardness in the treble, but the bass was a real strength, with fine speed, 'slam' and articulation. The stereo image was well resolved in focus, width and depth, while dynamics and detail were also pretty good. The overall character was lively and tuneful, if a touch 'steely' in terms of mid-band coloration.

CONCLUSIONS

Given their less than widespread UK distribution, NEC's CD players may take a bit of hunting down. However, the sound/price/build equation comes down firmly in favour of the '610 despite unspectacular lab performance, indicating a Best Buy rating and suggesting that the quest could well be worthwhile.

TEST RESULTS

	20Hz	1kHz	20kHz
Channel balance	0.11dB	0.12dB	0.23dB
Stereo separation	92dB	90dB	65dB
Channel phase difference	0°	5°	80°
Total harmonic dist, 0dB	-92dB	-86dB	-52dB
Total harmonic dist, -10dB	—	-82dB	—
Total harmonic dist, -60dB	—	-40dB	—
Total harmonic dist, -80dB	—	-22dB	—
Intermodulation, 19kHz/20kHz, 0dB			-89dB
Intermodulation, 19kHz/20kHz, -10dB			-92dB
Frequency response,			
left channel	0.02dB	0	-0.76dB
Frequency response,			
right channel	0.03dB	0	-0.45dB
Signal-to-noise, 20Hz-20kHz unweighted			91/95dB
Signal-to-noise, CCIR/ARM, 1kHz ref			84/91dB
Output level, 0dB, left/right			2.47V
Output impedance			1kohm
De-emphasis 1kHz, -0.33dB; 5kHz, -4.43dB; 16kHz, -8.95dB			
Track access time			5 secs
Error correction capability		>900µm gap, >800µm det	
Mechanical noise			fair
Spuriae up to 100kHz			-95dB
Resolution at -90dB			-93.2/-91dB
Headphone socket			variable, 150ohms
Dimensions (w x d x h)			43 x 34 x 10cm
Estimated typical purchase price			£250



HEYBROOK POINT FIVE



A REALLY DIFFERENT LOW COST TWO WAY LOUDSPEAKER

Heybrook's Pint-Size Point Five is the latest addition to the ranks of low cost two-way loudspeakers. But in a world which is mostly populated by clones, makeweights and also-rans, this one really is different.

What the Point Five is really all about, though, are the 3 qualities, speed, resolution and real attack and force. There's enough substance backing it up to add some flesh to the bones, too, so the music also has body and a well defined resonant structure.

The very high levels of resolution achievable with this design were plainly apparent on a wide range of materials, control was evident all the time, in the precision with which stereo in the build-up to crescendos, in the tidiness of the bass, in the precision with which stereo images were projected into the space around, and in front of, the speakers.

Finally - and on a resoundingly positive note - I must mention the unusually dynamic nature of the Point Five. Unlike most smallish loudspeakers, it doesn't appear to compress or change in sound as it goes loud, and with this unusual freedom from squash, it's quite easy to take the speaker right up to, and even beyond, its working dynamic range.

In short, this is one budget loudspeaker that works. Instead of trying to squeeze every last Hertz in the bass, or decibel in level, Heybrook have concentrated on

making a loudspeaker that is, above all, detailed, articulate and dynamic, whilst retaining excellent control. It's a powerful list of virtues at the price.

WHAT HI-FI?

FREE! WHAT CD? & DIGITAL AUDIO Tells you the best hi-fi to buy

The Heybrook is an excellent all-round design

that could easily be awarded top marks for compatibility. It is easy to drive, very clean-sounding and it is well-balanced at both bass and treble extremes.

One excellent feature of the Heybrook speaker is its full bass performance. The treble frequencies sounded excellent too, and the sound was unusually clean and dynamic - particularly when playing material with lots of cymbal work. Indeed, the little Point Fives often sounded the equal of a much bigger and much more expensive design.

Stereo imagery was pin-point sharp and highly detailed, yet not in a cold or dissecting manner. The Heybrook Point Five is an excellent example of cost-effective engineering where economies have been made to overall advantage. From the clever design of the cabinet with its mediate top and bottom pieces to the simple crossover and specially designed bass/mid unit, the whole speaker is an example of how to build a top class small speaker at a very reasonable selling price.

WHAT THEY SAY ABOUT US SOUNDS GOOD!

As you can see from these recent review extracts the Heybrook Point Five has really impressed.

The Point Five is just the latest in a line of Heybrook successes. Savour aural excellence from an award winning range of audio products; for further details send the coupon below.



HEYBROOK

For further information, dealer list and full review reprints please complete and return this coupon specifying products:

POINT 5 HB1 HB2 HB3 TT2 C2/P2

NAME _____

ADDRESS _____

POSTCODE _____

HEYBROOK HI-FI LTD., ESTOVER CLOSE, ESTOVER, PLYMOUTH DEVON TEL: 0752 780311

HI-FI Answers

Sound quality is, in a nutshell excellent

The speaker is always under firm and positive control. Transient and dynamic behaviour are both exemplary or better, and bass quality is fast, pitch accurate and has lots of drive.

The Point Five is simply very refined, and gives a 'big' sound with excellent dynamics and space, and very good resolution of detail. Best of all, though, is the midband which has a rare openness and an alive quality that is not easily mistaken. This is a loudspeaker where, given a decently well behaved reproduction system, the stereo soundstage comes out more than half way to meet the listener.

I believe that the new budget Heybrook is a significant product. By designing intelligently within tight cost constraints, the company have come up with something genuinely new and with obvious potential design stretch for future up-market models to exploit. Meanwhile, the Point Five's lively, forthcoming sound is very much in tune with what is required of a small, modern speaker. I'm positive it's going to be enormously and deservedly successful.

SPEAKERS

HEYBROOK POINT FIVE

MC, 2W, CB
Review: January 1988 Design/
Manufacturer: UK

The new Point Five, a small two-way loudspeaker from Heybrook, marks a break with the past in more ways than one. The enclosure is easily the most novel feature, the baffle being part of the main structure rather than being mounted in afterwards as usual. Heybrook had to use new construction techniques to achieve this, the benefit being a structure with greater physical integrity and which is easier to control.

Internal wiring is solid-core, which should be observed elsewhere in the partnering system too, and the crossover is also built in line with solid-core ideas as far as possible. Used a few inches clear of a wall the Point Fives have a bass and midrange that are marvelously expressive and articulate, and exhibit real control and excellent stereo. On very early samples the tweeter was slightly uncouth, but this trait has now been cured.

THE HIT LIST

NEC CD810

NEC HOUSE, HOME ELECTRONICS DEPT., 1 VICTORIA RD., LONDON W3 6UL. TEL: (01) 993 8111.

RECOMMENDED



NEC are one of the largest Japanese electronics companies, though their UK track record in hi-fi is negligible. This is largely for want of trying, as they certainly do not lack the expertise and are important players in the US and Japanese markets. Furthermore, one of their major activities is semiconductor manufacture, and as such they are responsible for many of the chips used in others' products. Hitherto the main UK strength has been in the office equipment market, particularly for Fax machines, while the decision to launch into the separates market with a clutch of standalone CD players and virtually no other components looks decidedly half-hearted.

Marketing commitment aside, the £400 CD810 is actually a hell of a machine, providing battleship build quality and luxury finish as a pretty realistic price. It is certainly a lot more substantially built than the Editor's much more expensive NEFAX10 (and will hopefully prove more reliable besides - Ed). The whole unit is very compact and solidly built with well damped panels, the basic extruded metal fascia is sensibly laid out and stylistically enhanced by a smart perspex panel, and the whole thing sits on proper feet. And those who fume at the fiddly dimensions of calculator style keypads can take comfort from sensible size track entry keys that are a pleasure to use.

Ergonomics are in fact very nice, as is the overall appearance. Braille markings on play and pause are a nice touch, though some of the front panel legends are clearly aimed at users with 20/20 vision. The handset is neat and compact, lacking volume adjustment but providing small-finger track entry facilities and a phase inversion switch.

The case is damped, copper plated heavy steel. The smooth acting plastic disc drive and clamp sits on a decoupled steel subchassis. There are two separate transformers with

good quality capacitors, providing separate regulation to internal sections screened by copper plated steel panels. The digital signals use internal optical coupling, with two Burr Brown FCM56P 16-bit DACs, but there is no digital output, electrical or optical. Construction is complex but fairly tidy, with carefully screened audio circuitry.

LAB REPORT

The very flat frequency response shows only a tiny lift over the last half octave. Stereo separation was very good, albeit reducing at higher frequencies, but balance between the two channels showed a broadband error of around 0.4dB, probably sufficient to require permanent balance control correction. Harmonic distortion measures quite low, but intermodulation fell somewhat short of the best, showing some evidence of stress at full (0dB) level.

Output level meets the standard, from a nice low source impedance, but signal-to-noise ratios are unexceptional. Mechanical noise could have been lower and track accessing faster, though shock and vibration rejection is very good and ultrasonic spurs are held down well. De-emphasis is accurate and error correction effective. The -90dB tone was reproduced with reasonable accuracy. To summarise, the 810 delivered a thoroughly competent set of results, though not perhaps the exceptional performance that the build quality might have led one to expect.

SOUND QUALITY

The 810 was rated solidly in the very good category for overall sound quality, which is a fine result considering its price is only slightly above the overall test group average. Showing a family resemblance to the 610, with a mild 'steely' quality on violins, the sound was nevertheless fast and powerful,

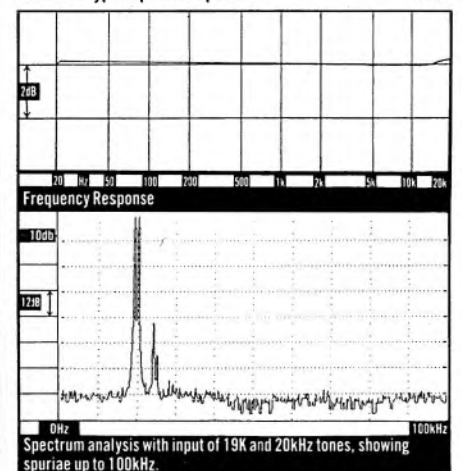
with fine bass transients and good tune-playing abilities. The treble was nicely placed and focused, and well integrated with the midband information. The stereo image was stable, detailed and of good scale, with fine depth and 'air'. Dynamics were a particular strength, and the overall character is best summed up as lively.

CONCLUSIONS

While the lab performance might have been tighter, sound quality, ergonomics and build quality all point towards Recommendation for this rare but attractive example of the CD player maker's art.

TEST RESULTS

	20Hz	1kHz	20kHz
Channel balance	0.37dB	0.38dB	0.51dB
Stereo separation	120dB	116dB	81dB
Channel phase difference	0°	0°	3°
Total harmonic dist, 0dB	-89dB	-87dB	-79dB
Total harmonic dist, -10dB	—	-83dB	—
Total harmonic dist, -60dB	—	-39dB	—
Total harmonic dist, -80dB	—	-19dB	—
Intermodulation, 19kHz/20kHz, 0dB	—	—	-74dB
Intermodulation, 19kHz/20kHz, -10dB	—	—	-86dB
Frequency response,			
left channel	0.03dB	0	-0.13dB
Frequency response,			
right channel	0.02dB	0	0.04dB
Signal-to-noise, 20Hz-20kHz unweighted	—	—	98/99dB
Signal-to-noise, CCIR/ARM, 1kHz ref	—	—	92/93dB
Output level, 0dB, left/right	—	—	2.10V
Output impedance	—	—	300ohms
De-emphasis 1kHz, 5kHz, 16kHz	-0.37dB, -4.62dB, -9.0dB	—	—
Track access time	—	—	3.5secs
Error correction capability	>900µm gap, >800µm dot	—	—
Mechanical noise	—	—	average
Spuriae up to 100kHz	—	—	-102dB
Resolution at -90dB	—	-88.77/-83.75dB	—
Headphone socket	—	—	149ohms
Dimensions (w x d x h)	—	—	43 x 34 x 10cm
Estimated typical purchase price	—	—	£400



NIKKO CD200R

NIKKO UK, 150 REGENT STREET, LONDON W1R 5FA. TEL: (01) 439 6288.



The Nikko brand was quite successful in the UK back in the early 'seventies, when distributed by what is now the HW operation, but disappeared from our ken during the subsequent slumps. The name has now started reappearing, albeit on a rather limited scale, via a UK arm of a German marketing organisation. Our attempts to establish the selling price of this particular player have hitherto been thwarted by an office which appears to be staffed by a telephone answering machine, which might suggest that the overall marketing commitment is not that great.

Nevertheless, the type number and build quality make it fairly clear that the CD200R is a bottom of the range, budget CD player. It is equipped with simple remote control but has no other particular distinctiveness apart from a red line to enliven the front panel graphics. Constructionally a standard mid-size plastic box with rather ratty metal top and plastic/metal base, it feels light in weight and build. Moreover, finish and presentation is not particularly clever at fooling the eye into believing it costs a lot of money, while the legends screened on the display window look oddly placed when unlit.

The internals show nothing much to quicken the pulse of an engineer. The single board construction uses Yamaha digital filtering and a Burr Brown PCM56P DAC operating with 2x oversampling. The transport is Yamaha-derived too, while the power supply transformer is quite small, with unshrouded mains leads (plastic case), and standard commercial grade componentry throughout.

LAB REPORT

The frequency responses were a little wayward, with some high frequency differences between the channels, the right peaking 1dB higher than the left. There was also a slight low frequency rolloff of around 0.2dB and some treble unevenness. Channel balance

was close, discounting the 20kHz anomaly, while stereo separation deteriorated to only 54dB at high frequencies. The output level was a touch above the norm, delivered from an excessively high 2.15kohms source impedance.

The high frequency inter-channel phase difference is typical of using a single time shared DAC. Track access time was rather slower than average, the error correction tests were all passed without problem, and mechanical noise was close to average, but resistance to shock and vibration was poor. Spurious were reasonably well suppressed, while signal-to-noise ratios were satisfactory. The de-emphasis circuits were not particularly accurate.

Total harmonic distortion figures were generally a little high. IM distortion and the down band products of a 20kHz full level tone were largely absent. Low level resolution showed good correlation between channels, with both some 4dB too high, but also made a fair attempt at producing a sine waveform. Resolution was assessed at around 15.7 bits.

SOUND QUALITY

This budget player rated fair, indicating a respectable if unspectacular performance for the price. The sound was considered a little bland, but competent allround nonetheless, with little significant criticism of any particular aspect. There were no undue balances emphases, though the treble had a slight, soft 'graininess', and bass was a little 'spongy'. Stereo imaging achieved a reasonably good standard, again without any particular excellence.

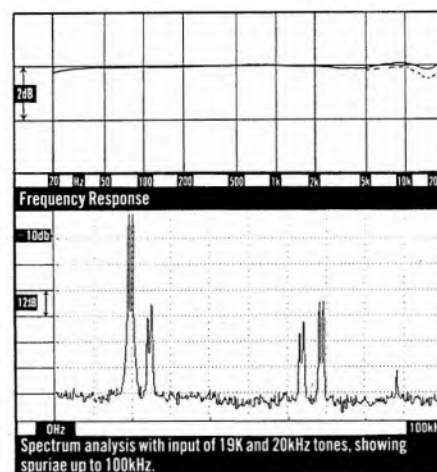
CONCLUSIONS

This player delivers fair overall performance at what is presumably a fair price, but is insufficiently distinguished to warrant Recommendation, while the level of commit-

ment of the UK operation does little to engender confidence in the brand's long term future.

TEST RESULTS

	20Hz	1kHz	20kHz
Channel balance	0.15dB	0.09dB	0.92dB
Stereo separation	117dB	89dB	55dB
Channel phase difference	0°	2°	54°
Total harmonic dist, 0dB	-84dB	-82dB	-82dB
Total harmonic dist, -10dB	—	-84dB	—
Total harmonic dist, -60dB	—	-43dB	—
Total harmonic dist, -80dB	—	-13dB	—
Intermodulation, 19kHz/20kHz, 0dB	—	—	-80dB
Intermodulation, 19kHz/20kHz, -10dB	—	—	-69dB
Frequency response, left channel	-0.02dB	0	0dB
Frequency response, right channel	-0.02dB	0	0.77dB
Signal-to-noise, 20Hz-20kHz unweighted	—	—	97/99dB
Signal-to-noise, CCIR/ARM, 1kHz ref	—	—	92/94dB
Output level, 0dB, left/right	—	—	1.91V
Output impedance	—	—	2.15kohms
De-emphasis 1kHz, -0.71dB; 5kHz, -6.15dB; 16kHz, -9.41dB	—	—	—
Track access time	—	—	5 secs
Error correction capability	—	—	>900µm gap, >800µm dot
Mechanical noise	—	—	average
Spuriae up to 100kHz	—	—	-85dB
Resolution at -90dB	—	—	-85.8/-85.6dB
Headphone socket	—	—	n/a
Dimensions (w x d x h)	—	—	42 x 29.5 x 8.6cm
Estimated typical purchase price	—	—	not known! £250 assumed



PHILIPS CD371

PHILIPS ELECTRICAL LTD., CITY HOUSE, 420-430 LONDON ROAD, CROYDON, SURREY CR9 3QR. TEL: (01) 689 2166.

BEST BUY



Inventors and co-developers of Compact Disc, Philips have cashed in pretty effectively, to the extent of being market leaders for separate players despite having no other components to back them up until very recently. Freed from concerns of rational range matching they can respond quickly to the latest developments, changing models almost bewilderingly often but creating positive improvement while doing so – happily the erratic drawer mechanisms of earlier models is now a thing of the past, for example.

The 371 is their latest 'midi' budget player, offering only manual operation and engineered with maximum cost effectiveness so sell at a highly competitive £180 price point. Build is resolutely lightweight (even by Philips standards), with a plastic chassis and front plus metal wrap. It follows the latest Philips cosmetics in separating the less essential control buttons onto an angled ledge along the bottom of the fascia (thereby ensuring that the dust which settles nice and evenly on such surfaces is unlikely to be disturbed too often by probing digits). Features are basic but quite adequate, and by implication the machine will be simple to use. The display is limited too, and the front panel presentation does little to disguise the fact that carbon is the main element involved.

This particular recipe uses Philips' newest transport mechanism but a 160-style main board, albeit with some modifications from that earlier model. In other respects the ingredients are standard Philips too, including their digital filter and 4x oversampling 16-bit DAC. Good quality audio output capacitors are fitted, but other components are fairly standard. There is no digital output.

LAB REPORT

Philips players normally manage a fine set of lab results irrespective of price, and this

player is no exception. Barring the (similarly normal) low level resolution problem there is little to criticize and much to praise. Channel balance was perfect and stereo separation commendable. Harmonic distortion was low at all levels down to -80dB where some improvement is desirable. Intermodulation products were very well suppressed and the downband noise from 20kHz full level was respectable. Frequency response was admirably flat, albeit with a dash of typical Philips digital filter ripple.

Output level was very close to the standard 2V. De-emphasis was accurate and error correction worked without problem. Track access was not as fast as some and the player mechanism was mechanically a little noisy by recent standards. However, resistance to shock and vibration was nothing short of excellent with our sample.

Ultrasonic spurious could have been better suppressed and signal-to-noise ratios were only adequate on this player (a notable contrast with others in the present range). Low level linearity is definitely a weakness with the Philips TDA1541 dual DAC, and the one fitted to this sample is no exception; resolution is close to 15 bits.

SOUND QUALITY

Despite the plastic, 'budget' build quality and price, Philips technology again ensures a good overall sound quality rating. There was slight midrange 'roughness' or 'coarseness', but not to a degree where it could be censured as 'hard' sounding. Detail, focus and depth were all pretty good, and the bass sounded lively and invigorating – quite 'snappy' and 'boppy' to be precise. The treble was slightly smeared, clearly falling somewhat short of the various more sophisticated variants on this particular technological theme, but again was pretty good nonetheless. The overall sound is lively and dynamic,

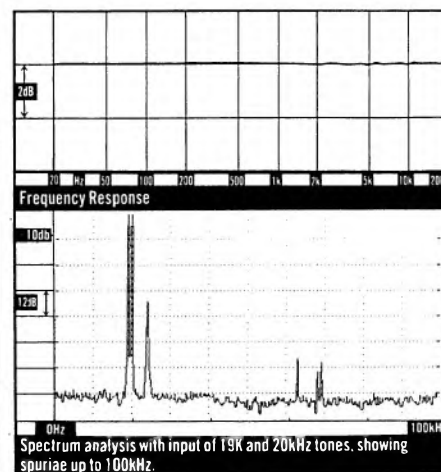
again showing many of the qualities of more upmarket stablemates.

CONCLUSIONS

Though the build and presentation may not be to every taste, this is a fundamentally honest basic player that delivers more than enough of the sonic goods to merit a Best Buy rating.

TEST RESULTS

	20Hz	1kHz	20kHz
Channel balance	0.00dB	0.00dB	0.03dB
Stereo separation	97dB	95dB	97dB
Channel phase difference	0°	0°	0°
Total harmonic dist, 0dB	-94dB	-87dB	-86dB
Total harmonic dist, -10dB	—	-81dB	—
Total harmonic dist, -60dB	—	-49.4dB	—
Total harmonic dist, -80dB	—	-20/14dB	—
Intermodulation, 19kHz/20kHz, 0dB			-102dB
Intermodulation, 19kHz/20kHz, -10dB			-99dB
Frequency response, left channel	0.01dB	0	-0.02dB
Frequency response, right channel	0.00dB	0	-0.06dB
Signal-to-noise, 20Hz-20kHz unweighted			98dB
Signal-to-noise, CCIR/ARM, 1kHz ref			104/105dB
Output level, 0dB, left/right			2.083V
Output impedance			200ohms
De-emphasis 1kHz, -0.38dB; 5kHz, -4.62dB; 16Hz, -9.10dB			
Track access time			4 secs
Error correction capability			>900µm gap, >800µm dot
Mechanical noise			average
Spurious up to 100kHz			-87dB
Resolution at -90dB			-94.36/-109dB
Headphone socket			150ohms
Dimensions (w x d x h)			32 x 29 x 7.8cm
Estimated typical purchase price			£179



PHILIPS CD472

PHILIPS ELECTRICAL LTD., CITY HOUSE, 420-430 LONDON ROAD, CROYDON, SURREY CR9 3QR. TEL: (01) 689 2166.



Clearly determined to hang onto their brand leadership, Philips demonstrate inventiveness to the point of confusion in ringing the permutations and combinations around their various CD player 'building blocks' – not to mention a pretty inscrutable line in model nomenclature. The '472 is their 1988 full width remote control budget player, targeted around £200, and clearly a prime candidate for partnering the new amplifiers, tuner and cassette decks that represent Philips' return to the full line hi-fi separates market.

Under the skin this is the usual combination of plastic chassis and metal wrap, with a touch of vibration decoupling in the feet. But it also represents a change in style compared with predecessors in the form of a 'dust trap' ledge along the lower edge of the front panel.

This should of course have helped sort out the ergonomics, but the front panel is all a bit busy, over-graphicised, and lacks the logical elegance that is one of the hallmarks of good design. The provision of a simple operational remote at this price is impressive, as is the fair size display and generally pretty comprehensive feature line-up. Why it should be necessary to reprint half the advertising brochure on the front panel remains a mystery – though to be fair Philips are by no means alone in being unable to resist emblazoning their "linear scate loading system/wireless remote control/digital filtering 16-bit D/A converter/four times oversampling". (Scate is presumably Dutch for a very tasty, if bony species of flatfish.)

This is a basic though fully up to date Philips machine in engineering terms, the printed circuit board closely resembling that used in the CD360 and its close relatives. 16-bit 4x oversampling D/A chips are naturally used, along with the new, more reliable transport/drawer mechanism. Apart from using good quality capacitors at the output, there are no other obvious special compo-

nents or features.

LAB REPORT

Despite its budget price, this Philips turned in as high a standard of performance as any of its ilk. The responses were flat, with the mild characteristic HF ripple. Channel balance was nice and tight, separation good at all frequencies, while dual DACs take care of any inter-channel phase shifts. Harmonic and intermodulation distortions are all well controlled in-band, though the IM spectrogram does show a fair amount of ultrasonic beats and the like.

Output level matches the standard, from a nice low source impedance. Signal-to-noise ratios are very good and ultrasonic spurious were generally pretty low. De-emphasis is accurate, error correction effective, mechanical noise low, and shock and vibration rejection very good, but track access was a little sluggish. The one weakness with the Philips DACs seems to lie in the low level linearity, one channel here being some 17dB out.

SOUND QUALITY

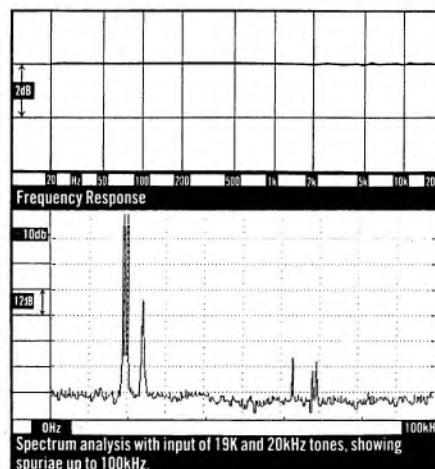
Despite its very modest price tag, the sound quality rating for this model was a solid good overall, verging perilously close to the very good rating normally the preserve of significantly more costly players. As expected, the fundamental Philips character was present in the lively overall sound with good bass 'bounce' and tunefulness. The parallels were closest with the 371 tested at the same time, though the full-width '472 did manage to sound just that little bit sweeter and more refined, with better depth and space perspectives. Indeed there is little to criticise, such is the fine overall balance, with only a little lack of scale and solidity, and loss of the most precise soundstage delineation separating this model from the top ranks.

CONCLUSIONS

Once again one cannot argue with the fine sound quality Philips make available at a modest price – with remote control and extensive facilities besides – ensuring yet another Best Buy rating.

TEST RESULTS

	20Hz	1kHz	20kHz
Channel balance	0.02dB	0.0dB	0.02dB
Stereo separation	96dB	95dB	95dB
Channel phase difference	0°	0°	0°
Total harmonic dist, 0dB	-95dB	-88dB	-85dB
Total harmonic dist, -10dB	—	-80dB	—
Total harmonic dist, -60dB	—	-47dB	—
Total harmonic dist, -80dB	—	-17dB	—
Intermodulation, 19kHz/20kHz, 0dB			-106dB
Intermodulation, 19kHz/20kHz, -10dB			-99dB
Frequency response, left channel	0.01dB	0	-0.02dB
Frequency response, right channel	0.01dB	0	-0.02dB
Signal-to-noise, 20Hz-20kHz unweighted			103dB
Signal-to-noise, CCIR/ARM, 1kHz ref			102dB
Output level, 0dB, left/right			2.048V
Output impedance			200ohms
De-emphasis 1kHz, -0.38dB, 5kHz, -4.64dB, 16kHz, -9.09dB			
Track access time			4 secs
Error correction capability			>900µm gap, >800µm dot
Mechanical noise			low
Spuriae up to 100kHz			-87dB
Resolution at -90dB			-94.06/-107.12dB
Headphone socket			150ohms
Dimensions (w x d x h)			41.9 x 30 x 7.9cm
Estimated typical purchase price			£199



PHILIPS CD473

PHILIPS ELECTRICAL LTD, CITY HOUSE, 420-430 LONDON RD, CROYDON, SURREY CR9 3QR. TEL: 01-689 2166

BEST BUY



Competitively priced, the full-sized *CD473* is fitted with *FTS* (favourite track selection), a useful facility which allows the programmed storage of a personalised playing order for several hundred discs. The front panel control lay-out is functional, with all the facilities needed for efficient operation – some on an angled lower section.

The display is switchable between track/index number and elapsed time for each track, and there is also a matrix calendar (up to 20) display: The progress of play is denoted by first flashing and then deleting these numbers. Flags appear for pause, repeat and *FTS* functions. Also included is a comprehensive remote control device complete with volume control and discrete track selection – unusual at this price level until very recently.

A variable headphone output socket (yet another improvement over its predecessor) is situated under the on/off switch. The player is well finished with a steel case over a plastic chassis, and a digital output socket is sited on the rear panel along with the audio outputs

LAB REPORT

Light construction aside, this player features a printed circuit board which contains all the main digital and audio functions. Separate DACs with four times oversampling means an almost textbook set of measurement results – the exception being the poor -90dB resolution which we have now come to accept from this series of Philips DACs (though interestingly Sony's application avoids the problem).

An extra circuit board has been added to include the digital volume control, which allows only eight individual steps in coarse 3dB increments. Also contained on this board are the output buffering and muting circuits.

The player mechanism has been improved and is smoother in action. Resistance to

shock is excellent, and mechanical noise is very low. Spurious could be better suppressed, but the figures obtained are adequate for the price. The headphone socket has an output impedance of 150ohms , and is therefore not really suitable for driving low impedance types.

The distortion figures are very good until low output levels are reached, and at -80dB are below average. The signal-to-noise ratios under all measurement regimes are entirely satisfactory. Channel separation was not as good as expected, being some 10dB worse than the earlier Philips *360*, but is still reasonable nonetheless.

SOUND QUALITY

This *473* design continues to keep Philips' budget players at the forefront in regard to sound quality. The advance over the previously highly rated Philips *CD360* was immediately apparent: this player had definitely moved up to the next grade, and is very close to some existing audiophile products. (But we must not forget that the *CD360* wasn't that far away either.)

The bass is articulate, with commendable 'speed' and 'slam'. The midrange was detailed and open, and we were unable to catch it out on a range of program from classical to jazz. The treble has little trace of grain, is well balanced and integrated with appealing transparency and resolution, but could be accused of being somewhat 'brash' at times.

The soundstage exposes some of the depth and 'layered' information normally only available from more expensive offerings, while width and imaging are well above average, with good ambience and separation. With the 'digital out' socket shorted this unit seduced and inspired even more, highlighting the characteristics of an already classy sound. As with the Marantz, the reproduction outclas-

sed many established players costing considerably more.

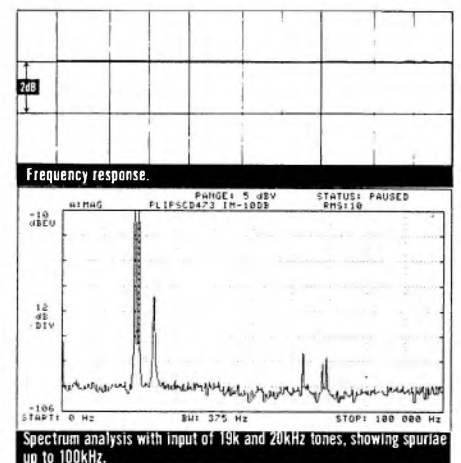
CONCLUSIONS

This is one of the best sounding Philips players, even compared with its much more expensive relatives. Combine this with an extremely good set of lab results and an ability to reveal a wealth of information lost to many players and it must be wholeheartedly welcomed as a Best Buy, providing production samples are up to this standard.

TEST RESULTS

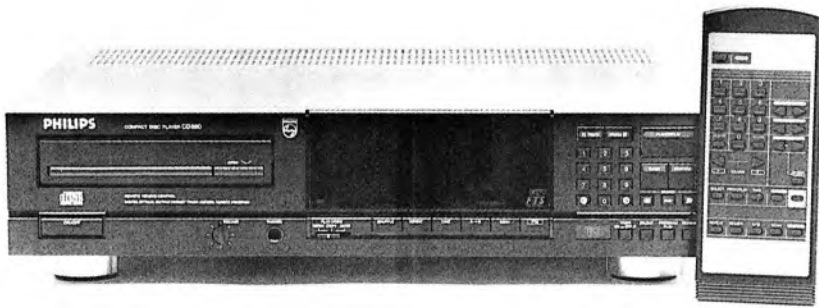
	20Hz	1kHz	20kHz
Channel balance	0.06dB	0.05dB	0.08dB
Stereo separation	95dB	96dB	89dB
Channel phase difference	0°	0°	0°
Total harmonic dist, 0dB	-94dB	-93dB	-87dB
Total harmonic dist, -10dB	—	-84dB	—
Total harmonic dist, -60dB	—	-44dB	—
Total harmonic dist, -80dB	—	-15dB	—
Intermodulation, 19kHz/20kHz, 0dB			-99dB
Intermodulation, 19kHz/20kHz, -10dB			-94dB
Frequency response, left channel	0.03dB	0	0
Frequency response, right channel	0.03dB	0	0
Signal-to-noise, 20Hz-20kHz unweighted			105/107dB
Signal-to-noise, CCIR/ARM, 1kHz ref			101/104dB
Output level, 0dB, left/right			2.04V
Output impedance			200ohms
De-emphasis 1kHz, 5kHz, 16kHz	-0.38dB, -4.61dB, -9.08dB		
Track access time			3.5 secs
Error correction capability		>900µm gap, >800µm dot	
Mechanical noise			low
Spurious up to 100kHz			-88dB
Resolution at -90dB			-100.8/-115.5dB
Headphone socket			yes, variable, 150ohms
Dimensions (w x d x h)			42 x 28 x 8.1cms
Estimated typical purchase price			£250

Reassessed and reprinted from *ISSUE* No. 53.



PHILIPS CD880

PHILIPS ELECTRICAL LTD., CITY HOUSE, 420-430 LONDON ROAD, CROYDON, SURREY CR9 3QR. TEL: (01) 689 2166.



Built like a tank, this £500 heavyweight claims Belgian manufacture (like all the cheaper Philips models) but in many respects resembles their 960 'flagship' produced in the ex-Marantz factory in Japan. The truth is it's something of a hybrid, sharing some parts with the 960 but assembled and cased in Belgium – a cost effective blend to be sure, if a trifle incongruous in the light of Philips current EEC politicking over European manufacturing content in CD players. The front panel extrusion confers confidence, as do the controls and operational smoothness – a nice touch being the rubber 'graze pad' along the front edge of the drawer, while the boxed heatsink on the rear also avoids abrading errant fingers. The base seemed well damped, but the wrapover top and sides is a bit rattly, while vibration decoupling through the feet seemed vestigial.

The feature count is pretty impressive, the front panel proclaiming the 'remote volume control' (in addition to implied remote function control) and 'digital and optical output/direct track access/direct program' to all and sundry. Other features include Philips' own clever FTS system for pre-programming one's CD collection, 'shuffle' (random) play, plus all the usual drive and programming functions expected on a luxury model. The very informative display is as elaborate as the array of controls, and the whole might prove a little daunting for some users, though button pushers will relish the 12-key programming pad with menu display etc.

The internal engineering and componentry go a long way towards justifying the 'de luxe' claims. The whole unit is based on a solid die-cast chassis, and some of the steel panels are copper plated, if undamped. The transport is also based on a Philips die-casting, and many of the components are specially selected, expensive grades. The

large power supply transformer has similarly generous 2x6,800µF reservoir capacitors, and the DACs are selected A-grade TDA1541s.

LAB REPORT

The frequency response up to 20kHz would put most signal generators to shame – very flat but with Philips' mild high frequency ripple. Stereo separation was very good and channel balance almost perfect. The dual DACs mean no inter-channel phase difference and absolute phase is maintained. THD was superior at all frequencies and levels, downband noise from 20kHz 0dB was well suppressed, and IM products were almost lost in the measuring instrument noise floor. Output level was a standard 2V from the familiar Philips 200ohm source impedance.

De-emphasis was correct, track access time fast, mechanical noise very low and resistance to shock and vibration judged excellent. No problems were encountered with error correction functions, and the white noise test was passed without problem. Signal-to-noise ratios were excellent, but ultrasonic spurious could have been better suppressed. The low level resolution was a little better than the majority of players using TDA1541 DACs, but still showed an average error of 6dB, though there was a reasonable attempt at the reproduction of a -90dB 1kHz sine wave.

SOUND QUALITY

This substantially built Philips costs significantly more than all but their 960, yet the very good sound quality rating justifies its position in the hierarchy. The sound was solid, competently uncoloured and pleasantly free of any oddities. There was a slightly 'steely' quality on strings, but the treble was really very good, if a touch bland. Bass showed a mild loss of weight, but was

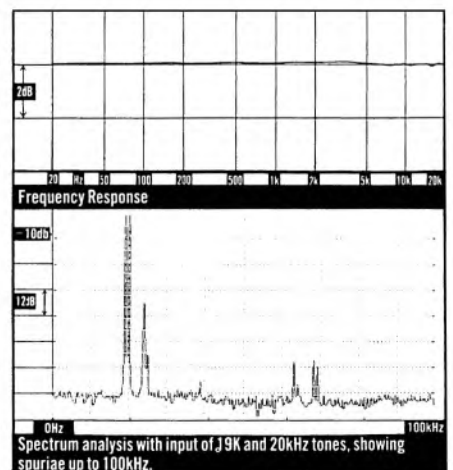
fast and dry, while the midrange was impressively neutral, if a shade muted dynamically. Stereo staging was consistently very good in all respects.

CONCLUSIONS

The 880 is an impressive blend of luxury build quality and features at a far from extravagant price. It also delivers the subjective goods and hence deserves Recommendation.

TEST RESULTS

	20Hz	1kHz	20kHz
Channel balance	0.03dB	0.04dB	0.05dB
Stereo separation	126dB	121dB	106dB
Channel phase difference	0°	0°	0°
Total harmonic dist, 0dB	-100dB	-87dB	-86dB
Total harmonic dist, -10dB	—	-83dB	—
Total harmonic dist, -60dB	—	-47dB	—
Total harmonic dist, -80dB	—	-25dB	—
Intermodulation, 19kHz/20kHz, 0dB	—	—	-105dB
Intermodulation, 19kHz/20kHz, -10dB	—	—	-101dB
Frequency response,			
left channel	0.01dB	0	-0.02dB
Frequency response,			
right channel	0dB	0	-0.04dB
Signal-to-noise, 20Hz-20kHz unweighted			104/108dB
Signal-to-noise, CC/IR/ARM, 1kHz ref			108/109dB
Output level, 0dB, left/right			2.03V
Output impedance			200ohms
De-emphasis 1kHz, -0.38dB, 5kHz, -4.62dB, 16kHz, -9.1dB			
Track access time			2.5 secs
Error correction capability			>900µm gap, >800µm dot
Mechanical noise			low
Spuriae up to 100kHz			-83dB
Resolution at -90dB			-95.3/-97.4dB
Headphone socket			variable, 144ohms
Dimensions (w x d x h)			42 x 34.5 x 10.5cm
Estimated typical purchase price			£500



PIONEER PD-5050

PIONEER HIGH FIDELITY GB LTD., FIELD WAY, GREENFORD, MIDDX UB6 8UZ. TEL: (01) 575 5757.

RECOMMENDED



Pioneer must be one of the few companies to have made a virtue out of Laservision, so their CD players sit on a firm foundation in optical disc technology. The *PD-5050* is a £200 budget player with a generous line-up of features and facilities for the price, but no remote control unit. For that you will have to buy the *6050*, costing some £30 more, but otherwise apparently identical.

Build is determinedly lightweight – inevitably so in view of the price – with no attempt at isolating the unit from the environment, though the actual box structure is solid enough, assisted by its firm honeycomb base. The plastic front panel is decidedly busy looking, enlivened (if that's the word) by gold graphics and a 10-key track entry pad. The display is also pretty elaborate if pretty small, with two time readouts plus a whole variety of telltales and legends.

Inside, an essentially plastic disc drive sits on a partly decoupled metal chassis, and incorporates a large disc damper. The unit as a whole has steel panels plus Pioneer's proprietary 'honeycomb' base. The mains transformer is quite small, and there is no evidence of 'audiophile componentry', while the digital technology is also fairly basic, with a single time-shared Burr Brown *PCM56P* DAC and Sony 2x oversampling digital filtering.

LAB REPORT

Channel balance was very good in the mid-band, with mild deviation at high frequencies. Channel separation was fine at all frequencies and the phase difference is typical of a time-shared converter running at 2x oversampling. No clipping was apparent with a full level white noise signal, and the impulse test showed minimal ring and no phase inversion. Total harmonic distortion was very good throughout, and intermodulation products were fairly well suppressed. The frequency response was acceptable for this price level,

showing some trivial aberrations above 5kHz.

The output level is to standard but the source impedance is a highish 1kohm. De-emphasis characteristics were correctly set and error correction circuits operate well. Ultrasonic spurious would benefit from further suppression, but the signal-to-noise ratios were fine. The low level resolution was not a strong point, both channels showing a 7.4dB error with a signal of -90dB; the 'sine wave' produced at this level was virtually indistinguishable from background noise. A further check performed at -80dB gave an output some 3dB low, indicating a resolution of 14.75 bits.

SOUND QUALITY

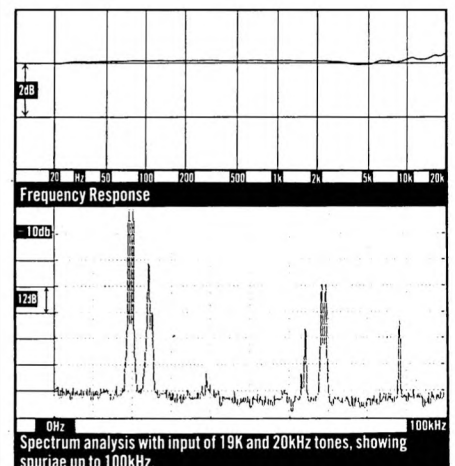
Fair enough considering this player sits firmly in the budget category, faint praise is not intended to represent damnation, but the *5050* was rather unexceptional, if competent enough for less demanding palates. The treble sounded a little 'scratchy' and 'spitchy', projecting good detail but perhaps drawing rather too much attention to itself. The mid-band was not entirely neutral, sounding a little 'pinched' and slightly coloured at the top of the range, but the bass sounded firm and extended, with a good sense of rhythm conveyed with gusto. Dynamics were pretty good, and the stereo image showed respectable staging and presentation.

CONCLUSIONS

Though it's true to say that this is neither our favourite budget CD player nor our favourite Pioneer, the £200 *PD-5050* (and by inference the remote-equipped £230 *PD-6050*) delivers a well judged combination of good build, plentiful features and decent sound at a price that comfortably qualifies for Recommendation.

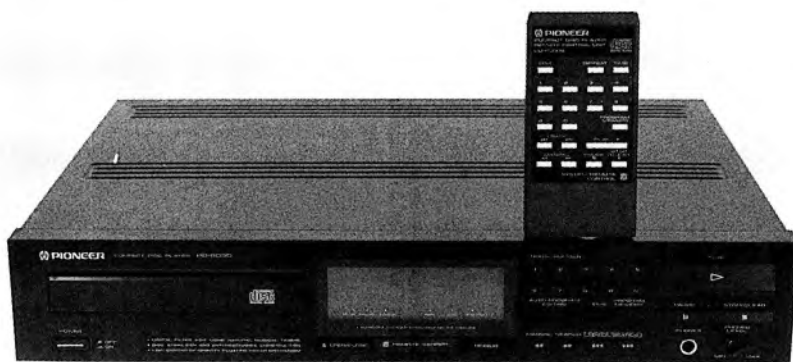
TEST RESULTS

	20Hz	1kHz	20kHz
Channel balance	0.02dB	0.03dB	0.18dB
Stereo separation	97dB	97dB	80dB
Channel phase difference	0°	2°	41°
Total harmonic dist, 0dB	-88dB	-91dB	-86dB
Total harmonic dist, -10dB	—	-84dB	—
Total harmonic dist, -60dB	—	-42dB	—
Total harmonic dist, -80dB	—	-19dB	—
Intermodulation, 19kHz/20kHz, 0dB			-89dB
Intermodulation, 19kHz/20kHz, -10dB			-94/81dB
Frequency response,			
left channel	0.02dB	0	-0.54dB
right channel	0.02dB	0	-0.38dB
Signal-to-noise, 20Hz-20kHz unweighted			98/101dB
Signal-to-noise, CCIR/ARM, 1kHz ref			90/95dB
Output level, 0dB, left/right			2.05V
Output impedance			1kohm
De-emphasis 1kHz, -0.41dB; 5kHz, -4.66dB; 16kHz, -8.31dB			
Track access time			3.5 secs
Error correction capability			>900µm gap, >800µm dot
Mechanical noise			not assessed
Spurious up to 100kHz			-70dB
Resolution at -90dB			-97.4/-97.4dB
Headphone socket			(variable, 121ohms)
Dimensions (w x d x h)			42 x 33 x 7.7cm
Estimated typical purchase price			£200



PIONEER PD-6050

PIONEER HIGH FIDELITY GB LTD, FIELD WAY, GREENFORD, MIDDX UB6 8UZ. TEL: 01-575 5757



Pioneer may not be one of the largest Japanese electronics companies, but they are known primarily as audio specialists and have long been well established in the UK. Over the years they have come up with some highly rated products, and their ventures into CD have provided some interesting players. As well as leading the market in sophisticated autochangers they also have well specified standard machines.

Such is the CD player sales competition, even budget players are now coming with standard facilities that were reserved for the more expensive end of the range only a year ago. This player is no exception: although lacking a 'digital out' socket, and any form of remote volume control, the PD-6050 has virtually everything else.

Constructed on Pioneer's now familiar honeycomb-pattern pressed steel base with steel cover, this player is very solid and rigid. The inside is neat, and all the major circuit functions are performed on a single, well designed circuit board. Controls are well laid out, and the remote control provides an additional keypad track select function, elsewhere duplicating the player's front panel controls apart from auto programme editing.

As well as the familiar established controls provided on every CD player, Pioneer allow the user to select the programme order with up to 24 steps, which can be edited while a disc is playing. A pause may be specified within the programme, and can then be manually overridden. Auto programme editing allows programmed tracks to be played back within a desired time – a useful feature. A variable output headphone socket is also provided.

LAB REPORT

Typical of Japanese players at this price level, a 2x oversampled time-shared DAC is used, resulting in unavoidable phase shift at

high frequencies. The frequency response is pretty flat, with some ripple at high frequencies which caused the slight fall in measured response at 20kHz; however, this is a very localised phenomenon, and not serious. The impulse showed that ringing was well controlled, and the player preserves absolute phase.

Channel balance was very good; separation was perfectly adequate and maintained up to 20kHz. Output level was slightly high and the output impedance of 1kohm (although higher than most) should cause no problems in normal applications. The de-emphasis circuits worked adequately, mechanical noise was low, and track access times were reasonably fast. Signal-to-noise ratios were adequate, and could have measured a little better.

Total harmonic distortion figures were very good indeed, and were amongst the best I have ever measured down at -80dB. Intermodulation distortion figures were also good, and linearity was a very respectable 15.8 bits. Spurious above 20kHz were a little on the high side, but being well out of the audio band should not cause any problems. Resistance to shock was a little below average.

SOUND QUALITY

The Pioneer impressed with a clean, firm, well controlled and extended bass, plus good dynamics which were particularly liked on rock and jazz program. The midrange was a little 'forward' and 'thin'; this showed up particularly on violins which had a tendency towards exuberance in the upper registers. Treble had good clarity, but was a mite exaggerated, though not seriously grainy or extravagant. The soundstage was well focused with better than average depth; images were well formed and a fair degree of ambience was portrayed.

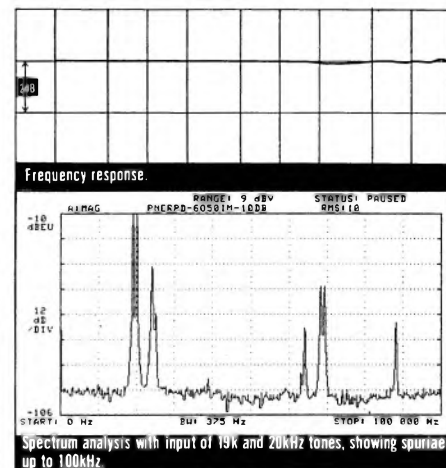
CONCLUSIONS

Although some aspects could be improved, the 6050 rates highly on the value for money quotient. On the whole the lab performance was highly commendable, and the sound quality well liked, so inclusion as Recommended is mandatory.

TEST RESULTS

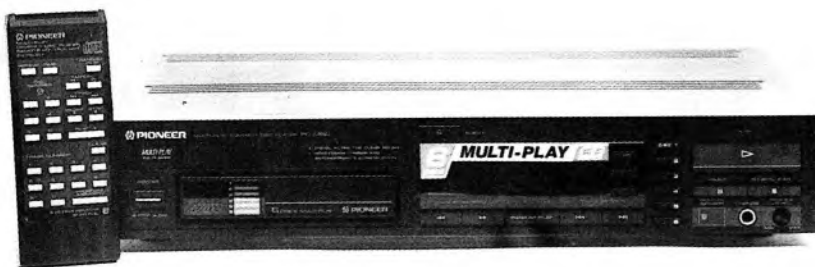
	20Hz	1kHz	20kHz
Channel balance	0.03dB	0.02dB	0.06dB
Stereo separation	95dB	96dB	91dB
Channel phase difference	0°	2°	41°
Total harmonic dist, 0dB	-94dB	-96dB	-83dB
Total harmonic dist, -10dB	—	-89dB	—
Total harmonic dist, -60dB	—	-57dB	—
Total harmonic dist, -80dB	—	-26dB	—
Intermodulation, 19kHz/20kHz, 0dB	—	—	-87dB
Intermodulation, 19kHz/20kHz, -10dB	—	—	-87dB
Frequency response,			
left channel	0.04dB	0dB	-0.43dB
Frequency response,			
right channel	0.04dB	0dB	-0.45dB
Signal-to-noise, 20Hz-20kHz unweighted			97/101dB
Signal-to-noise, CCIR/ARM, 1kHz ref			90/94dB
Output level, 0dB, left/right			2.23V
Output impedance			1kohm
De-emphasis 1kHz, 5kHz, 16kHz	-0.37dB; -4.58dB; -8.37dB		
Track access time			3.5 secs
Error correction capability			>900µm gap, >800µm dot
Mechanical noise			low
Spuriae up to 100kHz			-69dB
Resolution at -90dB			-92dB
Headphone socket			yes, variable, 120ohm
Dimensions (w x d x h)			42 x 32.5 x 7.9cms
Estimated typical purchase price			£230

Reassessed and reprinted from issue No. 53.



PIONEER PD-M50

PIONEER HIGH FIDELITY GB LTD., FIELD WAY, GREENFORD, MIDDX UB6 8UZ. TEL: (01) 575 5757.



Though one of the leading brands in conventional standalone players, Pioneer have carved out a particular niche for themselves in CD autochangers, able to select as required from a special caddy pre-loaded with six discs, for which there is a small but steady market. This latest model shows how neatly they have developed the concept, in a machine no larger than most standard size players. The autochanger inevitably carries some price premium, though this is probably down to around £50 or so, the rest of the package consisting of a competently built and finished remote control player selling at £280 *in toto*.

The need to cope with the programming and selection from a caddy of six discs seems to have imposed some measure of discipline upon Pioneer's frequently over enthusiastic stylists. The result is relatively easy to use, and as intuitive as any such autochange system is likely to be, even if the mixture of typefaces, sizes and colours could offend the aesthete. The player is built on Pioneer's proprietary rigid 'honeycomb' base, with a plastic front, a rather rattly metal top, and nothing much in the way of feet. The remote unit has keypads for disc and track selection, but no volume adjustment.

The complex multi-play transport mechanism is well executed with nylon plastic moving parts on a pressed steel chassis. Signal connections use ribbon cables, but the electronic components appear to be of standard commercial grades, and some internal mains leads are unshrouded. The digital technology is fairly basic, using a single time-shared Burr Brown DAC (*PCM56P*), plus a twice oversampling Sony digital filter chip set.

LAB REPORT

Channel balance was near perfect especially at low to mid frequencies, and separation

was quite reasonable. Although the white noise test revealed no clipping, this player seemed messy with a full level 1kHz signal, delivering a THD of -76dB , some 10dB less than expected. However, the low frequency performance was fine, and the downband products of a full level 20kHz tone were fairly well suppressed. At lower signal levels harmonic distortion was very presentable, but IM figures could have been better. The frequency response was fairly flat, with little HF lift. The output level was higher than normal, and de-emphasis was fine.

Although the track access time of 7 seconds may look slow, remember this is an autochanger; the ability to select the required track on the selected disc in that time is no mean feat. Mechanical noise was low. Signal-to-noise ratios were merely adequate by CD standards, and resistance to shock and vibration was only average. Ultrasonic spurious measured an unexceptional though adequate -73dB .

Low level linearity was very good, representing one of the high points of this machine's performance. The -90dB sine wave was well constructed, albeit slightly marred by some noise. The headphone output had a commendably low source impedance, so will drive most 'phones to decent levels.

SOUND QUALITY

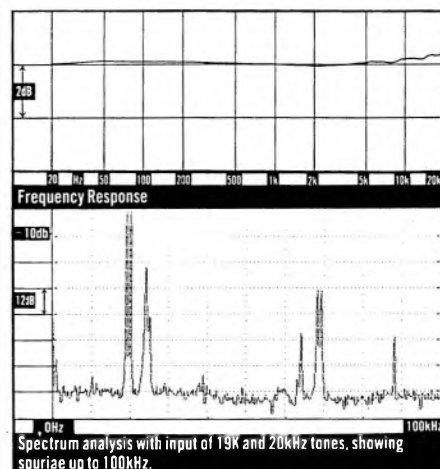
Rated good overall, this is a promising result for the price and considering the autochange facilities on offer. Stereo imaging was a strength, with above average depth, good width and focus. The midrange was quite clear, albeit with some 'squeakiness' and 'stringiness'. The bass might have usefully had more slam and power, while the treble was a little forward and 'obvious', with slight 'grain' and 'spitchiness'. Like other Pioneer models, dynamics were well liked, providing a lively and involving sound overall.

CONCLUSIONS

This machine would justify its price on features, sound and build quality even disregarding the autochange system. Add that into the equation and Recommendation becomes mandatory, at any rate for those who don't mind a little extra complexity or who will value the facility.

TEST RESULTS

	20Hz	1kHz	20kHz
Channel balance	0.02dB	0.01dB	0.09dB
Stereo separation	82dB	82dB	70dB
Channel phase difference	0°	2°	43°
Total harmonic dist, 0dB	-88dB	-76dB	-80dB
Total harmonic dist, -10dB	—	-76dB	—
Total harmonic dist, -60dB	—	-46dB	—
Total harmonic dist, -80dB	—	-21dB	—
Intermodulation, 19kHz/20kHz, 0dB	—	—	-71dB
Intermodulation, 19kHz/20kHz, -10dB	—	—	-70dB
Frequency response, left channel	0.02dB	0	-0.26dB
Frequency response, right channel	0.02dB	0	-0.36dB
Signal-to-noise, 20Hz-20kHz unweighted	—	—	96/100dB
Signal-to-noise, CCIR/ARM, 1kHz ref	—	—	89/94dB
Output level, 0dB, left/right	—	—	2.17V
Output impedance	—	—	1kohm
De-emphasis	1kHz, -0.4dB; 5kHz, -4.7dB; 16kHz, -8.1dB	—	—
Track access time	—	—	7 secs (autochanger)
Error correction capability	—	—	>900µm gap, >800µm dot
Mechanical noise	—	—	low
Spuriae up to 100kHz	—	—	-73dB
Resolution at -90dB	—	—	-87.9/-90.3dB
Headphone socket	—	—	variable, 25ohms
Dimensions (w x d x h)	—	—	42 x 32 x 7.9cm
Estimated typical purchase price	—	—	£280



CD + PH = A3

While in play, a compact disc is spinning at very high speeds. Which means that the tiny laser of light which plays the disc must be deadly accurate.

Unfortunately, there is one major hazard which the laser is almost certain to encounter:

It's called a fingerprint.

A treacherous mix of natural acids and tiny particles of everyday grime. The digital pH factor. And its effect on the laser can be like black ice on a speeding car. Often the result is an audible accident such as mistracking, skipping or complete rejection. At the very least the music will sound distinctly strained as your player tries to correct massive numbers of digital errors.

To avoid such problems, fingerprints and grime must be dissolved and removed in a safe, precise, radial



way. Otherwise damage may be permanent and discs become unplayable. The Allsop 3 system is unique. Fully compatible with CD manufacturers' cleaning recommendations, it is quick and easy to operate and is specially engineered so that radial cleaning is completely automatic.

Cleaning solution and spare cleaning ring are supplied with the system and further refills are also available.

So, to keep that crystal clear CD sound safe for life, just follow the formula and get Allsop 3.



ALLSOP 3
SYSTEM

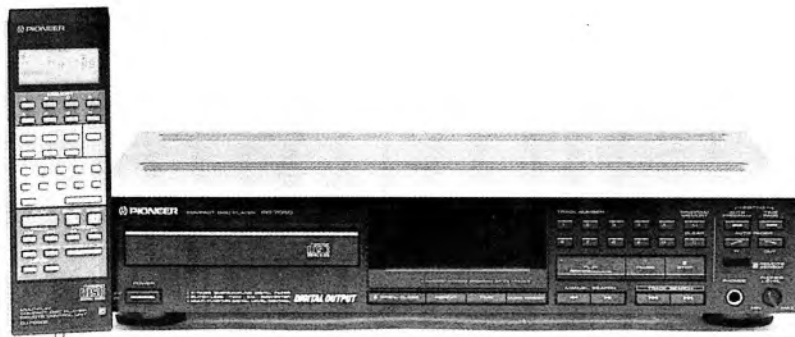
EFFECTIVE, COMPATIBLE CARE

PATM
GROUP PLC

Poth Group Plc, Deasborough Industrial Park, High Wycombe, Bucks HP12 3BG.
Tel: 0494 459981. Telex: 837134 PATM G. FAX: 0494 461209

PIONEER PD-7050

PIONEER HIGH FIDELITY GB LTD., FIELD WAY, GREENFORD, MIDDLESEX UB6 8UZ. TEL: (01) 575 5757.



Pioneer fans with £280 to spend have the option of going for this full feature, luxury build player or the slightly less substantially constructed M50 6-disc autochanger. There is a little confusion over the remote handset, as that supplied was reminiscent of the latest 'point and squirt' VCR programmers, with an LCD display and various memory programmes, whereas that shown in the instruction manual is more conventional and straightforward, albeit similarly comprehensive with full volume and digital fade facilities plus a direct track entry keypad.

The box has Pioneer's rigid honeycomb base, a substantial extruded metal fascia, and a rather resonant metal wrap, sitting on feet that may assist in isolation. This is not the most straightforward or intuitive machine to operate. The facilities are elaborate, and the Pioneer stylists have done nothing to soften the blow, busy graphics in fact tending to make the whole fascia look rather cluttered. The display is similarly complex and quite large, with menu track display and various telltales, but rather small individual digits.

The base provides good fundamental structural rigidity, and the loading drawer operates smoothly. The laser system reportedly has a sophisticated suspension and low centre of gravity in order to improve its stability. There are separate power supplies for the analogue and the digital circuitry, the latter having two 16-bit 4x oversampling DACs.

LAB REPORT

The frequency response is flat enough, albeit showing mild upturns at the extremes, notably in the bass. Channel balance was pretty close, though again a little out at the bass end, while separation figures were very good indeed, showing mild deterioration at high frequencies. The close channel phase corres-

pondance at high frequencies confirms the use of separate DACs for each channel. Harmonic distortion figures are very good, intermodulation slightly less so at full (0dB) level, giving some indication of mild stress here.

Output level is significantly above the standard, so care needs to be taken to compensate if attempting to make direct A/B comparisons, while the source impedance is also a little on the high side. Signal-to-noise ratios are all very good, but de-emphasis could have been more precise at high frequencies. Track access speed was predictably faster than the autochanger model, but is still somewhat slower than most rivals achieve, while error correction is fine and mechanical noise low. Ultrasonic spurious are reasonably low, though not quite up to the best, while low level (-90dB) linearity also leaves some room for improvement, but is actually rather better than most machines manage.

SOUND QUALITY

The 7050 scored an overall rating at the top end of our 'good' range, which is pretty good considering the reasonable price of this well equipped player. The bass sounded a touch 'thumpy' but with good weight and extension, while the midrange was very slightly 'thin' but clear and dynamic with effective 'layering' shown in the stereo imaging. A touch brash and excitable, this machine nevertheless delivered a committed performance that must represent good value for money.

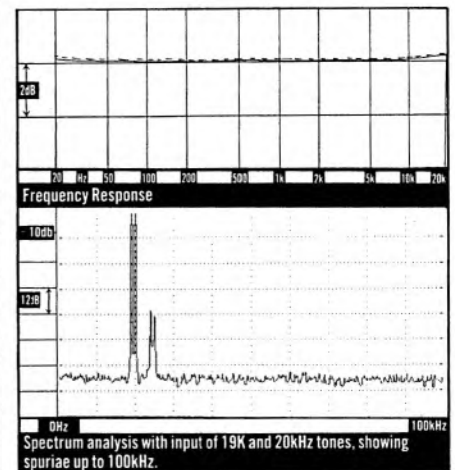
CONCLUSIONS

Balancing the various attributes of good lab performance and fine sound quality plus decent build and a plethora of facilities, this Pioneer comes out well on the plus side. Not everybody's idea of superficial beauty perhaps, its virtues are more than skin deep,

and the player clearly deserves a Best Buy rating.

TEST RESULTS

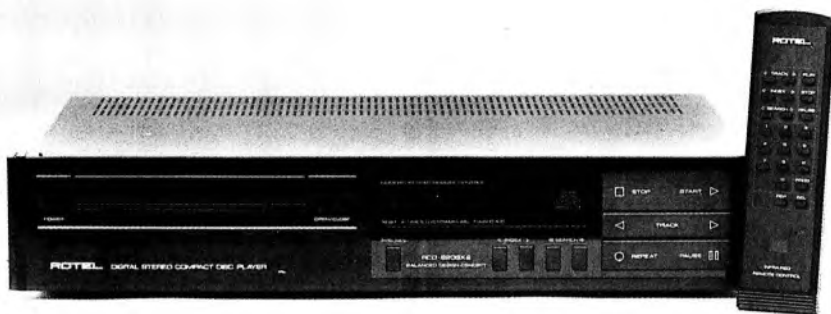
	20Hz	1kHz	20kHz
Channel balance	0.12dB	0.01dB	0dB
Stereo separation	120dB	113dB	95dB
Channel phase difference	0°	0°	0°
Total harmonic dist, 0dB	-96dB	-94dB	-90dB
Total harmonic dist, -10dB	—	-84dB	—
Total harmonic dist, -60dB	—	-39dB	—
Total harmonic dist, -80dB	—	-20dB	—
Intermodulation, 19kHz/20kHz, 0dB	—	—	-95dB
Intermodulation, 19kHz/20kHz, -10dB	—	—	-102dB
Frequency response,			
left channel	0.13dB	0	-0.09dB
Frequency response,			
right channel	0.13dB	0	-0.06dB
Signal-to-noise, 20Hz-20kHz unweighted			102/108dB
Signal-to-noise, CCIR/ARM, 1kHz ref			98/103dB
Output level, 0dB, left/right			2.42V
Output impedance			933ohms
De-emphasis 1kHz, -0.34dB; 5kHz, -4.78dB; 16kHz, -8.95dB			
Track access time			4 secs
Error correction capability			>900µm gap, >800µm dot
Mechanical noise			low
Spurious up to 100kHz			-92dB
Resolution at -90dB			-86.9/-85.9dB
Headphone socket			120ohms
Dimensions (w x d x h)			42 x 31.5 x 8.4cm
Estimated typical purchase price			£280



ROTEL RCD820BX2

ROTEL HI-FI, 25 HEATHFIELD, STACEY BUSHES, MILTON KEYNES MK12 6HR. TEL: (0908) 317707.

RECOMMENDED



Rotel have recently shown an uncanny knack of creating competitively priced amplifiers, manufactured overseas but carefully tailored by their UK design team to appeal to British enthusiasts. The other components have hitherto been less distinctive, and won't win any prizes for inventing names, but nevertheless find a ready market partnering the amplifiers.

This £300 CD player is fundamentally a Philips clone (though one couldn't wish for a better source), enlivened by Rotel's *BX2* 'tweaks'. Ergonomics are refreshingly nice and simple – operation is both intuitive and self explanatory. The front panel is a Rotel exclusive, the end overlaps adding a distinctive styling touch to a machine that is otherwise basically a lightweight plastic chassis with metal wrap. Less attractive are the exposed rear heatsink fins, just waiting to graze an unwary probing digit, while the feet provide no additional environmental isolation.

The display is quite comprehensive, but with small digits and unduly bright illumination, to the point where this could become an irritating distraction under subdued domestic lighting perhaps. A digital output socket provides some future readiness, and may be shorted if not in use for best subjective performance. The remote control handset is slim and fairly simple, lacking volume adjustment but incorporating a keypad for direct track entry.

Internally based heavily on the Philips 460 model and incorporating the latest *CDM2* disc drive, this *BX2* version adds an extra printed circuit board with additional audio power supply transformer, rectification, smoothing and regulation. There is also another new supply feeding the Philips 16-bit 4x oversampling DACs. The 'audio board' uses high grade polystyrene and Ashcroft film capacitors, and adds the 'shaping' char-

acteristic seen in the frequency response:

LAB REPORT

Channel balance was close to perfection at all frequencies, with zero inter-channel phase difference throughout. Separation was very good at low and mid frequencies, but there was some difference at 20kHz – left on right –76dB, right on left –94dB. Only a trace of ringing was observed on the impulse test and absolute phase is maintained.

The frequency responses were near identical on both channels, but Rotel have engineered a cut in both the high treble and the low bass (–1dB at 20kHz, –0.6dB at 20Hz). A generally fine set of THD results were obtained, with the exception of the right channel at –80dB. Intermodulation distortion was low.

De-emphasis was correctly engineered, and full level output was very close to standard from a low 200ohms source impedance. Error correction could not be faulted, while signal-to-noise ratios (not as good as a standard Philips 460 tested last year) can hardly be criticised. Track access speed was fair, mechanical noise low and resistance to shock and vibration about par for the course. Ultrasonic spurious were well suppressed and low level linearity was unbalanced, the left channel producing only 1.6dB of error, the right being 17dB out; paradoxically, the –90dB sine wave produced from the left channel looked more like a noisy square wave.

SOUND QUALITY

Now with added *BX2*, Rotel's particular sound tweaks are aimed at producing a 'budget audiophile' contender, and by and large seem to have succeeded. The overall rating hovered between the good and very good rankings, benefitting marginally from the insertion of a shorting phono plug in the

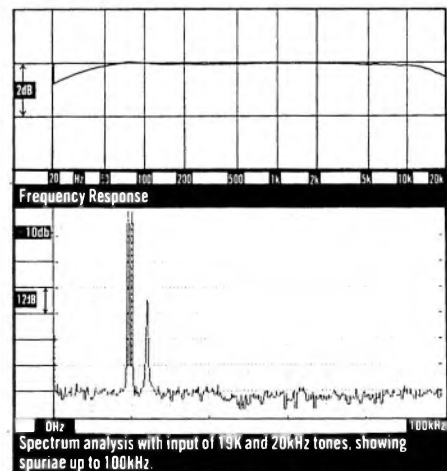
digital output socket. The sound was pleasantly neutral throughout, verging a little towards blandness perhaps. Bass was tight, clean and dynamic, if lacking a little power and weight, while the treble was tidy and well focused. The soundstage lacked the full depth and ambience recovery of the very best, but was good nonetheless.

CONCLUSIONS

Start with a good base and then make it sound better, the *820BX2* CD player maintains the reputation established by its namesakes, and comfortably deserves Recommendation.

TEST RESULTS

	20Hz	1kHz	20kHz
Channel balance	0.09dB	0.01dB	0.09dB
Stereo separation	124dB	105dB	76/94dB
Channel phase difference	0°	0°	0°
Total harmonic dist, 0dB	–94dB	–90dB	–86dB
Total harmonic dist, –10dB	—	–82dB	—
Total harmonic dist, –60dB	—	–42dB	—
Total harmonic dist, –80dB	—	–23/12dB	—
Intermodulation, 19kHz/20kHz, 0dB	—	—	–93dB
Intermodulation, 19kHz/20kHz, –10dB	—	—	–99dB
Frequency response, left channel	0.54dB	0	–1.05dB
Frequency response, right channel	0.63dB	0	–0.95dB
Signal-to-noise, 20Hz–20kHz unweighted	—	—	103/104dB
Signal-to-noise, CCI/ARM, 1kHz ref	—	—	100/102dB
Output level, 0dB, left/right	—	—	2.04V
Output impedance	—	—	200ohms
De-emphasis 1kHz, –0.36dB; 5kHz, –4.63dB; 16kHz, –9.59dB	—	—	—
Track access time	—	—	3.5 secs
Error correction capability	—	>900µm gap, >800µm dot	—
Mechanical noise	—	—	low
Spuriae up to 100kHz	—	—	–99dB
Resolution at –90dB	—	—	–91.6/–107.2dB
Headphone socket	—	—	n/a
Dimensions (w x d x h)	—	—	44.3 x 29 x 8.4cm
Estimated typical purchase price	—	—	£300



SAE D102

PRESENCE AUDIO, THE OLD POSTHOUSE, PLUMMERS PLAIN, HORSHAM, W. SUSSEX. TEL: (0403) 76777.



Scientific Audio Electronics Inc. were once a respected manufacturer of professional audio equipment, with a strong line in US-built amplifiers and equalisers. But that side of the business seems to have been replaced by a range of upmarket consumer electronics, assembled outside the US (Korea in the case of the *D102*) but with some internal design work and very definitely the cosmetics specified from the Los Angeles base. A complete rack-mount style system is imported to the UK by Presence Audio – we have already assessed the cassette deck, which performed pretty well, so now it is the turn of this £700 CD player.

Presentation is a real polariser – you'll either love its macho chunkiness, or loathe the brutish white and red graphics and exaggerated square typefaces. (It's a *D102*, not an *0102* I finally figured out.) Whichever, this is a bit of a throwback to the days when domestic hi-fi did its best to imitate the professional look, and then owned up by slapping wooden end cheeks on the side! (You can take the wood off if you want to keep pretending.)

Aside from the "hypersonic digital audio" banner, which is all part of the Starship Enterprise hype, the main gimmick touted by SAE is a 'computer direct line', by which signal paths are reportedly simplified by micro-processor control. That's as may be; otherwise it is a simple enough remote control player based on previous generation 14-bit 4x oversampling Philips technology. The case-work is solidly built if a bit rattly, with an aggressive looking sculpted front. The control layout is unconventional and based on a number of identical button pairs; it's logical enough and can be easily learnt, but doesn't seem immediately intuitive to the experienced CD user. An electronic volume control is matched on the remote handset. A simple display is backed by a handful of telltales.

Inside the substantial steel case lurks a sizeable enough power supply transformer, but elsewhere the *D102* is conventional enough – indeed slightly dated – Philips-based technology, with *TDA1540P* 14-bit 4x oversampling D/A converters and *LM833* standard op. amps. The loading drawer/transport is an older type Philips unit, and there is no evidence of special components – just the usual commercial grade capacitors and the like.

LAB REPORT

Maintained within a 0.4dB envelope, the response trace shows the pronounced high frequency 'wobble' that is a characteristic of early Philips CD technology. This in fact looks a trifle alarming but is subjectively quite innocuous. Channel balance is reasonable, with some HF divergence, and stereo separation respectable enough, with some HF diminution. Harmonic distortion is good, intermodulation rather less so.

The output matches the standard closely, from a nice low source impedance. Signal-to-noise ratios are very good, de-emphasis performs as advertised. Track access speed is quite leisurely but mechanical noise is very low. Ultrasonic spurious could have been better suppressed, but low level linearity at –90dB was pretty close – in this respect much more so than players based on the latest Philips chip sets.

SOUND QUALITY

The good overall rating is no disgrace, but must also be regarded as a slight disappointment, given the high price and audiophile pretensions of this US-influenced player. The midband focus seemed a bit 'phasey', leading to rather wide specific images within a gratifyingly wide soundstage. Detail was sharp and tidy, while the bass was dynamic, power-

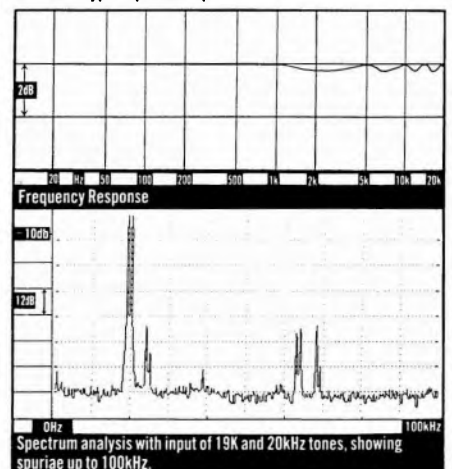
ful and extended. The midrange tended to sound a touch forward and slightly 'forced', while treble was also a little grainy. First impressions were rather better than the reaction after more extended listening.

CONCLUSIONS

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, so the *D102* is primarily of interest to those for whom the styling is an overwhelming attraction (and who are we to question their taste?)

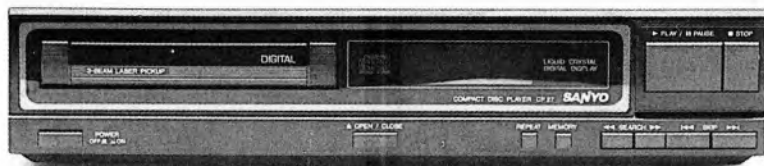
TEST RESULTS

	20Hz	1kHz	20kHz
Channel balance	0.08dB	0.08dB	0.34dB
Stereo separation	115dB	99dB	73dB
Channel phase difference	0°	0°	2°
Total harmonic dist, 0dB	–87dB	–86dB	–86dB
Total harmonic dist, –10dB	—	–80dB	—
Total harmonic dist, –60dB	—	–39dB	—
Total harmonic dist, –80dB	—	–24dB	—
Intermodulation, 19kHz/20kHz, 0dB	—	—	–80dB
Intermodulation, 19kHz/20kHz, –10dB	—	—	–74dB
Frequency response,			
left channel	–0.04dB	0	–0.4dB
Frequency response,			
right channel	–0.03dB	0	–0.4dB
Signal-to-noise, 20Hz-20kHz unweighted			105dB
Signal-to-noise, CCIR/ARM, 1kHz ref			109/110dB
Output level, 0dB, left/right			2.073V
Output impedance			200ohms
De-emphasis 1kHz, –0.42dB, 5kHz, –4.76dB, 16kHz, –9.15dB			
Track access time			4 secs
Error correction capability			>900µm gap, >800µm dot
Mechanical noise			very low
Spuriae up to 100kHz			–72dB
Resolution at –90dB			–86.67/–89.87dB
Headphone socket			10ohms
Dimensions (w x d x h)			48.2 x 33.9 x 10.1cm
Estimated typical purchase price			£699



SANYO CP27

SANYO MARUBENI UK LTD., SANYO HOUSE, OTTERSPOOL WAY, WATFORD, HERTS. TEL: (0923) 246363.



Sanyo are one of the very biggest consumer electronics companies, growing from the same Osaka roots as Matsushita in the pre-war era, and nowadays commanding immense resources and the most advanced technology. They are also very broad-based, operating in both 'white' (kitchen equipment) and 'brown' (lounge electronics) goods. (Remember teak veneer? Nowadays brown goods are all black of course.) Though active in most sectors of audio, their main strength is at the cheaper end of the market, with personal stereos and midi systems. Separates are confined to CD players at present, usually tailored to slot in with their midis, but able to operate in isolation of course as well.

The £220 *CP27* looks almost identical to the *CP17* tested in the December issue – indeed the only apparent difference is that this model has an extra rear socket to interface with Sanyo's *W27* midi system remote control, for which one is required to pay an extra £20. The display is unusual in using green illuminated LCDs, which makes a pleasant change but is not as easy to read from a distance. Features are limited to the usual basics, so the virtue of simplicity aids ergonomics, and the whole presentation with radiused edges and grey buttons is refreshingly different from the run of the mill.

The case is built from two undamped steel U-sections, while the plastic front panel is very glossy, and apt to show marks and scratches rather easily. The disc drive, chassis and clamp are plastic too, with rubber decoupling suspension. Digital circuitry includes a single Sanyo time-shared DAC with Sony-sourced digital filter. In all it is a pretty basic machine, with no particular pretensions to superior sound quality.

LAB REPORT

Despite staying within pretty acceptable

limits, the frequency response trends are clearly visible, with a gentle downtilt at the low frequency end and a mild 'hump' prior to rolloff at high frequencies, the latter probably subjectively audible. Channel balance was held nice and close, but stereo separation was distinctly below average at high frequencies.

The substantial inter-channel phase difference here is a function of using an uncompensated time-shared single DAC without oversampling. Distortion measurements showed various weaknesses particularly at high frequencies; the IM spectrogram shows considerable downband activity, reflecting the poor spot measurement figures recorded in the table.

Output is a little below the standard, so direct A/B comparison with other machines will need some compensation, while the source impedance is a highish 1kohm. Signal-to-noise ratios were adequate, de-emphasis likewise, while error correction performed as advertised. Track access was pretty quick but there was some audible mechanical noise, and ultrasonic spurious were generated in some profusion.

In all, this is a pretty mixed measurement bag that must raise question marks over the technical performance, particularly in comparison with rivals. Encouragingly from the point of view of our measurement consistency, if discouragingly from Sanyo's perspective, the results are almost identical to those obtained with the *CP17* in the last series of tests. Clearly they were hatched from the same clutch of eggs.

SOUND QUALITY

Sitting firmly in the middle of the fair category, the *CP27* was an undistinguished subjective performer, albeit at a modest enough price. A grainy quality seemed to overlay the sound, and the midrange seemed inclined to

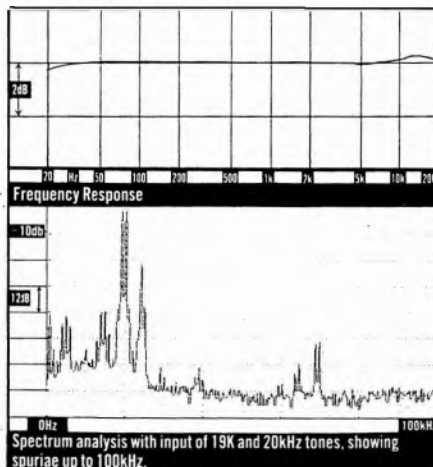
muddle more complex passages. But the stereo imaging was pretty good, portraying a fair measure of ambience and depth. String tone was fairly sweet but bass was disappointing, sounding a little 'boomy' with restricted definition. Dynamics and transparency were both weak.

CONCLUSIONS

System remote apart, the *CP27* offers no improvement over the cheaper *CP17*, and neither of these systems-oriented players really cut the subjective mustard compared to the best standalone separates at this fiercely competitive end of the market.

TEST RESULTS

	20Hz	1kHz	20kHz
Channel balance	0.02dB	0.04dB	0.05dB
Stereo separation	114dB	94dB	64dB
Channel phase difference	0°	5°	85°
Total harmonic dist, 0dB	-66dB	-66dB	-35dB
Total harmonic dist, -10dB	—	-64dB	—
Total harmonic dist, -60dB	—	-34dB	—
Total harmonic dist, -80dB	—	-13dB	—
Intermodulation, 19kHz/20kHz, 0dB	—	—	-38dB
Intermodulation, 19kHz/20kHz, -10dB	—	—	-49dB
Frequency response, left channel	0.09dB	0	-0.65dB
Frequency response, right channel	-0.13dB	0	-0.70dB
Signal-to-noise, 20Hz-20kHz unweighted	—	—	98/99dB
Signal-to-noise, CCIR/ARM, 1kHz ref	—	—	97/103dB
Output level, 0dB, left/right	—	—	1.825V
Output impedance	—	—	1kohm
De-emphasis 1kHz, -0.41dB; 5kHz, -4.85dB; 16kHz, -9.44dB	—	—	3 secs
Track access time	—	—	>900µm gap, >800µm dot
Error correction capability	—	—	average
Mechanical noise	—	—	-92dB
Spurious up to 100kHz	—	—	-89.86/-88.98dB
Resolution at -90dB	—	—	n/a
Headphone socket	—	—	33.4 x 28.5 x 7.4cm
Dimensions (w x d x h)	—	—	£220
Estimated typical purchase price	—	—	



SONY CDP-M35

SONY UK LTD., SONY HOUSE, SOUTH ST. STAINES, MIDDX. TEL: (0784) 67000.



As co-developers of the CD format, Sony are in the van of developments and hold a substantial share of the UK market, competing strongly at all prices from the luxury *ES* series down to personals, portables and budget separates like the neat mid-size *CDP-M35* reviewed here. Intended to sell at a highly competitive £170 price point, it is inevitable that the production engineers have worked hard to keep costs as low as possible, hopefully without significantly compromising the performance. The bone idle might note that an extra £20 will buy the *CDP-M55*, which is reportedly the self same machine but which functions under remote control with a simple operational handset.

Manual only in operation, this lightweight plastic player nevertheless offers the normal range of facilities, though there is no attempt to contend with environmental vibrations. Styling and presentation is pure Sony – in a word, classy, notwithstanding the price constraints, making full use of precision plastics injection moulding to fool the eye into believing this player costs more than its does.

The all plastic case and front panel is nicely finished externally, and has extensive internal bracing. The 16-bit 4x oversampling digital circuitry uses a Sony digital filter and Sanyo dual DAC. Unconventionally, the disc clamp is fixed in place and the disc drive moves up to meet it. The single board construction is neatly executed with a minimum of external contacts. The power supply transformer is modest, but some superior quality capacitors are used in the audio circuitry. There is no unconverted digital signal output.

LAB REPORT

This is yet another Sony player with an almost perfect frequency response – although slightly down at 20kHz, probably due to very slightly early filtering, the graph

speaks for itself. Channel balance was respectable at all frequencies – at worst 0.2dB, but held within 0.06dB over the majority of the range. Zero time delay between the channels is provided by the dual DACs

Although the white noise test didn't reveal any clipping, THD at 0dB and –10dB is poor by CD standards, and the player obviously suffers some stress near full modulation levels. This is confirmed by high intermodulation products – –55dB is amongst the poorest results in this issue. Distortion improved at lower levels, and the step error at –90dB was held to a modest 2.5dB.

The player survived both shock and vibration well, track access was reasonably fast, and mechanical noise was unobtrusive. The de-emphasis and error correction circuits worked correctly. The signal-to-noise ratios were acceptable, and ultrasonic spurious were well down. The *CDP35* produced 2.2V maximum from a 1.95kohm source, both of which are above normal, the latter sufficiently so as to render passive volume control and direct power amplifier connection distinctly marginal.

SOUND QUALITY

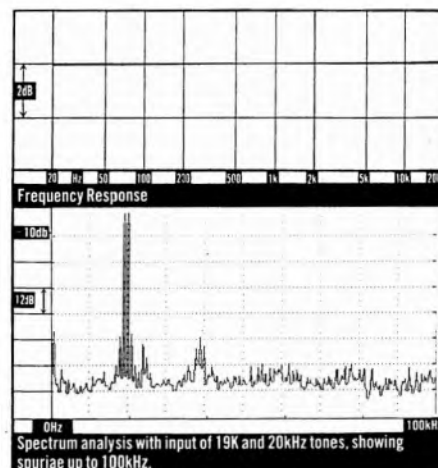
Though only rating fair overall in the listening tests, the *M35* actually came quite close to the 'good' rankings, which is a very respectable result for such a modestly priced player. Typical of budget Sony machines, the bass was well extended with reasonable power, if somehow a little lacking in pace. Despite a slight 'blurring' on massed strings and emphasis of sibilants, the midband was pleasant and well balanced, with average focus and stereo presentation in all respects. Thoroughly competent in all respects, the *M35* is fair enough for the money, if a trifle undistinguished.

CONCLUSIONS

Operationally there is no disguising the lightweight plastic construction of this player, but the technical performance, sound quality, aesthetics and ergonomics all deliver more than one has the right to expect for £170, so Recommendation is mandatory.

TEST RESULTS

	20Hz	1kHz	20kHz
Channel balance	0.05dB	0.05dB	0.2dB
Stereo separation	96dB	96dB	79dB
Channel phase difference	0°	0°	0°
Total harmonic dist, 0dB	–69dB	–67dB	–79dB
Total harmonic dist, –10dB	—	–56dB	—
Total harmonic dist, –60dB	—	–37dB	—
Total harmonic dist, –80dB	—	–23dB	—
Intermodulation, 19kHz/20kHz, 0dB	—	—	–54dB
Intermodulation, 19kHz/20kHz, –10dB	—	—	–55dB
Frequency response, left channel	0.02dB	0	–0.28dB
Frequency response, right channel	0.02dB	0	–0.15dB
Signal-to-noise, 20Hz-20kHz unweighted	—	—	101/104dB
Signal-to-noise, CCIR/ARM, 1kHz ref	—	—	92/97dB
Output level, 0dB, left/right	—	—	2.22V
Output impedance	—	—	1.95kohms
De-emphasis 1kHz, –0.37dB; 5kHz, –4.44dB; 16kHz, –8.5dB	—	—	—
Track access time	—	—	4 secs
Error correction capability	—	—	>900µm gap, >800µm dot
Mechanical noise	—	—	low
Spuriae up to 100kHz	—	—	–93dB
Resolution at –90dB	—	—	–92.4/–92.7dB
Headphone socket	—	—	100ohms
Dimensions (w x d x h)	—	—	35.5 x 27 x 8cm
Estimated typical purchase price	—	—	£170



SONY CDP-750

SONY UK LTD., SONY HOUSE, SOUTH ST. STAINES, MIDDX. TEL: (0784) 67000.

BEST BUY



Asked to guess the price of this player, I am sure the panel and studio audience would place it nearer to £300 than the £250 asked, so impressive is Sony's presentation packaging. Much is due to their legendary styling and finishing expertise, but there's no doubt that the 5x4 matrix used in Sony's 20-key track selectors does add a certain high-tech-upmanship – particularly when the same motif appears on both handset and display menu.

This review focuses on the full width *CDP-750*, though it shares specification, instruction manual and internals with the narrower, cheaper *CDP-M75*, for which findings would presumably be very similar. The unit sits on real feet, and is a middleweight in terms of build, with plastic front and well damped metal wrap and base.

It is a full feature model with elaborate remote handset, albeit stopping short of volume adjustment here. The player itself is fairly festooned with buttons, but these have been logically laid out so ergonomics are good – in this respect the *750* is clearly superior to the rather cramped *M75*. The display is similarly complex, and in consequence individual digits are rather small. Possible future applications are assisted by provision of a digital output socket.

Basically built on a plastic case with bottom bracing and damped steel panels, the *750* is built on a single large printed circuit board with a small transformer mounted 'on board'. Philips *TDA1541* D/A converters are combined with Sony's own digital filtering chips. Good quality capacitors are used at the output and for the critical power supply smoothing. Unlike most systems, the transport lifts the disc up to a stabiliser rather than lowering the latter down on the disc.

LAB REPORT

Output level was a trifle below the normal,

averaging 1.9V maximum, and an excessively high 1.9kohms output impedance was noted too, possibly making A/B comparison tricky. The frequency response was impressively flat, with the merest hint of high frequency lift, and channel balance was splendidly close, registering no more than 0.07dB variation.

The measured channel separation was pretty good in the lower octaves, reducing to a run of the mill 75dB at 20kHz, and there was no inter-channel phase difference (as usual for a dual DAC design). Downband noise measured a good -86dB at 20kHz, and total harmonic distortion a reasonable -88dB at full modulation. Decent results were obtained at lower levels too, and the IM distortion at full level is impressive. The low level (-90dB) dithered tone was also reproduced almost to scale, suggesting 15.8-bit resolution, but the resultant waveform was more square than sine. Ultrasonic spurious were well rejected.

Track access speed was rapid, mechanical noise very low, and the electrical signal-to-noise ratios were well above average. The error correction capability was not bothered by any of our tests, and the impulse signal was well reproduced and correctly phased.

SOUND QUALITY

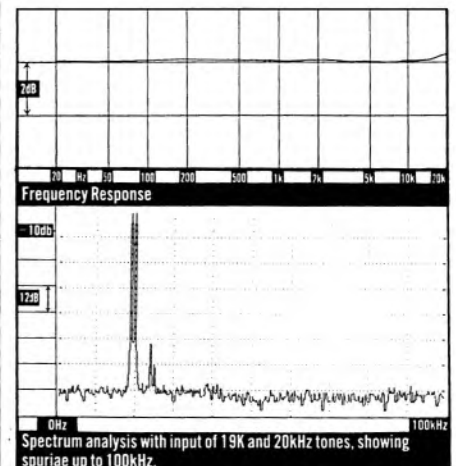
The *750* rated good overall in the listening tests, which is fully competitive at this price level, and the sound further improved marginally when the digital output socket was fitted with a shorting phono plug. Although a little 'slow' and lacking in 'drive', it proved to be a good allrounder, with a pleasant, sweet treble, quite good focus and depth, and a sweet and seductive midrange that was very easy on the ears. Slightly lacking in guts and low frequency weight perhaps, it nevertheless represents good sonic value for money.

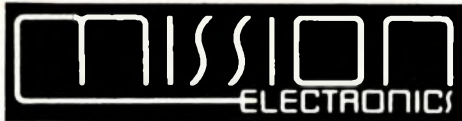
CONCLUSIONS

The *750* is a seductive blend of fine presentation and solid performance, all at a very realistic price that should ensure its success. A Best Buy rating is obviously merited.

TEST RESULTS

	20Hz	1kHz	20kHz
Channel balance	0.04dB	0.05dB	0.07dB
Stereo separation	119dB	105dB	75dB
Channel phase difference	0°	0°	0°
Total harmonic dist, 0dB	-88dB	-88dB	-86dB
Total harmonic dist, -10dB	—	-82dB	—
Total harmonic dist, -60dB	—	-45dB	—
Total harmonic dist, -80dB	—	-18dB	—
Intermodulation, 19kHz/20kHz, 0dB	—	—	-103dB
Intermodulation, 19kHz/20kHz, -10dB	—	—	-88dB
Frequency response, left channel	0.01dB	0	-0.07dB
Frequency response, right channel	0.02dB	0	-0.09dB
Signal-to-noise, 20Hz-20kHz unweighted	—	—	107/108dB
Signal-to-noise, CCIR/ARM, 1kHz ref	—	—	106/108dB
Output level, 0dB, left/right	—	—	1.896V
Output impedance	—	—	1.87kchms
De-emphasis 1kHz, -0.34dB; 5kHz, -4.31dB; 16kHz, -8.70dB	—	—	—
Track access time	—	—	3 secs
Error correction capability	—	—	>900µm gap, >800µm dot
Mechanical noise	—	—	very low
Spuriae up to 100kHz	—	—	-98dB
Resolution at -90dB	—	—	-90.34/-91.49dB
Headphone socket	—	—	100ohms
Dimensions (w x d x h)	—	—	42.9 x 33.5 x 9.6cm
Estimated typical purchase price	—	—	£250





FOUNDER MEMBER

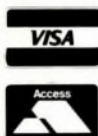
good dealer
good equipment
the foundation of a good music
system
from

Hampshire Audio Ltd

**Kingfisher House
2-12 Hursley Road
Chandlers Ford, Hants SO5 2FU
Tel: Southampton (0703) 252827 & 265232**

We stock selected items for:
Aloi, Audiolab, A&R,
Audio Technica, B&W, Bowers,
Celestion, Cliff Stone, Creek,
Cyrus, Denon, Dual, Gale, Glanz,
Grado, Gyrodek, Heybrook,
Hunt, Jordan, KEF, Koetsu, Linn
Isobarik, Linn Sondek, Marantz,
Mark Levinson, Maxell, Meri-
dian, Michell, Mission, Monitor
Audio, Musical Fidelity,
Nagaoka, Nakamichi, Ortofon,
Perreaux, QED, Quad, RATA,
Revolver, Revox, Rogers, Rotel,
Sennheiser, Snell, Stanton, Sys-
temdek, Supex, Wharfedale,
and others. Active systems on
demonstration.

with
The new **Cyrus** amps -



OPENING HOURS
TUES-SAT 10-6 THURS 10-8
CLOSED MONDAYS
(EXCEPT IN DECEMBER)

SONY 333ES

SONY UK LTD., SONY HOUSE, SOUTH ST. STAINES, MIDDX. TEL: (0704) 67000.

RECOMMENDED



Sony's luxury *Esprit* models of a few years ago proved a bit too exotic for British tastes, but their more recent and less ambitious *ES* initiative has comfortably exceeded sales expectations, helping to reawaken demand for luxury finish imported hi-fi. The £1,000 *555ES* was a particular favourite in our '87 tests, rivalling earlier two-box Sonys, so expectations run pretty high for this new £600 *333ES*.

It is a heavy, solid machine, encased in well damped metal (or slightly rattly metal in the case of the top-plate), sitting on proper feet which should assist environmental isolation. The front panel is necessarily elaborate to handle the large number of features, but the layout is clean and logical enough, apart perhaps from the rather odd looking white play mode buttons. The complex display incorporates a 20-track menu, alongside the 20 front panel and mirroring the 20 remote control handset track entry keys. Though otherwise comprehensive, Sony have deliberately refrained from providing remote volume adjustment. The overall finish is exceptional, the appearance just slightly aggressive, and slightly cluttered with gold and white graphics.

Internal inspection shows that the very solid casework has interlinked, damped panels, while the smooth disc drive also features special damping. High quality printed circuit boards are neatly interlinked and feature good quality components throughout. A decent size transformer uses a number of regulators to feed various sections. A Sony digital filter is combined with Philips *TDA1541A* DACs in a 4x oversampling configuration.

LAB REPORT

Given Sony's aspirations for this near-flagship model, an exemplary lab performance was pretty well inevitable. The fre-

quency response is a very straight line indeed, channel balance and stereo separation figures are both exceptional, and all represent a mild improvement over the earlier but more expensive *555ES*. Dual DACs ensure inter-channel high frequency phase consistency. Harmonic and intermodulation distortions were all very low.

Output measured close enough to standard, from a tolerantly low source impedance. De-emphasis is accurate, track access fast, mechanical noise very low, and the error correction circuitry corrects errors. Shock and vibration immunity was confirmed as very good indeed. Signal-to-noise ratios are exceptionally good, and ultrasonic spurious notable for their near absence - here again better than the *555*. The -90dB 1kHz sine-wave was reproduced very close to that level, indicating near-16-bit low level resolution. One observed oddity was that inserting headphones caused a change in the line output level. Overall it must be acknowledged that Sony have matched or surpassed the previously high standards set by their top line players.

SOUND QUALITY

Based on experience of more than one sample, the new *333ES* consistently rates excellent on sound quality, in fact achieving a higher overall score than did the more expensive *555ES*. (This could indeed be the best sounding CD player currently on the market, given that Cambridge's *CD1* is currently *in pupa* prior to metamorphosing into a *Series 2* model.)

The midrange sounds sweet, musical and unforced, while the well integrated treble has good perspectives and lacks unwelcome edge or 'grain'. Information is clearly presented and focus quite exceptional, as is stereo depth. By perfectionist standards the bass is slightly 'softened' and 'lightened',

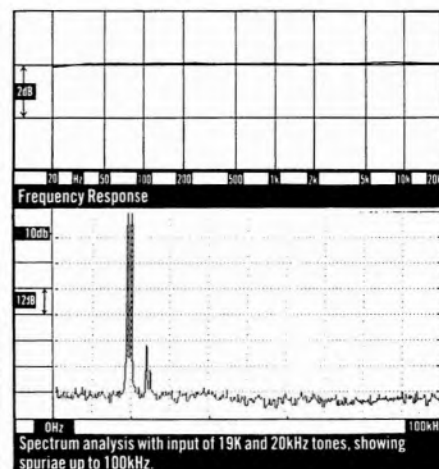
while dynamics also lack a little drama and power, though both are fundamentally good nonetheless. Above all this is one of the most consistently listenable players around.

CONCLUSIONS

Sony's new *333* represents a triumph for their development department, effectively bringing down the entry level price to 'high end' compact disc replay. Clearly Recommended, it is pretty good value for money as well.

TEST RESULTS

	20Hz	1kHz	20kHz
Channel balance	0.0dB	0.0dB	0.04dB
Stereo separation	130dB	120dB	104dB
Channel phase difference	0°	0°	0°
Total harmonic dist, 0dB	-89dB	-89dB	-87dB
Total harmonic dist, -10dB	—	-82dB	—
Total harmonic dist, -60dB	—	-43dB	—
Total harmonic dist, -80dB	—	-22dB	—
Intermodulation, 19kHz/20kHz, 0dB			-100dB
Intermodulation, 19kHz/20kHz, -10dB			-87dB
Frequency response, left channel	0.02dB	0	-0.04dB
Frequency response, right channel	0.02dB	0	-0.08dB
Signal-to-noise, 20Hz-20kHz unweighted			110/109dB
Signal-to-noise, CCIR/ARM, 1kHz ref			108/106dB
Output level, 0dB, left/right			2V
Output impedance			200ohms
De-emphasis 1kHz, -0.33dB; 5kHz, -4.55dB; 16kHz, -9.11dB			
Track access time			2 secs
Error correction capability	>900µm gap,	>800µm dot	
Mechanical noise			very low
Spurious up to 100kHz			-101dB
Resolution at -90dB			-91.5/-91.35dB
Headphone socket			100ohms
Dimensions (w x d x h)			43 x 34.5 x 11.8cm
Estimated typical purchase price			£599



TANDBERG 3015A

ORTOFON (UK) LTD., DENMARK HOUSE, TAVISTOCK IND. EST., RUSCOMBE, TWYFORD, BERKS RG10 9NJ. TEL: (0734) 343621.



This CD player is one of the Tandberg separates range now being distributed in the UK by Ortofon. Tandberg themselves are Norwegian, and one of the oldest names in hi-fi (tape recorders and tuners in particular). However, they suffered severely in the over-productive 'seventies, and are probably now better known for language lab facilities and related professional products, alongside a limited range of high quality but expensive hi-fi separates.

A £1,250 pricetag is something of a burden to justify, particularly when there are only basic facilities on offer, but there can be no qualms about the external finish and styling, both of which achieve a very high standard. The classy gunmetal anodised casework is made up of many alloy extrusions; it has ventilation slots and is shaped to improve rigidity, but is a bit rattly nonetheless, while the whole unit sits on a rubber ridge and two feet that should offer some vibration resistance between them. Silver circular operating buttons provide a nice visual contrast, but they are all the same shape and laid out rather randomly. The display is very small and simple, the remote handset quite large but similarly simple.

The basic technology is modified-Philips, with an older style disc drive mechanism. However, the main Philips board itself has been heavily modified, and there is an additional audio board with complex discrete component circuitry.

LAB REPORT

Basically flat, the response does show the characteristic Philips 'wiggle' at high frequencies. The 0.14dB channel balance error is a little disappointing at this price level perhaps, while stereo separation falls somewhat short of the best, at high frequencies in particular. There is no high frequency inter-channel phase shift, confirming the separate

DACs. Harmonic distortion is competent enough, while intermodulation products are likewise acceptable though still leaving room for improvement, the spectrogram showing a fair amount of ultrasonic activity besides.

Output level is accurate and source impedance low. Noise figures are all low, and shock and vibration resistance is very good. Though the transport is quiet enough, the slots seemed to help what noise there was become audible. De-emphasis is accurate, errors were corrected without problems, but ultrasonic spurious could have been better suppressed. The low level resolution test (-90dB) gave errors around 6dB on each channel - not textbook exactly, but rather better than most Philips based machines. Taken overall these are competent lab results but nevertheless do not perhaps reflect expectations for such an expensive player.

SOUND QUALITY

Though Tandberg have put a lot of effort into their reworking of the Philips building blocks (this is no simple clone), regrettably the sound quality was comparatively disappointing, dropping just short of good and merely rating fair overall - which is pretty bad news considering this is the most expensive single box player we have ever examined.

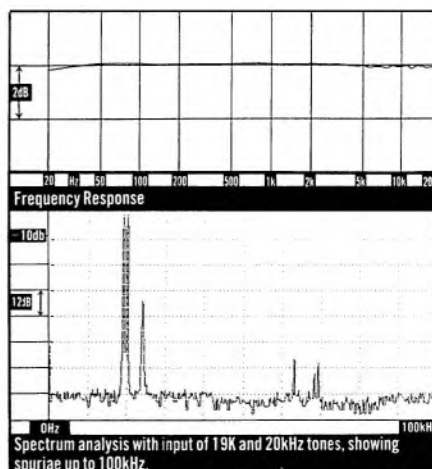
One irritant was that mechanical transport noises escaping through the lid slots were clearly audible at the listening position. This aside, the treble sounded very nice indeed, sweet and open with good detailing; the midrange sounded just a shade 'electronic' and 'hardened'. The bass, however, sounded frankly anaemic, lacking in impact, depth and weight. Stereo width and depth also seemed less than precisely resolved, with some 'clumping' of lateral images and cramping of soundstage.

CONCLUSIONS

Very classy presentation is not enough to compensate for a model which subjectively and objectively fared no better (and in some instances fell short of) standard and modified Philips packages that cost a fraction of its price.

TEST RESULTS

	20Hz	1kHz	20kHz
Channel balance	0.15dB	0.14dB	0.13dB
Stereo separation	110dB	100dB	79dB
Channel phase difference	0°	0°	0°
Total harmonic dist, 0dB	-84dB	-83dB	-87dB
Total harmonic dist, -10dB	—	-84dB	—
Total harmonic dist, -60dB	—	-47dB	—
Total harmonic dist, -80dB	—	-19dB	—
Intermodulation, 19kHz/20kHz, 0dB			-80dB
Intermodulation, 19kHz/20kHz, -10dB			-89dB
Frequency response, left channel	0.01dB	0	-0.14dB
Frequency response, right channel	0.01dB	0	-0.12dB
Signal-to-noise, 20Hz-20kHz unweighted			100dB
Signal-to-noise, CCIR/ARM, 1kHz ref			96/100dB
Output level, 0dB, left/right			2.0V
Output impedance			212ohms
De-emphasis 1kHz, -0.38dB; 5kHz, -4.62dB; 16kHz, -9.13dB			
Track access time			3.5 secs
Error correction capability			>900µm gap, >800µm dot
Mechanical noise			low
Spuriae up to 100kHz			-87dB
Resolution at -90dB			-95.62/-96.83dB
Headphone socket			47ohms
Dimensions (w x d x h)			43.5 x 38 x 8.9cm
Estimated typical purchase price			£1,250



TEAC PD-135

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



Tape recorder specialist Teac has been involved in CD players since the format's inception. They have recently opened a European subsidiary in the UK, to handle the distribution of their hi-fi and pro-audio products, and plan to increase their share of the separates market.

The *PD-135* is a modest, budget, full-width player. Intended to sell at £180, the consequent lightweight plastic chassis, undamped steel base and wrap, and no attempt at environmental isolation is probably inevitable, though not necessarily disadvantageous. Presentation is neat and simple, leading to intuitively easy operation, with quite discrete gold graphics delegated the unnecessary task of extolling various rather prosaic technologies. Facilities are restricted to the basic play, repeat, program, skip and scan functions, with information presented on a simple display. Track access was a little slow.

Pretty much a standard cost-effective package, the internals consist of a plastic disc drive and clamp on a decoupled steel subchassis. The single board is neatly wired but with standard commercial grade components and a small power supply transformer. Chip sets are sourced from Yamaha and Sanyo.

LAB REPORT

The frequency response conformed up to 15kHz, but showed a little high frequency unevenness thereafter; both channels peaked at 20kHz, the left almost 2dB up and 1dB stronger than the right. This high frequency aberration also showed up on the interchannel phase difference test. Channel separation was just about passable, though the 20kHz figure was unexciting. Like the vast majority of players, this one maintained absolute phase, while the impulse test also showed some ringing in the output filters.

The white noise test was passed, but produced rather inferior THD results and high IM distortion products at or near full level signals.

Low level signal distortions were adequate, and the output level came fairly close to the CD standard, but the 2.2kohms output impedance was much higher than most, prejudicing operation with a passive volume control direct to power amplifier. De-emphasis showed some inaccuracy at 1kHz and 5kHz, but was fine at 16kHz. Error correction was also fine, as were signal-to-noise ratios under all test conditions. Track access time was a very leisurely 5 seconds and resistance to shock and vibration was not impressive, but mechanical noise was low. Ultrasonic spurious were pretty well suppressed, but the linearity tests showed some exaggeration of low level signals. Nevertheless, this player did produce a recognisable -90dB sine wave.

SOUND QUALITY

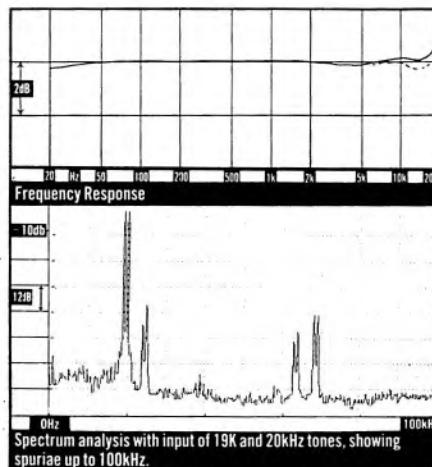
The *135* rated rather below average by today's standards, and was ranked on the borderlines between fair and poor overall. Criticism was levelled against some 'phasing' in the stereo imagery, reflected in a 'muzzy' quality on loud string passages. The midband sounded tonally well balanced but was also rather muddled, lacking clarity and losing depth and 'air'. A gentle 'sizzle' effect was noted at high frequencies.

CONCLUSIONS

In many ways an attractive player, particularly as regards ease of use, the *PD-135* lags a little behind the pack when it comes to sound quality, so formal recommendation is not appropriate, but it still represents a valid alternative for those who find the presentation attractive.

TEST RESULTS

	20Hz	1kHz	20kHz
Channel balance	0.05dB	0.07dB	0.88dB
Stereo separation	78dB	78dB	55dB
Channel phase difference	0°	3°	24°
Total harmonic dist, 0dB	-70dB	-67dB	-61dB
Total harmonic dist, -10dB	—	-63dB	—
Total harmonic dist, -60dB	—	-40dB	—
Total harmonic dist, -80dB	—	-19dB	—
Intermodulation, 19kHz/20kHz, 0dB	—	—	-56dB
Intermodulation, 19kHz/20kHz, -10dB	—	—	-67dB
Frequency response, left channel	0.02dB	0	-1.26dB
Frequency response, right channel	0.02dB	0	-0.30dB
Signal-to-noise, 20Hz-20kHz unweighted	—	—	101/104dB
Signal-to-noise, CCIR/ARM, 1kHzref	—	—	96/100dB
Output level, 0dB, left/right	—	—	2.145V
Output impedance	—	—	2.2ohms
De-emphasis 1kHz, -0.65dB; 5kHz, -6.05dB; 16kHz, -8.85dB	—	—	5 secs
Track access time	—	—	>900µm gap, >800µm dot
Error correction capability	—	—	low
Mechanical noise	—	—	-95dB
Spurious up to 100kHz	—	—	-83.3/-85.2dB
Resolution at -90dB	—	—	n/a
Headphone socket	—	—	43.4 x 29.5 x 8.4cm
Dimensions (w x d x h)	—	—	£179
Estimated typical purchase price	—	—	



TECHNICS SP-P 111

PANASONIC UK LTD., 300-318 BATH ROAD, SLOUGH, BERKS SL1 6JB. TEL: (0753) 34522.



The hi-fi brand of the mighty Matsushita organisation, Technics have been market leaders for many years, showing a particularly effective knack for choosing the right compromises when engineering components for the budget sector of the marketplace. This full-width £179 Technics player is a little different from most others of its type in the way in which the controls function, though in other respects it is a conventional enough budget player. Lightweight in construction, it is nonetheless well finished and presented, and is technically based on well established methods seen previously on more upmarket players.

Stark and simple enough to warm the hearts of many an audiophile, the 111's total complement of six large and three small push-buttons makes a dramatic contrast with the Technics' upmarket players like the 520, 720 and 1200. Surely Technics have not abandoned the feature race? Of course not! Many of these buttons serve more than one function, providing different facilities according to how they are pressed.

The result is a simple and easily understood configuration for the major tasks, plus the capability to do more for those prepared to crack the detailed code, set out in the even more detailed manual. Though distinctly economy-sized, the display panel has separate track and timing readouts, plus four machine status indicators. Most of the usual functions such as skip, audible scan, program play and repeat are available, plus something faintly bizarre requiring four separate control commands called 'preset edit play'.

LAB REPORT

The practice of applying older technology in budget players can be seen in the use of a single 16-bit linear time-shared DAC, with its attendant high frequency interchannel phase error, but the measurement set overall

was pretty well balanced nonetheless, with no particular weakness and some good points. The frequency response was pretty flat, with just some unevenness and channel imbalance at high frequencies. Distortion measurements were good, particularly for intermodulation, while the latter's spectrogram showed just one spurious ultrasonic reflection.

The output level was a little higher than spec. – those who attempt to carry out A/B comparison should be warned that this player may be flattered by additional loudness if levels are not adjusted carefully. Track access was very fast, mechanical noise low, and shock and vibration immunity pretty good. Error correction and tracing tests were handled without problems, electrical noise and ultrasonic spurious were both fairly low, while the practical low level linearity of our sample was a very good 15.7-bits.

SOUND QUALITY

While not setting any new benchmarks for performance against price, the SL-P111 acquitted itself respectably in the listening tests, rating fair overall, a satisfactory result for the price. Typically Technics, the tidy sound was coherent and well focused, with an even tonal balance but slightly 'hardened' and a touch forward in the midband. The bass was good, and depth was quite well portrayed, but there was a slight loss of transparency and softening of dynamics.

CONCLUSIONS

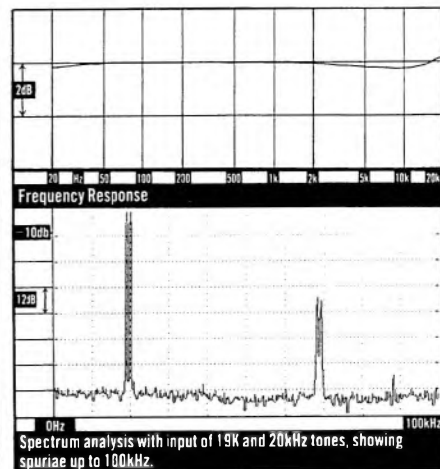
A fair sound quality at a well below average price, coupled with decent lab performance and good presentation and build quality is a clear Recommendation. The ergonomics of this player differ to a degree that may be appealing or infuriating, and the discerning may find the sound of some competitors more attractive, but the Technics scores above all

on its good balance – its relative success in being most things to most men.

TEST RESULTS

	20Hz	1kHz	20kHz
Channel balance	0.08dB	0.09dB	0.27dB
Stereo separation	93dB	93dB	83dB
Channel phase difference	0°	2°	45°
Total harmonic dist, 0dB	-80dB	-80dB	-83dB
Total harmonic dist, -10dB	—	-81dB	—
Total harmonic dist, -60dB	—	-43dB	—
Total harmonic dist, -80dB	—	-17dB	—
Intermodulation, 19kHz/20kHz, 0dB	—	—	-88dB
Intermodulation, 19kHz/20kHz, -10dB	—	—	-100dB
Frequency response,			
left channel	-0.03dB	0	0.03dB
Frequency response,			
right channel	-0.01dB	0	-0.16dB
Signal-to-noise, 20Hz-20kHz unweighted	—	—	96/99dB
Signal-to-noise, CCIR/ARM, 1kHz ref	—	—	91/94dB
Output level, 0dB, left/right	—	—	2.5V
Output impedance	—	—	550ohms
De-emphasis	1kHz, 0.3dB; 5kHz, 4dB; 16kHz, 8.9dB	—	—
Track access time	—	—	2.5 secs
Error correction capability	>900µm gap, >800µm dot	—	—
Mechanical noise	—	—	very low
Spurious up to 100kHz	—	—	-92dB
Resolution at -90dB	—	—	-87.9/-90.6dB
Headphone socket	—	—	no
Dimensions (w x d x h)	—	—	43 x 23.5 x 7.1cm
Estimated typical purchase price	—	—	£179

Reassessed and reprinted from issue No. 51.



TECHNICS SL-P220

PANASONIC UK LTD, 300-318 BATH RD, SLOUGH, BERKS SL1 6JB. TEL: (0753) 34522

RECOMMENDED



Technics are the hi-fi division of the giant Matsushita organisation, who produce one of the most extensive ranges of audio products available. They have a knack of creating components which provide a fine balance between engineering, styling, sound quality and price in each market sector, and are thus normally very competitive.

The SL-P220 fits neatly into the budget CD market sector and is well specified for the price. The whole player has a quality feel, and the case is made from light steel. The unit is supplied with remote control, which covers all the normal facilities and additionally provides keypad track selection, and a limited digital volume control that allows attenuation in 6 discrete 2dB steps.

The comprehensive front panel has the controls placed in a logical fashion, which makes the player a delight to use. The headphone socket has variable output, and a memory/recall button allows the user to program track numbers, confirm the program and to enter pre-set editing time into memory. Pre-set editing allows the user to specify the duration of play required.

The clear and concise display contains virtually everything you could desire for normal domestic use, showing track number, number of tracks on the disc (in a matrix format which is limited to 20), and 'elapsed time' or 'time remaining' as selected by the user. When the remote volume control is used the time and track display is momentarily blanked to reveal the amount of attenuation applied: The only missing feature is a 'digital out' socket - which will be no great loss for the vast majority of users.

LAB REPORT

This player performed exceptionally well in the lab. The full level distortion figures were superior to most I have measured at 20Hz and 1kHz, and were still very presentable at

low signal levels. Intermodulation distortion was also highly commendable. The phase error at high frequencies indicates that a single time-shared 2x oversampled DAC is used.

There was a frequency response shelf of about .3dB above 1kHz, and this was accompanied by some unevenness, but the channel balance was good, with only a very mild aberration at high frequencies. Mild criticism could be aimed at the -90dB resolution, showing a linearity of 15.4 bits, which could have been better, but this figure appears to bear little or no relationship to perceived sound quality.

De-emphasis worked as it should, output level was close to the standard, and the output impedance of 670ohms should cause no matching problems. Ultrasonic spurious were well suppressed and the error correction tests passed without any trouble. The variable headphone output has a reasonably low source impedance and provided useable levels into 600ohm headphones, but don't expect to be able to drive low impedance types satisfactorily. Track access was very fast and accompanied by low mechanical noise.

SOUND QUALITY

While not in the top rank for its price, the sound was still pleasant, and slightly below average in the context of this group of players. The panel considered that the treble was a little brittle and slightly defocused, but it did have reasonable detail and clarity. The bass had good weight and extension, but there was some loss of 'speed' when compared with the best of the competition. The midrange was detailed with a fine natural balance, and the soundstage was well formed with above average depth and good width. Though the player has a 'forward' presentation, probably caused by the high frequency

shelf, this did not detract from its overall merit. On complex passages, however, the image could become confused and there was some loss of transparency.

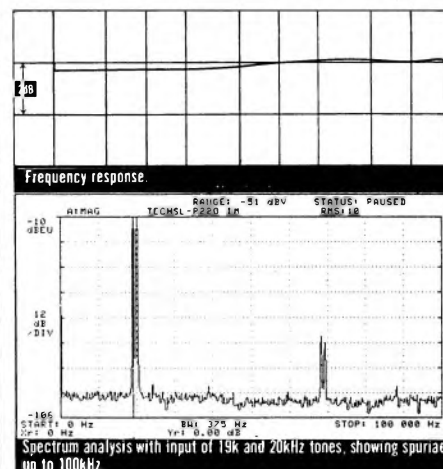
CONCLUSIONS

Although the sound quality was not the best at this price level, the *F220* is well constructed, has a host of facilities, a fine technical performance, and is very attractive to boot. This powerful combination should prove hard to resist.

TEST RESULTS

	20Hz	1kHz	20kHz
Channel balance	0.02dB	0.03dB	0.13dB
Stereo separation	95dB	93dB	82dB
Channel phase difference	0°	3°	42°
Total harmonic dist, 0dB	-93dB	-97dB	-86dB
Total harmonic dist, -10dB	—	-93dB	—
Total harmonic dist, -60dB	—	-41dB	—
Total harmonic dist, -80dB	—	-18dB	—
Intermodulation, 19kHz/20kHz, 0dB	—	—	-86dB
Intermodulation, 19kHz/20kHz, -10dB	—	—	-95dB
Frequency response,			
left channel	-0.27dB	0dB	-0.1dB
Frequency response,			
right channel	-0.26dB	0dB	-0dB
Signal-to-noise, 20Hz-20kHz unweighted			96/100dB
Signal-to-noise, CCIR/ARM, 1kHz ref			90/93dB
Output level, 0dB, left/right			2.13V
Output impedance			670ohms
De-emphasis 1kHz, -0.37dB; 5kHz, -4.37dB; 16kHz, -8.85dB			
Track access time			2.5 secs
Error correction capability			>900µm gap, >800µm dot
Mechanical noise			low
Spurious up to 100kHz			-97dB
Resolution at -90dB			-86.9/-85.8dB
Headphone socket			yes, variable, 120ohms
Dimensions (w x d x h)			43 x 25 x 8cms
Estimated typical purchase price			£229

Reassessed and reprinted from issue No. 53.



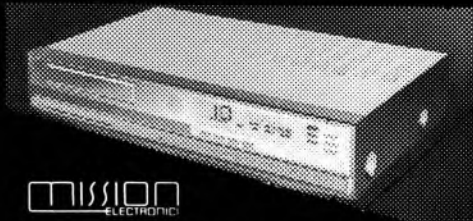
MISSION ELECTRONICS CONTROL CENTRES

AT Labs

159 Chase Side
Enfield
Middlesex EN2 0PW
01-367 3132



Although hardly in the first flush of youth by CD Player standards, the consistently delightful PCM 7000 still continues to sell in large quantities due to its smooth, unfatiguing presentation and sensibly designed remote control operation.



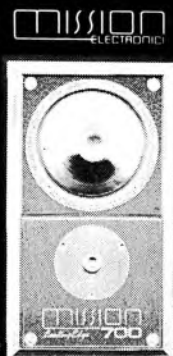
MISSION ELECTRONICS
PCM 7000 £399.90

Come and see what £399.90 will buy you in comparison to our comprehensive range of players from:- Acoustic Research, A & R Cambridge, Cambridge Audio*, Denon, Marantz, Meridian, Philips, Rotel, Yamaha.

** A limited number of new PCM 4000's are available at £299.90. **

MISSION
ELECTRONICS

MISSION
ELECTRONICS



With the acclaim afforded Mission for their electronics we tend to overlook the fact that they are one of the largest and most consistent speaker manufacturers in the UK. From the baby 70 MK II at £99.90 to the awesome 780 at £700 Mission speakers continue to collect Awards and Best Buy recommendations.



Compare with all the best speakers from:- Acoustic Research, Gale, Heybrook, Kef, ProAc

AT Labs

442-444 Cranbrook Rd.
Gants Hill Ilford
Essex IG2 6LL
01-518 0915

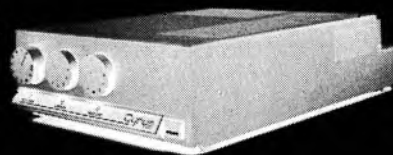


Audio T

190 West End Lane
London
NW6 1SQ
01 794 7848



Occupying a crowded area of the Amplifier market the Cyrus 2 nevertheless has an ace in the hole. It can be upgraded simply by the addition of the PSX power supply, effectively converting the already fine 2 to a pre-power combo of tremendous control and dynamics. We have the best amps available from £120 to £10,000. Phone for an audition.



MISSION ELECTRONICS
CYRUS TWO

Fine amplification from:- A & R Cambridge, Audiolab, Audio Research*, Cambridge Audio*, Exposure, Quad, Rotel.
* Product stocked at Audio T.

MISSION
ELECTRONICS

See the MISSION ELECTRONICS range at the LONDON CONTROL CENTRES

TECHNICS SLP990

PANASONIC UK LTD., 300-318 BATH ROAD, SLOUGH, BERKS SL1 6JB. TEL: (0753) 34522.



Technics' £450 990 reviewed here is but one of three new prestige players that are just coming onto the market, its soulmates being the £300 550 and 770. All feature Technics' new 18-bit 'high resolution' multiple DAC system at various levels of sophistication, and vary from middleweight through to the 8kg + Sumo-wrestling 990.

Seemingly hewn from solid armour plating, the way it grows out of its (proper) feet makes this unusually high player look more like an aircraft carrier than a battleship. It's a button-pushers dream for those with the patience to work through all the subsidiary functions, but the front panel nevertheless shows some design discipline in the layout and ordering of the controls - impressive, mildly aggressive too perhaps, but not totally daunting, as play, pause, stop and open are easily distinguished. Fast search uses Technics' proprietary 'scratch play' dial, there are twenty track entry keys on both player and handset, and the lightshow covers all eventualities - including an analogue (!) style time readout.

Built to Technics' normal high standards, the steel case has laminated damping on the topplate, while the base adds a large, braced plastic moulding to a steel panel that sits on rubber inset feet. The decoupled disc drive has a plastic chassis and disc clamp mounted on a steel drawer. Two transformers and three separate rectifiers supply good quality smoothing capacitors, and other audiophile-oriented components are used extensively elsewhere in the audio circuitry. Technics' own digital filter feeds no less than four Burr Brown PCM56P DACs in order to achieve 4x oversampling with 18-bit resolution. Both electrical and optical digital outputs are provided.

LAB REPORT

The frequency response is nice and flat, with

just the slightest upturn at high frequencies, while the lack of any phase shifting at HF confirms the use of multiple DACs. Channel balance is very close and stereo separation exceptionally good. Harmonic and intermodulation distortion tests all give reference standard results too - the spectrogram revealing nothing whatever beyond the two test spikes, in or out of the audio band.

The output level is significantly above the CD standard, so caution and compensation will be needed if performing A/B comparisons against other machines. Signal-to-noise ratios again approach the state of the art, error correction is fine and de-emphasis accurate. Track accessing is very fast while mechanical noise is very low. The low level resolution of a -90dB test tone is probably the best we have ever measured - within 0.5dB for the poorer of the two channels! By any standards the 990 delivers an exceptional set of lab results, showing that considerable care has been taken throughout the design and in the alignment of the sample concerned.

SOUND QUALITY

The straight good rating certainly helps justify this player's substantial pricetag, though the auditioning in fact proved a slightly frustrating experience. At times the sound was truly excellent - tight, crisp with fine focus and detail - yet at other times there was a hint of artificiality that proved ultimately a trifle unsettling.

Bass was fast and powerful, though the midrange sounded a shade boxy and thickened, while the treble was generally smooth and controlled. String tone sounded a little odd, adding a slight 'sheen', while depth was not entirely convincing either, though the image had fine scale and width. Clarity and presentation seemed to vary somewhat according to the complexity of material, and

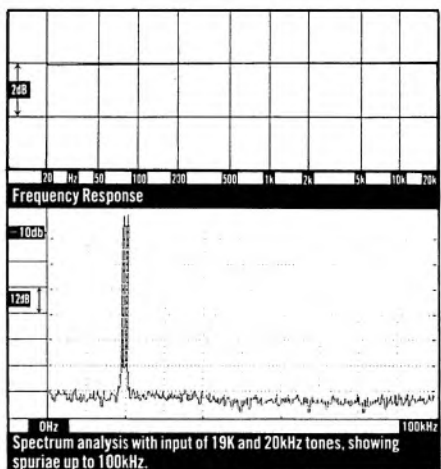
this inconsistency seemed to be the Achilles heel of an otherwise impressive performer.

CONCLUSIONS

It seems almost churlish not to Recommend a player which is such an obvious *tour de force* technically, and which offers ample engineering and build quality to justify a price which is only a little above average. But the fact remains that our listening tests left sufficient sound quality reservations to keep the 990 in a 'worth considering' category, and suggest that those attracted by its many impressive attributes should check this aspect out for themselves.

TEST RESULTS

	20Hz	1kHz	20kHz
Channel balance	0.0dB	0.03dB	0.03dB
Stereo separation	134dB	134dB	107dB
Channel phase difference	0°	0°	0°
Total harmonic dist, 0dB	-92dB	-92dB	-85dB
Total harmonic dist, -10dB	—	-85dB	—
Total harmonic dist, -60dB	—	-51dB	—
Total harmonic dist, -80dB	—	-26.5dB	—
Intermodulation, 19kHz/20kHz, 0dB	—	—	-97dB
Intermodulation, 19kHz/20kHz, -10dB	—	—	-100dB
Frequency response,			
left channel	0.00dB	0	-0.02dB
Frequency response,			
right channel	0.02dB	0	-0.03dB
Signal-to-noise, 20Hz-20kHz unweighted			111/113dB
Signal-to-noise, CCIR/ARM, 1kHz ref			106/109dB
Output level, 0dB, left/right			2.635V
Output impedance			560ohms
De-emphasis 1kHz, -0.33dB; 5kHz, -4.50dB; 16kHz, -8.95dB			
Track access time			2 secs
Error correction capability		>900µm gap, >800µm dot	
Mechanical noise			very low
Spuriae up to 100kHz			-102dB
Resolution at -90dB			-85.93/-90.52dB
Headphone socket			28ohms
Dimensions (w x d x h)			43 x 33 x 12.9cm
Estimated typical purchase price			£450





TURN UP THE QUALITY
TURN DOWN THE PRICE

The Orell SA-040 Stereo Integrated Amplifier is probably the highest specification amplifier in the world for its price.

It impressed Hi-Fi Choice magazine so much they gave us their coveted 'Recommended' mark, which we wear with pride.

But you can only tell exactly how good it is by hearing it in action at one of our select dealers around the country.

Get your ears around one soon. Write for a list of stockists and more information.

M O D E L
S A - 0 4 0



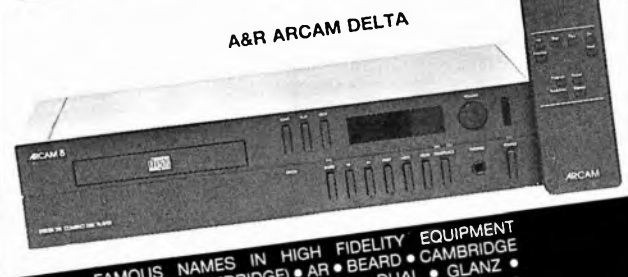
Orell Electronics Limited.
25 Nathans Road, North Wembley
Middlesex HA0 3SA

O'BRIEN hi-fi

QUALITY EQUIPMENT ON DEMONSTRATION ON MOST OF THE BEST BUYS



PHILIPS CD473



A&R ARCAM DELTA

FAMOUS NAMES IN HIGH FIDELITY EQUIPMENT
FROM A&R (CAMBRIDGE) • AR • BEARD • CAMBRIDGE
AUDIO • CELESTION • DENON • DUAL • GLANZ
HADCOCK • HARMON • KEF • LINN • LOGIC
HEYBROOK • HITACHI • MORDAUNT-SHORT
MARANTZ • MICHELL • MONROSE • MYST
MERIDIAN • MISSION • OAK • ORTOFON • PINK
NAKAMICH • NYTECH • QED • REVOLVER • REVOX
TRIANGLE • QUAD • QED • SONY • SUPEX • SYRINX •
ROGERS • ROTEL • SONY • SUPEX • YAMAHA
TECHNICS • THORENS • YAMAHA

95 HIGH STREET, WIMBLEDON VILLAGE, LONDON, SW19. 01-946 0331
• CREDIT FACILITIES (Trinity Finance APR. 38.4%. Written details on request)
• SERVICE FACILITIES • ACCESS/BARCLAYCARD
• FULL ORDER & EXPORT SERVICE • Opening Hours: Tues-Sat 9-50.30.

HI-FI MARKETS



**LET YOUR DEALER GUIDE
LET YOUR EARS DECIDE**

LET YOUR
DEALER GUIDE

LET YOUR
EARS DECIDE

READING HI-FI-CENTRE.

32DA
THE ULTIMATE IN
SOUND QUALITY

6 Harris Arcade, Friar St., Reading, Berks. RG1 1DN, Tel: (0734) 585463.

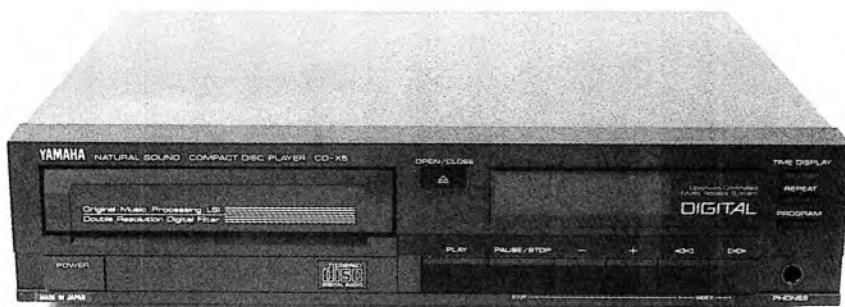
Opening Hours: Tues-Sat: 9.30am to 5.30pm (Lunch: 2 to 3pm. Except Sat).

● CLOSED ALL DAY MONDAY. ●

▶ DEMONSTRATION APPOINTMENTS ADVISED. ◀

YAMAHA CD-X5

YAMAHA ELECTRONICS UK LTD., YAMAHA HOUSE, 200 RICKMANSWORTH ROAD, WATFORD, HERTS WD1 7JS. TEL: (0923) 33166.



This large and diverse Japanese company has a broad range of activities with a number of totally autonomous divisions, mostly reflecting a general interest in different aspects of music (disregarding the motor cycles of course). The hi-fi division has shown increasing strength on the UK market in recent years, with amplifiers and CD players making prominent contributions.

The *CD-X5* is a manual only machine costing £180 with the usual basic quota of facilities, nicely finished and with good build quality, if rather light in weight and lacking any real anti-vibration measures.

The front panel is simple and straightforwardly laid out, with large buttons for main transport functions like play, skip and scan, and a smaller threesome for programming, repeat and display mode. The display itself is fairly elaborate, with two separate digital readouts for disc information, plus half a dozen status indicators. The rear panel carries just a stereo pair of phono sockets.

LAB REPORT

This Yamaha model uses a single time-shared 16-bit DAC, with $2\times$ oversampling and digital filtering, so there is some high frequency inter-channel phase shift. The response was pretty flat through bass and midband, but rose fractionally to a broad treble plateau, +0.4dB across the final octave. Channel balance was very close, and separation about average, deteriorating somewhat at high frequencies. Harmonic distortion was good, and intermodulation acceptable if below average, the spectrogram revealing significant ultrasonic spurious.

The output impedance is sufficiently high to suggest exercising extra compatibility care if proposing to drive a power amplifier directly or *via* a passive volume control. Mechanical noise was quite low, track access a reasonable 4 seconds, but shock and vibra-

tion resistance was poor. Error correction tests were passed without fuss, electrical noise levels were quite low, but ultrasonics showed limited filtering. Low level linearity was a respectable 15.3-bits.

SOUND QUALITY

Rating fair overall, this is a reasonable result for a low cost player. The *CD-X5* is cheerful and lively, with good dynamics, but the sound was also a touch 'coarse' with hints of 'hardness' on loud sections. The upper treble was oddly projected and defocused from an otherwise good stereo image with fair depth and clarity. The bass showed good drive, but an impression of treble 'grain' and mild sibilant exaggeration remains.

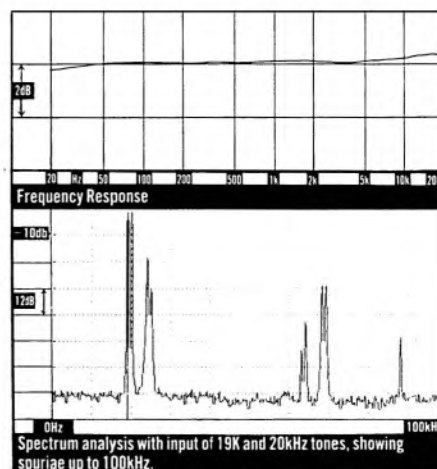
CONCLUSIONS

Good build quality, respectable lab performance and modest sound quality at a realistic price. It is not in our view the best sounding in its class, but offers a fine overall balance taking the construction and finish into account.

TEST RESULTS

	20Hz	1kHz	20kHz
Channel balance	0.03dB	0.03dB	0.04dB
Stereo separation	86dB	85dB	66dB
Channel phase difference	0°	2°	40°
Total harmonic dist, 0dB	-83dB	-84dB	-84dB
Total harmonic dist, -10dB	—	-82dB	—
Total harmonic dist, -60dB	—	-42.5dB	—
Total harmonic dist, -80dB	—	-21dB	—
Intermodulation, 19kHz/20kHz, 0dB	—	—	-77dB
Intermodulation, 19kHz/20kHz, -10dB	—	—	-83dB
Frequency response, left channel	0.01dB	0	-1.3dB
Frequency response, right channel	0.01dB	0	-1.34dB
Signal-to-noise, 20Hz-20kHz unweighted	—	—	99/103dB
Signal-to-noise, CCIR/ARM, 1kHz ref	—	—	94/98dB
Output level, 0dB, left/right	—	—	2V
Output impedance	—	—	2.2kohms
De-emphasis	1kHz, 0.26dB; 5kHz, 3.81dB; 16kHz, 9.1dB	—	—
Track access time	—	—	4.0 secs
Error correction capability	—	>900µm gap, >800µm det	—
Mechanical noise	—	—	quite low
Spuriae up to 100kHz	—	—	-74dB
Resolution at -90dB	—	—	-85.6/-85.4dB
Headphone socket	—	—	yes (fixed output); 100ohms
Dimensions (w x d x h)	—	—	34 x 7.7 x 28.5cm
Estimated typical purchase price	—	—	£180

Reassessed and reprinted from issue No. 51



84

CHARING CROSS ROAD

HOME OF

COVENT GARDEN RECORDS

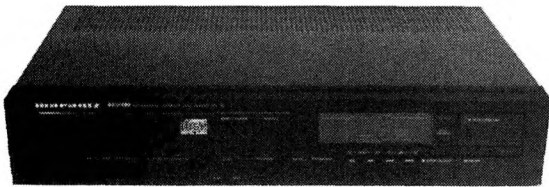
BRITAIN'S LEADING COMPACT DISC CENTRE
PRESENTS

MARANTZ

COMPACT DISC PLAYERS

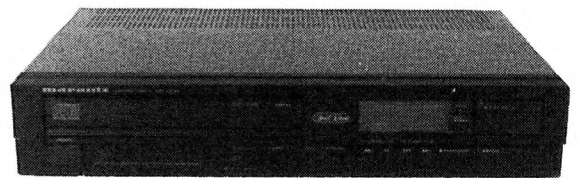
In Stock

And On Demonstration



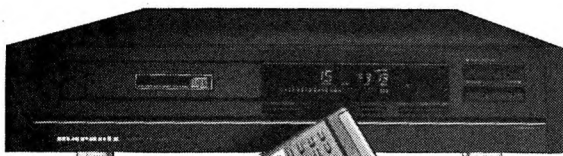
CD75 DX

HIGH QUALITY CD PLAYER
TWIN 16-BIT DIGITAL TO ANALOGUE CONVERTOR
FULL FUNCTION REMOTE WITH FTS
PRICE £299.00



CD65 DX

MARANTZ QUALITY AT BUDGET PRICES
WITH FULL FUNCTION REMOTE CONTROL
PRICE £249.00



MARANTZ CD94

OUTSTANDING SOUND AND BUILD QUALITY
PRICE £799.00
SPECIAL OFFER FREE FIVE YEAR WARRANTY
INSURANCE



STOCKISTS OF QUALITY
AUDIO EQUIPMENT BY
QUAD, B&W, MISSION,
MERIDIAN AND MANY
MORE.

FREE DELIVERY OF
SYSTEMS WITHIN THE
M25 AREA.



CD273 SE

WHAT HI FI BEST BUDGET CD PLAYER
PRICE £239.00
NOW £199.00

OVER 45 CD PLAYERS
IN STOCK FROM
£179 TO £2000

TWO PRIVATE
DEMONSTRATION
ROOMS AND OVER
6000 CD TITLES



COVENT GARDEN RECORDS

84 Charing Cross Road, London WC2H 0JA

Tel: 01-379 7674/7635/7427

Open Mon - Sat 10am-7.30pm

2 mins from Leicester Sq. and Tottenham Court Road Tube



£50 OFF
WHEN YOU BUY A CD PLAYER

BRING THIS COUPON IN DURING MAY 1988 AND
YOU WILL GET £2 OFF THE NEXT 25 CD'S YOU BUY
(£10.95+) THIS YEAR. ALSO AVAILABLE ON AUDIO
COMPONENTS OVER £500.

HFC/5/88

"VALID TO 30/5/88"



TECH TALK

Our test programme included complete laboratory analysis as well as thorough auditioning of each player. Here we explain the review approach and test methods.

The sound quality of top quality black disc players remains beyond question, but CD players are winning more and more sales from analogue.

The general consensus seems to be that CD provides a reliably good baseline of audio quality, which is more than satisfactory for the majority of non-enthusiast applications. Given this baseline the more critical listener can discern significant and important differences in CD player sound quality. In context, a CD player can be auditioned much as one investigates an audio pre-amplifier; indeed many of the subjective effects may be described in amplifier sound parlance.

The advantages which are indisputably offered by Compact Disc players over vinyl disc playing equipment can be summed up as follows:

- 1) Up to 1 hour 15 minutes uninterrupted playing time.
- 2) Freedom from surface noise, clicks and pops.
- 3) Discs are comparatively damage and wear-proof.
- 4) No complications of stylus wear, contamination or alignment.
- 5) Full automatic facilities, track programming etc, many having comprehensive remote control.
- 6) All the usual 'cheap turntable' problems such as pitch stability, wow and flutter etc, are absent.
- 7) CD players can be small.
- 8) High level 'flat response' output can obviate the pre-amplifier, and many players also have competent headphone outputs.
- 9) High lab specifications for distortion, balance, separation and signal-to-noise ratio.
- 10) Some immunity to acoustic feedback and reasonable levels of shock and vibration resistance.
- 11) The sound is relatively neutral, with a wide open frequency characteristic as well as notably good bass, since arm/cartridge subsonic resonances are avoided. Stereo is usually very stable and well focused, with much separate detail.[†]

That said, there remain enthusiasts who continue to prefer their music from vinyl LP sources, complaining of a slightly 'amusical' quality about the sound of CD. The enormous new and secondhand repertoire and much lower disc prices remain further major vinyl incentives.

As regards the more subtle aspects of sound reproduction, CD players can vary in their stereo presentation – some have a more relaxed 'distanced' perspective while others seem more direct and 'up-front'. Differences can be found in the far space or depth region behind the frontal image plane, while some players may also show a softening of definition in the bass or treble extremes. The treble may also appear a touch 'grainy' and fatiguing. The mid can vary in tonal quality, with a thinner, 'harder' effect on some players, and a sweeter, more natural balance on others.

LABORATORY TESTS

An established test programme was employed for the CD players. In general, these tests check whether the review samples were free from manufacturing defects and were up to spec. Further tests operating beyond the normal specifications seek to explore other aspects, many of which have been shown to correlate well with subjective sound quality factors.

The test discs used here are made by Sony, Technics, Polygram and Denon, but others can also be obtained. As with the equivalent laboratory vinyl test discs, frequency response, channel separation, signal-to-noise ratio and distortion sections are all present, while special impulses for transient response may also be included, plus very low level tones for assessing linearity and quantisation errors.

'ALIASING' AND SPURIOUS TONES

Due to aliasing, an effect where the higher audio frequencies may 'beat' or mix with the clock or sampling rate at 44.1kHz, various spurious tones may be produced, and their presence is likely to

influence sound quality in the upper registers. Excessive spurious tones in the audible range may increase 'brittleness', 'glare' or 'hardness' in the sound. Excessive spurious above audibility may give rise to problems in the audio stages following the CD, for example cassette or PCM recorders and amplifiers.

Ultrasonic tones may beat with further signals, producing more 'rubbish' and noise which by difference mixing may fold back into the audible range.

For this edition, the full reviews include a spectrogram from 0Hz to 100kHz, showing the spurious products resulting from a pair of high frequency tones at 19 and 20kHz, with peak level a reasonably fair – 10dB.

FREQUENCY RESPONSE

For frequency response, a high resolution graph has been used, to the same scale as the RIAA equalisation accuracy charts in the *Choice: Amplifiers* issues. Left and right channels are both assessed to ensure that no balance errors occur. Other tests include checking for correct de-emphasis; testing response alignment; output impedance (important when using passive control units); output level; track location speed (assessed as the time taken to access track 15 on the Sony test disc YEDS2). Weighted and unweighted signal-to-noise ratios were measured with and without pre-emphasis and each player's mechanical noise was also assessed.

ERROR CORRECTION

Further tests examine the ability of a player to correct and conceal errors as well as disc faults. This tolerance of the disc errors and damage is a key factor in CD's durability, and is further believed to exert a marginal effect on sound quality. A machine operating at a low internal error rate may sound better than one with a high error rate, even when the errors are fully corrected.

The effect of vibration is also important. Though CD players are normally considered to be both acoustic feedback and vibration-proof, acoustic and vibrational energy can

nonetheless find their way to the disc transport and disc itself. In theory the high speed of the laser head servos responsible for tracking renders them immune to energy at lower frequencies, say below 500Hz, which is the main range of acoustic excitation. In practice noise and vibration may increase the intrinsic error rates and thus may influence sound quality; furthermore players may be slightly microphonic, depending on construction and circuitry.

Tests have shown that as with analogue turntables, although to a lesser extent, isolating shelves, platforms and tables can have a beneficial effect on CD. A small mat, placed over a disc to damp vibration can by implication help lower error rates – the early Meridian players incorporated such a device. Remember that CD operates with almost continuous errors which are subject to a powerful computed correction, and only at the ultimate error limit (almost never attained) will the machine fail to compute. In this case, it momentarily guesses or may even mute and then recover. In theory this can occur once or twice in 20 hours of programme, and generally passes unnoticed. With giant errors or gaps in the disc, a click can be heard as no correction or concealment is then possible, and usually the laser then sticks or misses a track. Discs which do this should be returned.

LISTENING TESTS

After a reasonable conditioning/warm-up period, each player was auditioned by a small group of experienced listeners using a wide range of source material, paying particular attention to establish consistency of rating against previous reviews.

The basic reference system included special bi-wired Celestion *SL600* loudspeakers on Cliff Stone stands, driven *via* various exotic van den Hul cables from Krell *KMA100 II* power amplifiers, fed from a Cello *Audio Suite* pre-amplifier (Premium boards). Reference was made to vinyl reproduction from Pink Triangle *PTT00/SME Series V*/van den Hul *MC One*.

84

CHARING CROSS ROAD

HOME OF

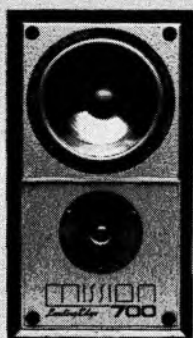
COVENT GARDEN RECORDS

BRITAIN'S LEADING COMPACT DISC CENTRE

PRESENTS



NOW AVAILABLE THE SUPERB NEW CD PLAYER, THE PCM II AND THE IMPROVED CYRUS 1 AND 2 AMPLIFIERS, THESE OUTSTANDING PRODUCTS SET NEW STANDARDS FOR REPRODUCING MUSIC AS IT WAS PERFORMED.
NOW IN STOCK AND ON DEMONSTRATION



MISSION 700LE
£139.00



MISSION 780
£699.00



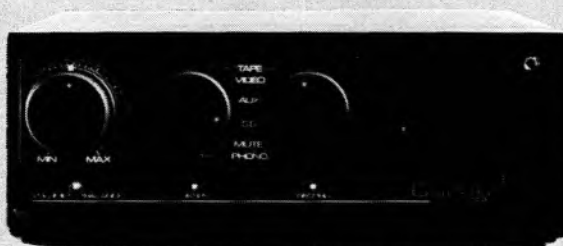
MISSION PCM II CD PLAYER

- MISSION PCM II CD PLAYER£599.00
- Available with P.S.X. Power Supply£799.00
- CYRUS 1£179.00
- CYRUS 2£299.00
- PSX£179.00

Mission Loudspeakers on Demonstration. From the 700LE through to the 780. Hear them!!

Two private demonstration rooms

Free installation service for systems in the M25 area.



MISSION CYRUS 1 AMPLIFIER

Free installation of Mission Systems ★ subject to availability ★ If we can't supply within 48 hrs we will give you £25 of CD's of your choice.

We stock over 6000 titles on CD!

Hear your choice of music for a demonstration.

ALSO STOCKISTS OF

COMPONENTS AND COMPLETE SYSTEMS BY A & R CAMBRIDGE, B & W, DENON, MARANTZ, MERIDIAN, MONSTER CABLE, MONITOR AUDIO, NAKAMICHI, PIONEER, QUAD, REVOX, ROGERS, ROTEL, SENNHEISER, SONY, WHARFEDALE, YAMAHA AND MORE. OVER 45 CD PLAYERS IN STOCK RANGING IN PRICE FROM £179-£2000.



£1 OFF

On purchase of 1 CD Over £9.95
 Valid until 30/5/88
 NO TOKEN GIVEN

HFC/5/88

COVENT GARDEN RECORDS

84 Charing Cross Road,
 London WC2H 0JA
 Tel: 01-379 7674/7635/7427
 Open Mon - Sat 10am-7.30pm



£6 OFF

On purchase of 5 CD's Over £9.95
 Valid until 30/5/88
 NO TOKEN GIVEN

HFC/5/88



CD PLAYERS: CONCLUSIONS, BEST BUYS AND RECOMMENDATIONS

The current state of CD players compared to the situation a year ago, plus our favourite machines at all price levels.

Based on the latest listening tests conducted for this issue, it is clear that the sound quality of CD players continues to improve steadily. It is also obvious that a wider range of features is now available at lower price points than before, while technical performance also continues to show steady gains.

Looking first at the overall sound quality picture for the latest reviews, the test group auditioned in fact consisted of over 40 players, of which 31 new reviews are published. The balance consists of re-auditioning some established players, saving some reviews until *The Collection* 'high end' edition in two months time, and some work carried out for another magazine.

The average price of these machines works out at around £380 – somewhat lower than the £520 average for the group tested a year ago (a figure that was somewhat distorted by a 'Nakamichi effect'). Meanwhile the average overall sound quality rating has increased by about 7.5 per cent over the year, which can't be bad. This shift upward in overall quality necessitates some retrospective rescaling of the value judgements and Recommendations relating to earlier reviews, as listed in the directory or reprinted alongside the new reviews.

We have discarded the earlier 'average'-based ratings, partly because the term has become almost perjorative as our language becomes overburdened with a superfluity of marketing-led superlatives, and partly because it becomes illogical when a group average falls in the upper range of the 'good' category, as we found happening with amplifiers recently. The overall performance of the group as a whole still determines the relative attainment of any particular model as a matter of course, but we will now be 'broadbanding' the value

judgements into the following groups: 'poor', 'fair', 'good', 'very good' and 'excellent'.

The 'group average' for CD player overall sound quality is currently fair and square in the 'good' category, whereas last year it would have hovered around the top end of 'fair', such is the rapid rate of product development in this still comparatively new technology.

A sound that was regarded as something special a year ago is now much closer to the accepted norm, and in the author's opinion today's middle rank CD player is now capable of taking on its vinyl disc equivalent on sound quality grounds, let alone convenience and ergonomics. (*This is an opinion which individuals really ought to confirm for themselves, as the two formats differ qualitatively rather than quantitatively – Ed.*)

These CD players can now deliver a sound quality to match an analogue 'front end' (turntable, arm and cartridge) costing up to £500, and it is only when the vinyl replay equipment costs from £600 upwards that it can still offer effective competition. Given the current rate of progress with CD, vinyl disc could well have become relegated to archive and specialist enthusiast roles by 1989, whether audiophiles like it or not.

On the facilities side, simple remote control is now available on top brand machinery (Philips, Sony etc.) for below £200, while £250 can buy virtually all the operational paraphernalia that anyone could hope to want – or be bothered to learn to use – save the autochangers which now start from as low as £280. Higher prices tend to bring further sound quality benefits and better build, plus improvements in technical performance through tighter tolerancing.

Technical standards continue to improve, as more machines adopt dual DACs and multiple

oversampling techniques with advanced digital filters. 4x oversampling has now spread to Japanese brands, who are often sourcing DACs from Philips as well as Burr Brown and others. Cambridge Audio's 16x oversampling has leapfrogged the world yet again, but 8x is widely expected to appear on Far Eastern machines before the year is out. Build quality and field reliability are improving alongside, the recent Philips CDM2 disc drive reportedly laying the ghost of unreliability that haunted the early days of their previous mechanism.

BEST BUYS AND RECOMMENDATIONS

The following machines have been selected first and foremost because of the good performance they deliver for their price (current on going to press, as quoted in the review), particularly on sound quality grounds. We also take some account of build quality, facilities and presentation, but the customer should decide for him or herself the relative importance of such factors.

Only lower price machines are considered eligible for Best Buy ratings, while sheer value for money is less important than value per se when recommending the more expensive machines in particular. We should also point out that a 'worth considering' rating or even none whatsoever does not necessarily imply condemnation. Some machines behaved perfectly adequately but simply failed to distinguish themselves sufficiently in our listening tests. Under different conditions they could well fit the bill.

The players in each category separately are listed in ascending order of price.

BEST BUYS

Philips CD371 (£180)

Budget manual midi-size player

artfully blends earlier 160-style board with 47 series drive mechanism.

Marantz CD273 (£200)

Fine sounding manual midi-size player, if not quite as ruggedly built as some.

Philips CD472 (£200)

Full width plus remote plus good sound at fiercely competitive price.

Sony CDP-M75 (£230)

Midi-size version of 750, costing £20 less.

Marantz CD273SE (£240)

'Special Equipment' adds worthwhile sound improvements to already good 273.

Marantz CD873 (£240)

Fine sounding midi-size player, lightweight build and good lab performance.

Philips CD473 (£250)

Full width remote player with fine sound quality and plenty of facilities.

Marantz CD873LE (£250)

Audiophile standard sound quality at near budget price (while stocks last).

NEC CD610 (£250)

Full width player with nice ergonomics, good build and very good sound quality.

Sony CDP-750 (£250)

Competitive full-width package offers very good sound, full remote, plus Sony style and build quality.

Pioneer PD7050 (£280)

Elaborate feature count in full size remote player with very good sound quality.

RECOMMENDED

Sony CDP-M35 (£170)

Decent sounding, (very) budget midi-size player – lightweight build but good presentation.

Technics SL-P111 (£180)

Simply presented manual midi-size player with good build quality and fair sound.

Sony CDP-M20 (£180)

One of last year's leading budget contenders, this midi-size player offers a high standard of presentation and good build quality.

Hitachi DA-7000 (£180)

Simple and easy to use, with reasonable sound at competitive price.

Sony CDP-M55 (£190)

Effectively the *M35* package plus simple remote control at a very competitive price.

Pioneer PD5050 (£200)

Decent sound, good build and a welter of manual control features.

Denon DCD-300 (£210)

Nicely built mid-size manual player with well balanced sound.

Pioneer PD6050 (£230)

Remote version of *5050*.

Technics SL-P220 (£230)

Well built with good ergonomics, remote control and respectable sound quality.

Pioneer PD-M50 (£280)

This autochanger model delivered similar sound and build quality as *5050*.

Denon DCD-800 (£300)

Good sound quality and high feature count in well built full-width package.

Luxman D-90 (£300)

Simple and easy to use, with very good sound and Luxman standards of finish.

Rotel RCD820BX2 (£300)

BX2 tweaks and their own front panel keep this Philips-based player fully competitive.

Technics SLP-520 (£350)

A complex full feature remote machine with fine build and respectable sound quality.

Mission PCM7000 (£400)

Significant modifications plus very good sound quality keep this remote-volume Philips-based machine ahead of most competitors at its new low price.

NEC CD810 (£400)

Heavyweight build, attractive ergonomics and very good sound at a reasonable price.

Technics SLP720 (£400)

Improving significantly soundwise on the *520*, the *720* has similarly excellent lab performance and build.

Arcam Delta 70 (£500)

Attractively 'British' player inside

and out, with understated presentation, solid build and refined sound quality.

Cambridge Audio CD2 (£600)

16x oversampling and the best midrange sound quality around, though not a sonic match for its big brother overall.

Denon DCD 1500II (£500)

Elaborate facilities, heavyweight build and very good sound quality.

Denon DCD 1700 (£650)

Very good sound quality distinguishes this fine all rounder from most of its immediate competition.

Philips CD880 (£500)

Economy version of *960* with Japanese innards assembled in Belgium.

Sony CDP-333ESD (£600)

Arguably the new all round reference for sound quality, plus luxury build and features and exceptional lab performance.

Philips CD960 (£700)

Very good sound quality plus Japanese build plus *FTS* - what

more could one want?

Marantz CD94 (£800)

Luxury Marantz flagship from their Japanese factory gives very good sound with extensive features and fine lab performance.

Sonographe CD1 (£800)

Basic Philips chassis with the Conrad Johnson touch creates reference standard sound quality with adequate build.

Meridian 207 (£950)

Uniquely versatile and handsome, Meridian's transport now with the latest Philips 16-bit chips creates a benchmark for sound quality.

Sony CDP-555ES (£1,000)

Luxury-build heavyweight gives very good sound quality with exceptional lab performance.

Cambridge Audio CD1 (£1,500)

Build may be bettered elsewhere, but not the sound quality of our reference yardstick. *Series 2* model now on the way.

setting the standard in loudspeakers.....

Rogers

BRITISH HIGH FIDELITY

Visit one of our dealers listed below to hear the Recommended **LS2** and the Best Buy **LS6** plus our new **LS7t** and **Studio 1A**. Find out why we set the standards.

BRISTOL
CAMBRIDGE
CHANDLERS FORD
CHELMSFORD
CROYDON
EDINBURGH

Radford Hi Fi, 52/3 Gloucester Road
Steve Boxshall Audio, 41 Victoria Road
Hampshire Audio, 8/12 Hursley Road
Rayleigh Hi Fi, 216 Moulsham Street (on the Parkway)
Spaldings, 352/4 Lower Addiscombe Road
Hi Fi Corner, 1 Haddington Place

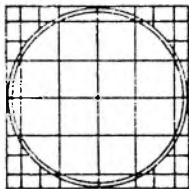
GLASGOW
HUDDERSFIELD
LEEDS
LEICESTER
LIVERPOOL
LONDON W1
LONDON W1
LONDON W2
LONDON W5
LONDON WC2
LONDON WC2
LONDON NW6
LONDON SW19
MANCHESTER
RAYLEIGH
READING
ROTHERHAM
SEVENOAKS
SOLIHULL
WARRINGTON
WATFORD

In Hi Fi, 63 George Street
The Music Room, 221 St Vincent Street
Huddersfield Hi Fi, 4 Cross Church Street
Audio Projects, 45 Headingley Lane
Alpha Electronics, 1 Guildhall Lane
W. A. Brady, 401 Smithdown Road
Telesonic, 92 Tottenham Court Road
K.J. Leisuresound, 26 New Cavendish Street
Thomas Heinitz, 35 Moscow Road
Ealing TV & Hi Fi, 27 bond Street, Ealing
W. A. Brady, 18 Monmouth Street
Covent Garden Records, 84 Charing Cross Road
Studio 99, Fairfax Road, Swiss Cottage
M. O'Brien Hi Fi, 95 High Street, Wimbledon Village
The Music Room, 50 Bridge Street
Rayleigh Hi Fi, 44a High Street
Reading Hi Fi Centre, 6 Harris Arcade, Friar Street
Moorgate Acoustics, 2 Westgate
Sevenoaks Hi Fi, 111 London Road
Alternative Audio, 95 Hobs Moat Road
Doug Brady Hi Fi, Kingsway Studios, Kingsway
Acoustic Arts, 101 St Albans Road

SWISSTONE ELECTRONICS LIMITED

310 COMMONSIDE EAST, MITCHAM, SURREY CR4 1HX. Telephone: 01-640 2172

Source-Odyssey



Going for Gold

Products of Distinction:

The Source Turntable in black, mahogany or oak.	£849.00
The Source E.L. Starter System in black complete with fitted Audio-Technica AT-1120 arm and AT-115E cartridge.	£990.00
The Odyssey RP1-xg arm in silver & gold or black & gold finish.	£699.00
The Third Dimension high current Power Supply.	£350.00
The range of Daniel Lamb Equipment Furniture in black, gold & marble.	Various

The Odyssey RP1-xg Signature arm in brass alloy plated in 24 carat gold with custom specified wiring and fittings. Hand made to order. P.O.A.

The Source Signature 100 Limited Edition in black lacquer and gold plate complete with the Odyssey RP1-xg Signature arm and the Third Dimension power supply. Lovingly made to order in a numbered and signed edition of 100. £2,990.00

Dealers of Distinction:

Acoustic Arts, Watford 0923 33011 * Alternative Audio, Solihull 021 742 0254
Audio Craft, Uxbridge 0895 833752 * Derbyshire Hi-Fi, Derby 0332 44638
Hi-Fi Corner, Edinburgh 031 220 1535 * James Kerr, Glasgow 041 332 0988
Norman Audio, Preston 0772 53057 * Unilet Ltd., New Malden 01 942 9567
See Hear, Aberdeen 0224 574674 * Sounds Exclusive, Cranleigh 0483 26439
Sounds Expensive, Rugby 0788 79736 * Steve Boxshall Audio, Cambridge 0223 68305
The Music Room, Manchester 061 835 1366 & Glasgow 041 248 7221
Wilmslow Audio, Wilmslow 0625 529599 * Zeus Audio, Dungannon 08687 67985
Zeus Audio, Belfast 0232 332522.

More information on Source-Odyssey products can be obtained from the authorised dealers above or, in case of difficulty, from Walker-Nicholson Consultants on (0449) 721701

The Acoustic Arts Spring Collection

ATC

We have a very special loudspeaker which is very special indeed. It is relatively small (28ins. high) beautifully made and finished and very expensive. What does it do for the money? - simply it goes louder than you could believe, is more transparent and neutral than anything else in its class. The speaker has become a legend in professional circles for some years and the list of owners reads like a who's who' in the music business!

ALPHASON SONATA

We have been captivated by the performance of this turntable. It offers a sound quality which is unique in its price class and we are delighted to have it here. Stereo imaging and depth along with outstanding detail characterise its major qualities. You really must hear it at the earliest opportunity.

ACOUSTIC ENERGY

You have now read the review in March *Hi-Fi Answers*, come and hear why we stock the AE 1. Better news still, there is a bigger brother called the AE 2 which is even better. How do these 'guys' do it! We can run our Krell KSA 100 flat out into them and they don't explode!

MARANTZ

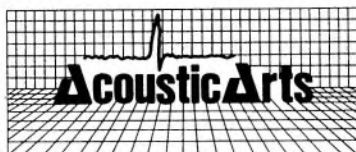
We are delighted to announce our appointment as main Marantz agents. The range contains significant integrated amps right through to some of the finest CD players on the market. The new CD65 and 75DX models are quite outstanding and a real improvement on their predecessors. The superb CD94, one of the best CD players available has now got a partner in the CDA94 outboard convertor which lifts the performance into the super league. Please come and see this outstanding range.

DENON DAP-5500 POA-6600 - DCD-3300

Quite simply the best CD replay system we have yet heard. We have always liked the DCD 3300 but when you use the optical link to the DAP-5500 the sound quality is stunning and lifts CD replay a major step forward. We thought that the Denon 6600 monoblock amplifier would be the most dispensable item of the system but we were wrong! They are superb and put a great number of established amplifiers to shame. This really is some system and we are already gathering a sizeable order book.

Acoustic Arts

Hi-Fi dealer - the most important product on this page. We are friendly, helpful and never forget the customer comes first. Why not pay us a visit and find out why people travel from all over the country to shop here. We even get customers visiting us from Europe.



Our agency list includes:

A & R, ATC, Acoustic Energy, Alphason, Audiolab, Carnegie, Castle, Celestion, Counterpoint, Crystal, Deltec, Denon, Dual, Elite, Gale, Heybrook, Incatech, Jadis, Koetsu, Krell, Linx, Logic, Magnephanar, Manticore, Marantz, Meridian, Monitor Audio, Musical Fidelity, Pink Triangle, P.S. Audio, Quad, Quicksilver, Revolver, Revox, Robertson, Rogers, Rotel, SD Acoustics, SME, Sonus Fabus, Spondor, Systemdek, Source, TDL, Tannoy, Thorens, VDH, WTA, Yamaha, etc.

101, St. Albans Road, Watford, Herts
Telephone: Watford 245250
Open Monday-Saturdays 9.30am-5.30pm





CHOOSING AND USING . . . LOUDSPEAKER STANDS

The stand should be regarded as a vital part of the speaker, proper support playing as important a part in the reproduction of sound as proper siting.

Today's loudspeaker purchaser, entering a specialist hi-fi shop with £150 to spend, is quite likely to end up with £100 loudspeakers sitting on £50 stands, a situation that would have been unheard of five years ago. And as often as not he will have made the decision himself, based on a demonstration which has left little doubt of the vital role that the stands play in the overall sound. Indeed it is becoming increasingly clear that the stand should be regarded as an integral part of the loudspeaker. Proper support is as important as proper siting, and both are nearly as important as the loudspeaker itself.

Exactly why this particular accessory should only have assumed such subjective significance quite recently remains somewhat obscure, though not beyond conjecture. The bottom line is that loudspeaker stands have an important influence upon the overall sound quality that a system can produce, and the fact that this was barely identified five years ago is perhaps evidence of steadily improving (analogue and digital) signal source quality.

In the reviews (and particularly the *Tech Talk*) Paul Miller describes his new initiative in objectively analysing loudspeaker stands. It is probably the first time that such work has been published anywhere, and again vindicates *Choice's* comparative reviewing policy. In isolation the measurements are very difficult to interpret; in comparison with one another the patterns start to emerge through the 'noise', and subjective/objective correlation can begin to be made.

It would be arrogant to assume that these techniques answer all the questions raised by loudspeaker support, but they certainly represent a major first step, and an important basis for improving our understanding of why and how these sonically important devices operate. The reviews provide a valuable

starting point, but cannot take account of all the various permutations and combinations of different loudspeakers and stands. In the final analysis 'suck it and see' is still part of the overall recipe, and the end result may well depend as much upon the skills and resources of the dealer in creating the best cocktail of price and performance, and in carrying out set-up and installation with care.

THE STORY SO FAR

Loudspeaker stands first started appearing about 15 years ago. Their purpose was to partner the BBC-influenced monitor loudspeakers like the Spendor *BC1*, Rogers *LS5/6*, KEF *104AB* and their successors. These designs have unusually low inherent midrange coloration and the stands helped avoid additional coloration from room reflections, first by raising the loudspeaker up from the floor, and also by allowing the speaker to be rolled out easily into free space away from walls when in use.

In this they were undoubtedly successful, but at the time no-one seemed conscious of the other influences that the stand had on the sound. Paradoxically, whereas the search for low coloration had originally spawned the stand, the search for increased dynamic contrast and liveliness – often at higher levels of coloration with wall-mounted designs – led to the second generation of rigid stands with floor- and cabinet-spiking. Following close behind, a third variation appeared, adding substantial mass to an inherently rigid design.

Sacrificing the convenience of castors means that the loudspeaker is now fixed more or less permanently to its site in the room – this is certainly one reason for the rise in popularity of wall-mount over free-space designs of late. However, the improvement in sound quality from adopting rigid stands is so dramatic that one can no longer seriously consider older castor

type stands for hi-fi applications. Rigid mounting improves dynamic contrasts and impact, stereo width and depth, and also the subjectively perceived bandwidth; it will also affect and may improve the coloration of the loudspeaker.

To believe this, you have to hear it for yourself, and the writer can still vividly recollect the incredulous faces of a pair of hard-bitten and cynical BBC engineers when they first heard the effect of spiking stands. To understand why this should be important is rather easier, and one merely has to look afresh at what a stereo pair of loudspeakers is trying to do. More objectively, Martin Colloms once substituted a Cliff Stone *Pi* stand in place of the earlier *Foundation* model, and noted that for the same volume control setting the bass/mid cone now 'bottomed' on a specific bass transient. The obvious inference is that the enclosure was being held more rigidly so that the cone excursion was increased.

THE ROLE OF THE STAND

The loudspeaker has to create vibrations in the air which correspond to the signals with which it is fed, simultaneously covering a wide range of frequencies from around 20Hz up to 20kHz, and colossal differences in dynamic range. This is done by vibrating diaphragms mounted on the front plate or baffle, but the ideal signal transfer can only be achieved if the mounting plates are absolutely rigid with respect to the room. And it is easy to see why large movements of a comparatively heavy bass cone inevitably cause considerable vibration in the enclosure and baffle.

This can shake the drivers and modify the wanted signal, and can be transmitted into adjacent surfaces such as tables or shelves. Non-rigid supports will allow the whole enclosure to move around to a sufficient degree to upset dynamics and stereo, while rigid supports

effectively couple some of the mass of wall or floor to the enclosure and at least give the pair of speakers a chance to create a coherent stereo soundfield.

Beyond the question of rigidity which is now generally accepted, there is the question of the energy transfer between the enclosure and stand (and the floor), and the complex effects which this can have. Here we start to get into rather murky and more controversial waters. Different types of enclosures deal with vibration in different ways; different types of stands interact in different ways to the various forms of vibration which the enclosures produce; and further variations are created by spike or Blu-Tack contact between enclosure and stand.

Generally speaking – and there are bound to be a number of exceptions – the heavier loudspeakers do tend to prefer the lighter stands, and the lighter loudspeakers respond better to the heavyweight stand. Heavyweight proponents point out – quite correctly – that lighter stands produce more vibration and hence coloration, while lightweight fans note that the heavier stands are apt to store and return the energy over a longer timespan. And then there is a further element of debate on the uses of different types of stands and floor-keying methods according to whether the floor is wooden, concrete, or some combination or alternative.

Ultimately we are moving steadily towards the integrated loudspeaker and stand, as seen in such recent upmarket commercial models such as the Naim *SBL*, Mordaunt-Short *MS442* and Roksan *Darius*. In the meantime, with the vast majority of conventional box loudspeakers, the various stand specialists have the opportunity to improve upon and offer greater variety than the loudspeaker manufacturer, while the user has the option to choose stands which help enhance the overall balance of the rest of a system.

APPOLO A820

APPOLO SYSTEM SUPPORTS, UNIT 2, PRINCES END

IND. EST., NICHOLLS ROAD, BATMANS HILL, TIPTON,

W. MIDS. DY4 9LG. TEL: (021) 520 5070.



Typical of currently available light, open-framed budget designs the Appolo A820 remains one step ahead of the older-style castored stands. It employs a relatively thin, black-powder coated steel top plate which is supported at each corner by vertical struts cut from 20mm square section tubing. These uprights are welded to both the top-plate and lower C-shaped bottom frame. Four adjustable spikes are included at both top and bottom to facilitate the best alignment and here Appolo have scored a plus point by incorporating a knurl on the main body of the spikes, ensuring a firm purchase.

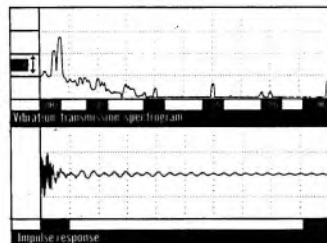
However, the torsional rigidity of the frame has been compromised by the lower frame which is not fully closed. This appeared to be related to the lower amplitude resonance at 12.2Hz (-72dB) while the sustained resonance at 16.7Hz (-50dB) was related to the top-plate flapping. Fortunately, these two modes were well differentiated and frequency modulation appears to have been avoided, higher frequency modes and harmonics being suitably suppressed. The vigorous nature of the main resonance is not only reflected in the high-Q amplitude peak but also in the protracted decay, only dying away at 2 secs.

Sonically the A820 was superior to the castored alternatives especially in the area of transient attack, treble definition and openness. The SL6S speakers remained essentially free of boxy colorations (linked with *Blu-Tack*) but stereo images were slightly diffuse and the very top-end appeared somewhat lighter and more ragged than with costlier stands. This airiness lent an extra element of space to many vocals for instance, but it was also clear that the bass was both softened and reduced in rhythmic definition.

Overall, the sheer purpose of the Appolo A820s has been slightly thwarted by its lack of rigid bracing, this and the height of the vertical members rendering it a little unstable in two planes. Good value for money in material terms, these are subjectively superceded by others costing £10 more.

GENERAL DATA

Top-plate area	190 x 190mm
Weight	2.5kg
Height	530mm
Spikes	1/8 adj.
Finish	Fair
Value	Good
Typical Retail Price	£40



APPOLO A10

APPOLO SYSTEM SUPPORTS, UNIT 2, PRINCES END

IND. EST., NICHOLLS ROAD, BATMANS HILL, TIPTON,

W. MIDS. DY4 9LG. TEL: (021) 520 5070.



Smaller but more expensive than the A820, the A10 is both chunkier and more rigid making it ideal for the larger box loudspeakers. The same thin steel top plate has been used and the four vertical supports are also welded at each corner, the rear two being perpendicular to the plate while the front legs are slightly angled outwards. In common with the lower horizontal frame the legs are composed of substantial 26mm steel tubing and are finished with a dull black coating.

Four threaded holes are included at each corner so that inverted spikes may be used to support the speaker instead of *Blu-Tack*. The rear of each spike recedes into the hollow square-section tubing of each leg. However, in my opinion the cleaning-up of the welds and general de-burring could be improved.

The lower frame is closed and therefore very much more rigid than that of the A820, and this is reflected in the lower amplitude/higher frequency main frame resonance at 13.3Hz (-83dB). The top-plate flapping remained fixed at 16.7Hz (-76dB) though it was substantially better controlled by the rigid bracing elements. The lower frame deferred resonance until 22.8Hz (-84dB) while another family of second-

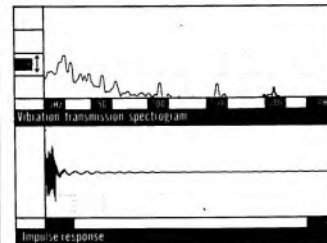
dary modes can be observed at 31.4Hz, 35Hz and 38.9Hz (@ -95dB). The initial impulse was barely attenuated but the low centre of gravity and low mass has resulted in a clean and rapid decay, full stabilisation being achieved by 0.8sec.

Compared to the cheaper A820 the A10 allowed each speaker to present transient information, such as percussion, with increased clarity, transparency and above all, gusto. Individual notes were better differentiated and the sense of bass rhythm improved even if it lacked the unerring solidity provided by some of the heavier stands. If the tweeter axis is required at ear height its size precludes the smaller bookshelf loudspeakers, but larger boxes are inevitably more expensive and so this cheaper stand may not be thought appropriate in that context.

A robust and lightweight model, it would make an ideal upgrade for those still happy with the big boxes of old, such as the Celestion *Dittons* and the original KEF 104 derivatives.

GENERAL DATA

Top-plate area	190 x 190mm
Weight	3.2kg
Height	440mm
Spikes	1/8 adj.
Finish	Fair
Value	Good
Typical Retail Price	£47.25



RECOMMENDED

FOUNDATION FRED

FOUNDATION AUDIO, 9 DERWENT ROAD, LEVERSTOCK

GREEN, HEMEL HEMPSTEAD, HERTS HP3 8RE.

TEL: (0442) 50657.



Bearing that acronym made famous by Quad, *FRED* (in this case standing for Foundation Rigid Economy Design) is one of Cliff Stone's more affordable designs. The main structure is composed of 50 x 26mm rectangular-section tubular steel, the two central uprights being welded to the steel top-plate and two holes drilled in the top surface so that sand or lead fillings may be added. Conceivably, the lower T-shaped bottom bracket could also be filled with a dense, mobile material but the plastic end caps would first have to be removed.

The stand is balanced about three points and may be adjusted at each end of the lower frame by rotating any of the three spikes, which should then be locked to ensure maximum rigidity. Above, the speaker may be supported with an array of either three or four spikes, or alternatively these may be removed and *Blu-Tack* used there instead.

Subject to the impulse test, they proved remarkably lively and the initial shock was measured with very little attenuation. The top-plate bending mode was registered at a high 20.6Hz (-64dB) due to its substantial 4.5mm thickness and central support. Nevertheless, this simple oscillation was modulated by

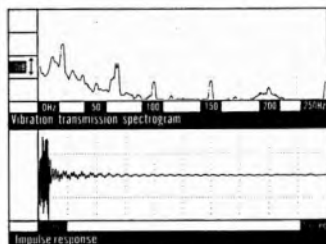
a particularly strong frame ringing mode centred at 67.5Hz (-83dB) and the subsequent complication of the decay ripple is readily seen on the time domain plot. This modulation had ceased by 0.8 sec but full stabilisation was only attained by 1.9sec. Filled with sand, the ringing mode was adequately suppressed but the main frame and lower bracket bending modes remained at 11.8Hz.

Without any filling, the *FREDS* were best used with inverted spikes - with *Blu-Tack* coupling they tended to sound very reverberant with a larger than-life bass quality. Vocal material was thrust forward and appeared somewhat exaggerated just as treble detail was coarsened. However, with a sand filling much of this false exuberance was curtailed and the speakers sounded tighter, more coherent and rather more even tonally.

Certainly a characterful stand, the *FREDS* are only worth considering when damped with a sand infill.

GENERAL DATA

Top-plate area	190 x 190mm
Weight	4kg
Height	360, 430, 590mm
Spikes	T/B adj.
Finish	Average
Value	Good
Typical Retail Price	£65



RECOMMENDED

FOUNDATION 'MAGGI' PANEL SUPPORTS

FOUNDATION AUDIO, 9 DERWENT ROAD, LEVERSTOCK

GREEN, HEMEL HEMPSTEAD, HERTS HP3 8RE.

TEL: (0442) 50657.



Dissatisfied with the lack of rigidity afforded by the long, flat feet or platform bases usually accompanying panel-type loudspeakers, Foundation have developed the clamp-on *'Maggi'* feet. Although touted as universal, these heavy steel appendages were first developed to supplement the Magneplanar range of isodynamic loudspeakers. Two mirror-image feet are provided for each panel, utilising a short C-section bracket to envelop the lower portion of the two wooden sleeves fitted to all Magneplanar loudspeakers. The brackets are clamped onto the sides of the speaker *via* two chunky grub screws and a metal strip, so preventing damage to the wooden sleeves of the speaker.

Lead and sand-filled blocks are welded to each bracket and these are coupled to the ground by two adjustable spikes. The brown finish matches the speakers better than would black but they still draw more attention to themselves than the original flat feet!

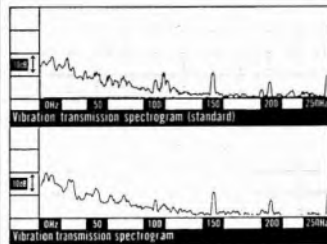
Similar tests were performed on both the flat stabilisers and the *Maggi* feet, though the results are not comparable with the other stands reviewed. A 30V gated input was fed to each speaker in turn, monitored by an accelerometer half-way up each

panel and RMS averaged over ten shots. The original feet led to a fundamental panel rocking mode centred on 4.4Hz (-81dB) with the frame actually bending at 9.4Hz (-83dB). Secondary bending modes were observed at 24.7Hz and 27.5Hz (-87dB). With the *Maggi* feet, the main rocking mode was increased to a higher frequency 'whip' at 22.5Hz (-84dB), the 9.4Hz frame bending still apparent. Furthermore, a higher frequency structural mode, related to the metal bracket, was resolved at 106.9Hz (-98dB).

Subjectively, the *Maggi* feet imparted a sharper, tighter but very slightly less atmospheric sound compared to both Magneplanar *MG11c* and *MG2.5R* with conventional feet. Nevertheless, the overall soundstage appeared better focused and generally more accurate while instrumental separation also benefitted. Bass definition seemed both deeper and more transparent, successfully integrating with the higher frequencies. The *Maggi*s should also suit such speakers as the Audiostatic electrostatics, their relatively high price commensurate with the cost of the panel loudspeakers.

GENERAL DATA

Top-plate area	500 x 20mm
Weight	7kg
Height	20mm
Spikes	B, adj.
Finish	Very Good
Value	Fair
Typical Retail Price	£159



FOUNDATION PI STANDS

FOUNDATION AUDIO, 9 DERWENT ROAD, LEVERSTOCK

GREEN, HEMEL HEMPSTEAD, HERTS HP3 8RE.

TEL: (0442) 50657.

RECOMMENDED



As the original 'heavyweight' stand, the *Pis* have been somewhat instrumental in our appreciation of the effects wrought by such supports. Composed entirely of a thick nylon-coated steel, the base plate is reinforced with a flange around the periphery and parallel welded braces running underneath. Four adjustable corner spikes are fitted into threaded holes and locked into place *via* knurled and gold-plated fingernuts – a nice touch.

Two vertical supports are welded, one behind the other, onto this base plate and the underside of the thick steel top-plate. Holes drilled through the top-plate have allowed Foundation to fill the two pillars with a proprietary sand/lead pellet mixture, adding to what is already a substantial bulk! More recent samples have incorporated threaded inserts on the top-plate for the optional use of inverted spikes, though with many loudspeakers the potential benefits of the *Pis* may be lost if not coupled with *Blu-Tack*. Celestion *SL600s* are one of the few exceptions here.

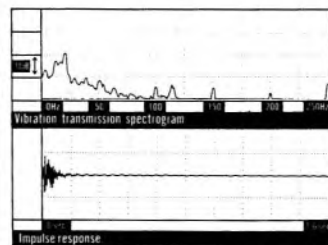
Impulse measurements demonstrated a very early attenuation of the primary transmission wave with only a trace of top-plate 'flapping' thereafter. In fact

this was faintly modulated by a non-correlated high frequency component at 115.5Hz (-102dB), visible up to 0.26secs. The massive supporting structure resonated at a low 3.3Hz (-89dB) with 12.8Hz (-81dB), 17.2Hz (-82dB) and 20.6Hz (-74dB) being attributed to the base and top-plate modes respectively. Foundation's use of *two* pillars mounted fore and aft has effectively clamped the top-plate against undesirable front-to-back oscillations, forcing resonance into modes of less importance.

One of the most noted characteristics of the *Pi* stands must be the subjective reinforcement at lower frequencies, seemingly extracting a deeper response, better transient attack and sheer 'slam' from a wide variety of loudspeakers. Stereo images appeared tighter and with improved focus just as subtle timbral detail was retrieved intact from the wealth of solid information. Problems may be encountered with specialist cabinets – such as those with aerolam or melamine laminate sandwich panels – but conventional wooden shells appear to react favourably. Overpriced in material terms, the subjective performance of the *Pis* nevertheless deserves firm Recommendation.

GENERAL DATA

Top-plate area	200 x 200mm
Weight	17kg
Height	250, 380, 460, 530mm
Spikes	T/B, adj.
Finish	Very Good
Value	Fair
Typical Retail Price	£250



HEYBROOK POINT 5

HEYBROOK HI-FI LTD., ESTOVER CLOSE, ESTOVER

IND. EST., PLYMOUTH, DEVON PL6 7PL.

TEL: (0752) 786311.

BEST BUY



Developed to accompany Heybrook's cheaper *Point 5* loudspeakers, the *Point 5* stands use a fairly novel open-frame construction. A chunky steel top-plate is clamped at three points around its edge by bolts that locate into the three supporting members, welded to one portion of the T-shaped bottom frame, composed of powder-coated 26mm steel tubing.

Sold as a flat-pack kit, the T-chassis is assembled so that the angled uprights line up with the appropriate mounting holes on the top-plate, and only when these are locked into place does the overall structure become stable. The stand has three adjustable spikes on the base to ensure easy levelling while the braced superstructure further increases the overall rigidity. This is reflected in the impulse trend which showed a dominant high-Q resonance of the top-plate flexure at 13.3Hz (-64dB). Some amplitude reinforcement was obvious here as the unbraced vertical members also suffered a primary bending mode at the very same frequency. Further upband a resonance at 66.7Hz (-87dB) was caused by movement of the *bolted* sections – a welded structure would avoid this problem. On the time domain plot this secondary resonance is

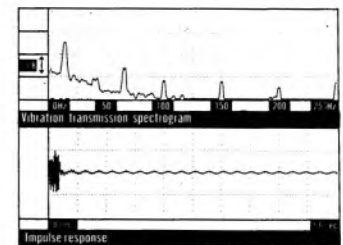
witnessed as a frequency modulation of the primary top-plate 'flapping', visible up to 0.56secs. The main ripple was rather protracted but of a decently low amplitude, so subjectively is unlikely to be very serious.

Compared to the costlier *HBSI* the *Point 5* sounded very slightly more transparent, possessing a greater sense of fluidity and coherence (a see-through quality) throughout the critical midband. Nevertheless, it did impart a slightly thinner aspect to, for example, stringed instrument reproduction – the *HBSI* was faintly warmer but softer overall.

Transient information was faithfully preserved, low drums and attacking cymbal-work delivered with equal 'speed' and without unnecessary reverberant overhang. This is a good value stand – with or without Heybrook's own loudspeakers!

GENERAL DATA

Top-plate area	230 x 215mm
Weight	5kg
Height	470mm
Spikes	T fix ed/B adj.
Finish	Very Good
Value	Excellent
Typical Retail Price	£50



THE AMPLIFIERS.



THE AMPLIFICATION.

“With sensible partnering hardware – loudspeakers up to £150 are probably best suited, the PM635 is a peach.”

COMPACT DISC REVIEW June 1987

“Following the well-received PM625 it *has* to sound good and it does.

The amp's attack is on a par with Mission's Cyrus 1, and that's high praise indeed.”

HI-FI NEWS March 1987



“I have seldom been as impressed with an integrated amplifier as I was from the start with the PM655. Sonically it does all the right things.”

GRAMOPHONE June 1987

“The PM655 is a gem ... the amplifier is in a class of its own when price and performance are taken into account.”

WHICH COMPACT DISC August 1986

harman/kardon

For information on harman/kardon products, write to:
Harman UK, 5 Mill Street, Slough, Berks. SL2 5DD. Tel: 0753 76911.

DEFINITIVE PERFORMER...

Across the world the SME Series V precision pick-up arm is now the standard by which other arms are judged.

Holder of Japan's coveted Hi-Fi Component of the Year Award its performance is not an accident, its reputation not a market whim, but the predictable outcome of innovative design allied with more than a quarter of a century of high quality manufacturing experience.

Ownership of a Series V offers the serious audiophile or professional user deep and lasting satisfaction. Its development and many special features are described in a four-page colour brochure which we shall be happy to send you on request.



SME Limited
Steyning, Sussex BN4 3GY
Telephone: (0903) 814321
Telex: 877808

Among SME dealers specialising in Series V are:

Absolute Sound & Video
Acoustic Arts
Audiocraft
Audioscene
Audio Excellence
Audio T.
Beechwood Audio
Doug Brady Hi-Fi
The Cornflake Shop
Graham's Hi-Fi
Hampshire Audio
Harrow Audio
Hi-Fi Care
Hi-Fi Corner
Hi-Fi Experience
Horns of Oxford
Image Hi-Fi
James Kerr & Co.
KJ Leisuresound
Lintone Audio
Midland Hi-Fi Studio
The Music Room
Phonograph
The Pinewood Music Company
Radford Hi-Fi
Reading Hi-Fi Centre
Sound Organisation
Sounds Expensive
Spalding Electrical
Stafford Hi-Fi Studio
Studio 99
Subjective Audio
Telesonic
Unilet Products
Wilmslow Audio
Zeus Audio

SME

The best pick-up arm in the world

HEYBROOK HBS1

HEYBROOK HI-FI LTD., ESTOVER CLOSE, ESTOVER

IND. EST., PLYMOUTH, DEVON PL6 7PL.

TEL: (0752) 786311.



Recently upgraded in terms of construction – and unfortunately price – the Heybrook *HBS1s* retain their characteristic aesthetics. Specifically, the bottom frame is now cast from an alloy to reduce higher frequency ringing harmonics and increase rigidity, the four appendages at each corner being an integral part of this casting and sporting four spikes to allow fine adjustment of balance. By increasing the distance between the spikes the effective centre of gravity of the entire system is lowered, thus improving its lateral stability.

The main support is composed of two rectangular frames, welded together from steel tubing and 5mm slats which bolt onto the lower base and upper top-plate, lying parallel to each other. The same steel top-plate as the *Point 5s* is used but the four-point fixing and bracing of the rectangular frames has increased the stiffness of this mounting surface.

Specifically, the impulse test showed the plate resonance had been lifted to 15.8Hz but with an increased amplitude of -59dB. The time domain plot also indicated that the increased mass of the system was exacerbating this sustained resonance, full stability only being achieved after 2.4secs (rel. to 50msec impulse).

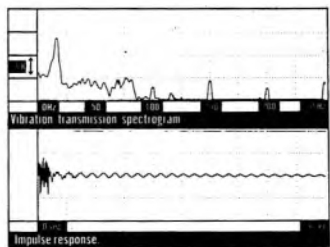
Fortunately, this decay was composed of a single component, there being little sign of any long-term frequency modulation.

The main beam modes are visible as a shoulder near the original frequency of 13.3Hz, the bolted sections resonating nearer 70Hz and well-suppressed at -96dB. Nevertheless, the damped alloy baseplate was responsible for the low-Q structure between 74Hz and 82Hz, harmonics of the main structural modes appearing between 25-60Hz.

In the listening tests the *HBS1* fared very well indeed, displaying that open and spacious quality portrayed by only the best open-frame stands. Compared to older-style stands the *HBS1* allowed most speakers to recreate crisp, precise stereo images suffering little for a trace of lean softness in the very lowest registers. *Blu-Tack* and inverted spikes were tried, the latter being generally preferred, though it should be recognised that much more of the speaker's own 'sound' remains intact. Recommended and good value.

GENERAL DATA

Top-plate area	230 x 210mm
Weight	7kg
Height	470mm
Spikes	T fix./B adj.
Finish	Very Good
Value	Very Good
Typical Retail Price	£75



LINN KAN II

LINN PRODUCTS LTD., FLOORS ROAD,

WATERFRONT, EAGLESHAM, GLASGOW G76 0EP.

TEL: (041) 644 5111.



Conceived with the infamous Linn *Kan* speakers in mind, these tall open-frame stands allow the box to be held both rigidly and in its favoured position near a rear wall. A rectangular steel top-plate is employed, supported by a welded square-section tubular frame that is actually bolted through the corners of the plate. This frame is composed of two totally enclosed parallel structures that are subsequently bolted directly underneath the top-plate onto the lower base frame.

Shaped like the Roman numeral II, the lower frame is built of welded 26mm steel tubing with adjustable spikes located at the end of each leg. The use of a broad base increases stability but as the main frame is offset to one side (to facilitate near-wall sitting), it also offsets the centre of gravity thereby de-stabilising the entire structure.

The similarity in construction between for instance, the *Kan II* stands and Heybrook *HBS1s* is outlined by the comparable low frequency resonance pattern which contains both top-plate and vertical support resonances. The tall beams break at around 12.2Hz while the plate 'flapping' mode occurs at 14.4Hz (-56dB), superimposed peaks effecting some overall reinforcement.

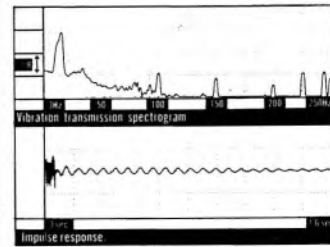
Highly unusual however, are the two components at 227Hz and 243.3Hz (-93dB) which ultimately were traced to the external sections of the welded and braced lower frame. The time domain trace was sustained by the high amplitude primary resonances, though the initial shock was very well controlled.

With *SL6S* loudspeakers, the *Kan IIs* imparted a slightly recessed midband, tending to conceal some spatial and depth information. It lacked the treble freedom shown by other open-frame stands and sounded curiously damped overall, almost as if the loudspeaker were somehow bandwidth limited! Similarly the soundstage was rather small-scale and muted.

Originally built to support the *Kan* loudspeakers (a very characteristic design and one with peculiar requirements) the *IIs* seem eminently suited for their intended purpose but their applicability elsewhere would seem to be somewhat restricted.

GENERAL DATA

Top-plate area	190 x 160mm
Weight	6kg
Height	590mm
Spikes	B adj.
Finish	Very Good
Value	Fair
Typical Retail Price	£74



LINN SARA STANDS

LINN PRODUCTS LTD., FLOORS ROAD,

WATERFRONT, EAGLESHAM, GLASGOW G76 0EP.

TEL: (041) 644 5111.



Of a broadly similar design to the Linn *Kan* stands, the *Saras* have been primarily developed for use with the eponymous loudspeakers. Naturally with the larger cabinet size, the top-plate of the stand has been enlarged while the H-shaped bottom frame has been drawn out to accommodate the wider distance between the vertical members.

As before, the two rectangular frames, comprising the main section, are packed separately and must be bolted onto the top and bottom portions of the stand proper. The tighter these bolts are clamped down the better for this type of fixture will never supercede the mechanical integrity of a good old-fashioned weld!

Technically the *Saras* would appear to have a problem. A minimum of two, closely spaced and closely matched, resonant peaks, each representing an entirely different mode of movement. The largest, at -61dB, is centred on 16.1Hz and represents the main bending mode of the steel top-plate as excited by an attached loudspeaker. This is coupled to a nearby peak at 12.8Hz (-65dB) caused by the breakup of the supporting beams and resulting in a strong reinforcement/cancellation effect that appears in the time domain plot as amplitude modulation. It is, in fact

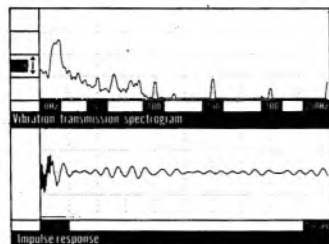
very closely spaced frequency modulation rendering the stand comparatively unstable. However it's important to realise, that even with speakers of differing mass a similar combination of resonant frequencies is observed, leading to a similar frequency intermodulation - this is not specific to Celestion *SL6S* boxes.

Sonically these stands introduced a flattening coloration analogous to that heard with the *Kan II* stands. Low bass notes were firm but curiously detached from upper bass and midrange frequencies. This strange lack of tonal integration seemed rather program dependent but was fairly consistent with differing loudspeaker types. Heavier cabinets were just slightly less susceptible, the weight of the low bass region 'spilling over' into the upper bass and filling a subjective 'hole'.

Once again, the *Sara* exhibits some odd properties so its use other than with a *Sara* loudspeaker should be viewed with caution.

GENERAL DATA

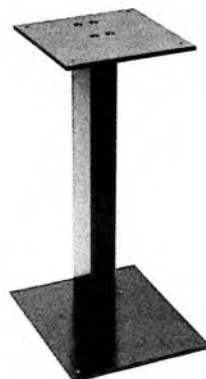
Top-plate area	250 x 210mm
Weight	7.5kg
Height	530mm
Spikes	B adj.
Finish	Very Good
Value	Fair
Typical Retail Price	£80



MONOTRAK ENGINEERING M1

122 SOUTHLAND PARK ROAD, WEMBURY, S. DEVON

PL9 0HH. TEL: (0752) 863086.



Relatively new on the hi-fi scene, Monotrak Engineering have in the past been involved in several manufacturer's loudspeaker stands. Now they've decided to go it alone with a vengeance, producing a range of both pillar-type and open-frame stands in addition to offering a custom design service. The *M1* is of the single, central pillar variety, the user being expected to fill the empty column with a deadening material such as sand or lead. This is easily achieved by removing the four allen bolts clamping the thick steel top-plate to the apex of the pillar - these pillars bear a remarkable resemblance to those used in dual array on for instance the Foundation *Pi* stands.

Threaded holes at each corner of the plate ensure correct levelling of the loudspeaker with inverted spikes, while a similar arrangement at the base facilitates the balancing of the entire structure. Formed of a larger section of steel sheeting the base plate is connected to the vertical pillar with the same combination of four allen bolts. As it's not strengthened with ribbing or any sort of flange the load-bearing centre is under some considerable stress, unaided by the sheer distance of the supporting, corner spikes. This was highlighted by the averaged impulse

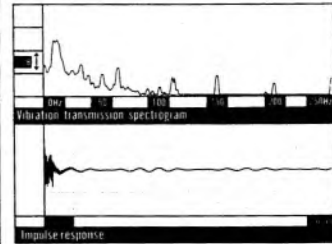
response showing a combination of resonances at 8.3Hz, 11.1Hz and 13.2Hz (@ -66dB), these being associated with the top and bottom plates. The time domain plot demonstrated some very low rate frequency intermodulation, implying that the *M1* is unstable at subsonic frequencies.

The undamped main pillar was responsible for several ringing modes at 32.2Hz (-90dB), 64.4Hz (-93dB) and 113.4Hz (-100dB) which, in turn, effected some early frequency modulation some 0.2 secs subsequent to the impulse.

On test the bass sounded rather lacklustre and muddy, lacking rhythmic definition. However, the mid and treble were commendably smooth relaying a fair amount of unencumbered transient detail - a sand filling extracting further improvements in this area as well as fleshing out the low bass to a degree. Overall, the *M1s* provide a fair performance for the price and are certainly worth considering.

GENERAL DATA

Top-plate area	190 x 185mm
Weight	14kg
Height	480mm
Spikes	T/B adj.
Finish	Good
Value	Fair
Typical Retail Price	£58



Doug Brady Hi-Fi

We have in stock all of the products awarded "Best Buy" and "Recommended" in this guide if they meet our requirements of reliability and good build quality. Your "Best Buy" could well be featured in this Issue, but your "Recommended" procedure is to first come to **DOUG BRADY HI-FI**. Here you will be able to find your "Hi-Fi Choice" and make your "Best Investment".

We offer flexible credit terms, home trial, exchange of goods, 2-year guarantee; but above all we take a genuine interest in our client's needs.

A fruitful long-term relationship is our goal and can only be achieved by good service — before and after sales!

We are enthusiasts, but we won't talk technical jargon at you. Our best advertisement is a happy customer. Come and visit us at Liverpool or Warrington or our new store in Covent Garden.

DOUG BRADY HI-FI — HI-FI CHOICE IS OUR BUSINESS

Kingsway Studios,
Kingsway North,
Warrington.
(0925) 828009
Open six days

18 Monmouth Street,
Covent Garden,
London WC2H 9HB
(01) 379 4010
Open 6 Days



W. A. Brady & Son,
401 Smithdown Road,
Liverpool L15 3JJ
(051) 733 6859
Closed all day Wednesdays

We Stock AR · A&R · Alphason · Apollo · Apogee · Audiolab · Beyer · Celestion · Denon · Foundation · Fuji · Goodmans · Kef · Krell · Koetsu · Linn · Marantz · Meridian · Mission · Monitor Audio · Musical Fidelity · Naim · NAD · Nakamichi · Ortofon · Philips · QED · Quad · Revolver · Rogers · Rotel · Revox · Sennheiser · Tannoy · Target · Technics · TDK · Wharfedale · Yamaha etc.

BLACK, BEAUTIFUL, BRITISH and BEST BUY



CAS 4140 Series II
40 Watt Integrated Amp
**CREEK
AUDIO SYSTEMS**

CREEK AUDIO SYSTEMS 2 Bellevue Road Friern Barnet London N11 3ES England Tel: 01-368 4425 Tlx: 261507

MONOTRAK ENGINEERING M4

122 SOUTHLAND PARK ROAD, WEMBURY, S. DEVON

PL9 0HH. TEL: (0752) 863086.

RECOMMENDED

MONOTRAK ENGINEERING M4S

122 SOUTHLAND PARK ROAD, WEMBURY, S. DEVON

PL9 0HH. TEL: (0752) 863086.



The Monotrak *M4* features a thick steel top-plate bolted (by the user) to two rectangular frames composed of square-section steel tubing. For the base, Monotrak have welded together a steel frame with angular appendages at each corner, loaded with adjustable spikes for accurate levelling.

This lower frame is bolted onto the two main rectangular supports though its tubular construction renders it a little more resonant than Heybrook's superior alloy casting. The standard of finish was very good with a thicker and rather more glossy black coating than the vast majority of the competition.

Monotrak's corner struts do not exit the main frame on a true diagonal, but are displaced somewhat so that the whole structure is not as stable as it could be. This is demonstrated by the frequency/amplitude plot, not only bearing expected similarities with Heybrook's stand but also highlighting the protracted resonance caused by a strong fundamental peak at 16.8Hz (-54dB). This is the main top-plate mode (loaded of course), the frame resonance visible as a shoulder at 13.3Hz.

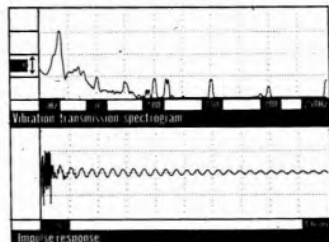
Monotrak's tubular base frame exhibited a complex bending mode reduced to a clump in the

25-40Hz region (@ -87dB), however higher-order ringing harmonics appeared at 75Hz (-99dB) and at 112.2Hz (-96dB). In the time domain initial shock was adequately controlled while the subsequent ripple seemed too extended with a decay time of 2.7secs - this contributing to the 'live' tonal balance noted in the listening tests.

Begging comparison with Heybrook's *HBS1*, the *M4* sounded fractionally lighter and conveyed less of the weight and low frequency ambience of a performance. Nevertheless, it maintained much of the transparency, openness and forthright detail available throughout the upper octaves. Not as structurally stable nor as crisp-sounding as the *HBS1*, the *M4* does however represent a saving of some £12, and should not be overlooked if the budget is particularly tight.

GENERAL DATA

Top-plate area	230 x 215mm
Weight	7kg
Height	530mm
Spikes	B adj/T fix.
Finish	Very Good
Value	Very Good
Typical Retail Price	£58



Priced the same as the two other Monotrak stands, the *M4S* is a smaller derivative of the *M4* open-frame model. The '4', by the way, denotes the use of four uprights in the way that the *M1* has a single supporting pillar. The same height as the *M4* but with a smaller top-plate area and simplified base the square-section 26mm steel tubing has been used once more, the top plate connected with allen bolts in much the same manner as the bottom II-shaped frame.

Composed of welded steel tubing, the lower frame is similar to that used on the Linn stands but occupies an even smaller area, hardly encouraging stability in the front-to-back direction. Naturally, adjustable spikes are included. The susceptibility of this stand to 'rock' was hardly eased by the coincident beam and plate resonances at 10.2Hz and 12.8Hz (@ -61dB) respectively. As the time domain plot shows, this led to close-frequency modulation which destabilised the frame at subsonic frequencies - the resultant modulation of the speaker will influence the subjective audio range, nonetheless.

This superimposition of resonances was also rather unfortunate in the light of the remaining resonant modes which were very well controlled! The initial

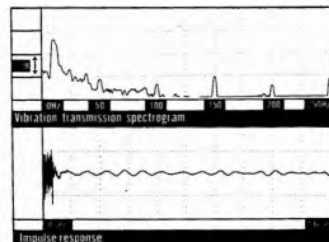
impulse was subject to only adequate termination, the total decay time reaching 1.8 secs.

Throughout the listening period some muddying of pitch and bass resolution was very slightly audible, though this effect was more obvious with the Celestion *SL6S* than *SL600s*: the use of *Blu-Tack* only exacerbating the condition. The improved isolation afforded by inverted spikes also seemed to reduce the input of noise to the stand and therefore decrease any potential instability. Nevertheless, the reactionary component was unaltered regardless of the coupling, the front-to-back 'wobble' remaining.

In its favour, the *M4S* possessed the characteristically open midband and clear treble delivered by the better open-frame stands, but its stature and stability would seem to mark it out as being most suitable for the smaller, lighter cabinets. Unendorsed must be the final verdict.

GENERAL DATA

Top-plate area	200 x 175mm
Weight	5.8kg
Height	530mm
Spikes	B adj/T fix.
Finish	Very Good
Value	Fair
Typical Retail Price	£58



MORDAUNT-SHORT IS1 II

MORDAUNT SHORT LTD., DURFIELD MILL,

PETERSFIELD, HANTS GU31 5AZ. TEL: (0730) 80721.



Mordaunt Short are one of a growing number of loudspeaker manufacturers who have taken the plunge and designed their own, matching stands. These *IS1 IIs* are of the open-frame, build-them-yourself variety and have been developed primarily for the *MS10* and *MS15* loudspeakers. Supported on three vertical members to which it is bolted, the top-plate is rather thin and drilled with holes for the optional use of inverted spikes. The rear frame is fashioned from 26mm steel tubing into a four-sided structure that progressively narrows towards the top; the square-section steel box frame that comprises the base is therefore much wider than the top-plate, lowering the centre of gravity and enhancing stability.

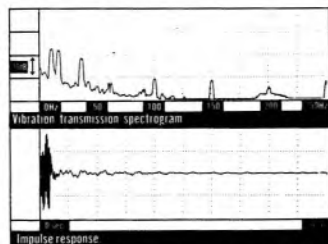
A single front strut bolts onto both the top-plate and front of the lower frame, completing the overall support. This lower box frame also extends further to the rear where two of the four knurled spikes distribute the weight of the speaker and stand. On test, the *IS1 II* proved very interesting although it demonstrated three isolated resonant modes and offered virtually no attenuation of the initial impulse. The overall stability of the frame was ratified by the quick decay.

The top-plate was found to move at 18.1Hz (-69dB), the heavier rear frame at 10Hz (-68dB) and the thinner (20mm) front strut at an elevated 36.9Hz (-78dB). Some higher-order ringing components were observed at 200Hz but these were of a much reduced amplitude. Returning to the time domain, the initial shock was quite undiminished but the subsequent instability was shortlived due to the low mass, good differentiation and low amplitude of the resonances. This is greatly preferable to a sustained resonance which may introduce an audible 'smearing'.

The *IS1 IIs* certainly sounded forthright and slightly 'jazzed-up' with leading edges magnified, but overall the sound was quite un-muddled and free of bass overhang. However, the *IS1 II* is another stand best suited to low mass loudspeakers, preferably using spikes to effect coupling. For the asking price they certainly represent good value and can be recommended.

GENERAL DATA

Top-plate area	180 x 150mm
Weight	4kg
Height	560mm
Spikes	B adj./T fix.
Finish	Good
Value	Excellent
Typical Retail Price	£45



ORIGIN LIVE SPEAKER STANDS

ORIGIN LIVE, 87 CHESEL CRESCENT, BITTERNE,

SOUTHAMPTON SO2 4BT. TEL: (0703) 442183/671237.



Yet another product from the prolific Origin Live stable (previously known as *Soli-Core*), these new stands incorporate a number of important and well thought out design points. The stand is based around a tripod-like structure with three angled supports fashioned from square-section steel tubing welded together *via* two T-shaped inner frames. The two front legs are of 26mm tubing while the rear member is composed of two separate 26mm tubes welded back to back, decreasing the probability of sympathetic resonances.

A large welded T-frame maintains the legs at the correct attitude while the very top of the stand is held rigidly by a similar, but smaller, welded T-frame. No top-plate is used but three fairly blunt inverted spikes are permanently welded at the apex of each leg. At the base of the widely spaced legs, provision has been made for three enormous threaded spikes, no less than 18mm in diameter and held in place with 24mm steel locknuts!

The success of this design is captured in both frequency and time plots, the latter demonstrating the effectiveness of a very low centre of gravity. Despite the fact that some other stands provided a greater attenuation of the initial impulse, the overall settling

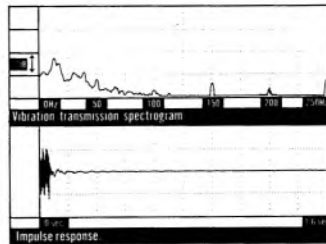
time and suppression of resonance was without peer. The absence of a top-plate is clearly reflected in the frequency domain plot, the front and rear legs breaking at 12.8Hz (-80dB) and 16.7Hz (-85dB) respectively.

Subjectively, the Origin Live stand provided a near-ideal balance and allowed several loudspeaker types to perform at their best. Large soundstages were successfully re-created without blurring or any unnecessary overhang while mid and treble definition was both smooth and highly detailed - the performance of the loudspeaker itself being the limiting factor. Bass definition was also very good, possessing a coherent sense of rhythm which was totally integrated with the higher frequencies.

They may occupy a large floor-space but for subjective and technical performance, they must be wholeheartedly recommended.

GENERAL DATA

Support area	220 x 175mm
Weight	4.5kg
Height	520mm
Spikes	B adj./T fix.
Finish	Good
Value	Very Good
Typical Retail Price	£117

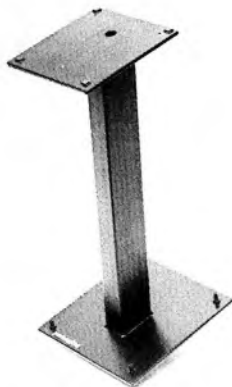


PARTINGTON PP4

PARTINGTON & CO., UNIT 9, KESTNER IND. EST.,

KING EDWARD ROAD, GREENHITHE, KENT.

TEL: (0322) 843712.



Partington & Co. are responsible for everything from climbing frames to hi-fi equipment supports, and even a very interesting table with adjustable platforms which, unfortunately, entered production just too late for last month's survey. The PP4 stand is one of Partington's established stands, the top model in a range of four.

Construction is quite simple and involves two black-epoxy coated steel plates separated by a welded steel column fashioned from 64 x 39mm square-section tubing. This hollow pillar is set back at an angle to the perpendicular and may be filled with either sand or lead *via* an access hole drilled in the top-plate. The plate itself has three further holes drilled about the edge and these are threaded to accept inverted spikes if required. The PP4's baseplate is fairly broad but unreinforced, putting some strain on the four downward-facing spikes situated at each corner.

Once again, the time domain response illustrates the effect of an unclamped and 'flapping' top-plate, relating to the 12.2Hz resonance at -63dB on the frequency *vs.* amplitude plot. Once the stand is filled with sand the column mode at 7.2Hz is reduced from -70dB to -80dB but the top-plate resonance is bolstered

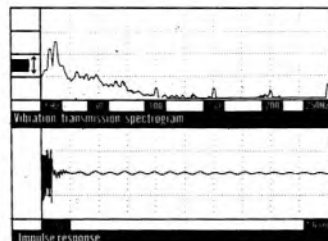
to -57dB with an extended settling time of 2.5 secs. Very low frequency stability is further compromised by flexure of the baseplate, the resonant peaks accounting for the broad structure between 5Hz and 15Hz.

Without any sand filling the PP4 tended to add a trace of 'bloom' to the lower registers while the upper octaves seemed very slightly indistinct. Damped with a sand infill, the stand was less ready to embellish the overall sound and low frequency detail became tauter, quicker, while the stereo focus at higher frequencies benefitted from an extra degree of sharpness. This said, there was a slight feeling that spatial ambience, related to very low frequency signals, was constricted.

The PP4 offers a rather mixed performance. In material terms they may seem a little lacking, but the use of welds rather than bolts is some justification for the price.

GENERAL DATA

Top-plate area	180 x 165mm
Weight	4.8kg
Height	480mm
Spikes	B/T adj.
Finish	Good
Value	Fair
Typical Retail Price	£50

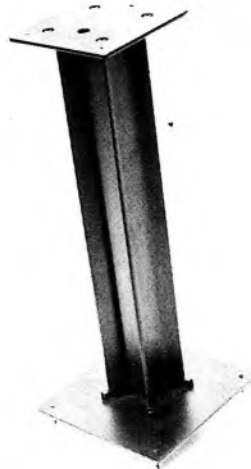


PARTINGTON DREADNOUGHT II

PARTINGTON & CO., UNIT 9, KESTNER IND. EST.,

KING EDWARD ROAD, GREENHITHE, KENT.

TEL: (0322) 843712.



The original Dreadnought stand was a heavy, but conventional single-pillar design that suffered through having too large a top-plate, but the IIs represent a significant advance in this and other areas. A small but detachable top-plate is fixed into position with four hefty allen bolts which locate into the top of Partington's novel centre pillar. This column is composed of several welded flanges in a star-like pattern; the centre is critically damped with a proprietary mixture of lead shot, sand and a polyester resin. The large steel base plate is coupled to the bottom of this dense pillar in much the same fashion as the top-plate while adjustable spikes are located at each corner for easy levelling.

Partington have made further attempts to reduce any top-plate resonance by cutting a finger hole in the middle of the largest expanse of metal, though the tests revealed larger forces at work. Specifically, the use of bolts in a stand of this mass is quite unsuitable as the very high amplitude (-54dB) top-plate movement at 12.8Hz reveals. This is typical of a resonance caused by inadequate mechanical termination and sustained by the inertia of the stand. The long steel flanges were also found to

resonate in this region - note the shoulder at 10Hz.

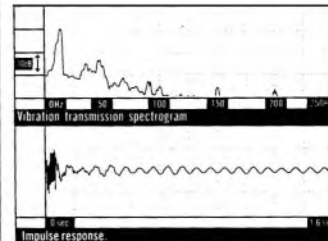
The upshot of all this is highlighted in the time domain plot which shows the alarming amplitude of the decaying ripple, this instability lasting for some 4.1secs - after a 50msec impulse! A welded top-plate would go a long way to reducing this problem.

A rich and resonant bass quality was observed just as the treble seemed somewhat sweetened, any explicit 'edginess' thankfully muted without any apparent loss in detail resolution. Encouraging a sound that was not tight or wholly accurate it nonetheless introduced a warm and rather appealing quality! Inverted spikes curtailed the boom that occurred with *Blu-Tack* as the coupling agent but then much more of the original 'boxy' colorations were audible.

Ideal for systems on the light/bright side of neutral, the Dreadnought IIs still need some careful re-examination by Partington.

GENERAL DATA

Top-plate area	175 x 165mm
Weight	11.5kg
Height	630mm
Spikes	T/B adj.
Finish	Very Good
Value	Fair
Typical Retail Price	£120 (filled)



SUPER SYSTEM BEST SELLERS!

THE FOUR GREAT VALUE SYSTEMS BELOW ARE OUR BEST SELLING SYSTEMS AND WE HAVE THEM ALL ON DEMONSTRATION AT OUR LEWISHAM SHOP. NOT ONLY DO WE PROVIDE INSTANT OR BOOKABLE DEMONSTRATIONS, FAST MAIL ORDER SERVICE, (ORDER USING YOUR ACCESS OR B/CARD OVER THE PHONE) AND INTEREST FREE CREDIT FOR PERSONAL CALLERS. (RING FOR DETAILS). YOU CAN SAVE UP TO £85.00 ON INDIVIDUAL PRICES. NO WONDER OUR BEST SELLERS ARE BEST BUYS.



or Dual 503/1
£20 Extra



NAD 3020E



Goodmans
Maxims

NAD 5120 TURNTABLE + NAD 3020E AMP + GOODMAN'S MAXIMS/2

SUPER SYSTEM 1

TERRIFIC PERFORMANCE FROM THIS BUDGET SYSTEM AND NOT JUST FOR SMALL ROOMS

ONLY £259.50

Free UK delivery on these systems

SECURICOR DELIVERY ON THESE SYSTEMS ONLY £5.00



Dual 503/1 Inc Cart
On it's own £115.00



Rotel RA820AL amp
20 x 20W Huge power supply
Great value, black finish



DUAL CS503/1 + ROTEL RA820AL + JPW P1 SPEAKERS

SUPER SYSTEM 2

A FIRM BUDGET SYSTEM FAVOURITE WITH A GREAT SOUND AND GOOD UPGRADE POTENTIAL

ONLY £299.00

Free UK delivery on these systems



Again the Dual 503/1
On it's own £115.00



NAD 3130



DUAL 503/1 + NAD 3130 + AR 18BX SPEAKERS

SUPER SYSTEM 3

THE NEW RISING STAR IN BUDGET SYSTEMS OFFER COMPACT QUALITY WITH NEW STANDARDS OF CLARITY.

ONLY £329.00

Free UK delivery on these systems



Black Ash finish inc. arm
inc. free AT95E



The evergreen A60 offers
38/38W of musical power with
a good range of inputs



REVOLVER/ARM + A & R A60 + M A R252V SPEAKERS

SUPER SYSTEM 4

OUR MOST POPULAR MID PRICED SYSTEM NOW AVAILABLE WITH REVOLVER ARM AS A STANDARD FEATURE.

ONLY £489.00

Free UK delivery on these systems

THIS SYSTEM IS AVAILABLE IN ALL BLACK MATCHING COMPONENTS AT NO EXTRA COST. OTHER SPEAKER CHOICES FROM SPEAKERS LISTED BELOW PLEASE i.e. HB1 speaker no extra cost

TURNTABLES

AR EB 101 T/T	£209
AR LEGEND	£189
AR inc LV.X	£269
Dual 503/1	£115
Dual 503/3	POA
Heybrook TT2	£269
Heybrook TT2 inc LV.X Plus	£398
Linn LP12	£471
Linn LP12 inc LV.X Plus	£600
Rega Planar 2	£135
Rega Planar 3	£188
Rotel RP830	£139
Systemdek 2X	£139
S/deck 2X inc RB250	£203.50
S/deck electronic	£219
Revolver inc Arm	£179
Mantra inc Arm	£319

COMPACT DISC

Marantz 2735E	£239
Marantz CD 94	£799
Marantz CD75B	£299
Denon DCD300	£209
Denon DCD700	£289
Denon DCD300	£389
Yamaha CDX5	£199
Yamaha CD500	£269
Yamaha CD700	£299

PICK-UP ARMS

Linn LV.X Plus	£129
Rega RB250	£64.50
Rega RB300	£90
Linn Ittok	£399

TUNERS

A&R T21	£199
Creek 3140	£149
Quad FM4	POA
Sansui TU99X	£199

AMPLIFIERS

A&R Alpha Plus	£149
A&R A60 (Plus)	£219
Creek CAS4040	£145
Claymore	£345
Marantz PM35	£159
Marantz PM45	£199
NAD 3130	£149
NAD 3020E	£109
Naim Nait	POA
QED A240	£169
Quad range stocked	POA
Rotel RA820AL	£109
Rotel RA820BX/2	£149
Rotel RA840BX/2	£199
Sansui AUG 11X/2	£139
Sansui AUG 30X	£199
Yamaha A420	£149
Mission Cyrus 1	£149
Mission Cyrus 2	£299

SPEAKERS

A&R Arcam 3	£129
A&R Arcam 1+2	POA
AR18BX	£125
AR range stocked	POA
Boston A40/2	£119
B&W DM110/2	£149
Mission 770F	£399
Mission 700LE	£129
Heybrook HB1	£165
JPW P1	£115
Kef C10	£85
Kef C20	£109
Kef 104.2	POA
Linn Index	£165
Linn range stocked	POA
Monitor Audio R252V	£139
Monitor Audio range	POA
New Kef 103/3	£599
Tannoy Mercury/2	£139
Rogers range stocked	POA

CASSETTE DECKS

Aiwa ADF260	£89
Aiwa ADF360	£119
Aiwa ADR460	£139
Aiwa ADF640	£199
Aiwa ADW707	£179
Aiwa ADF770 e/dem	£199
Denon DRM 07	£139
Denon DRM 12X	£209
Denon DRM 24X	£289
Denon DRM 30X	£319
NAD 6220	£149
NAD 6155	£249
AD200WXE/D	£189
Nakamichi BX300E	POA
Nakamichi BX 125	POA
Sansui D705	£299
Yamaha KX200	£139
Yamaha K340	£159
Marantz SD35	£159
Marantz SD45	£199

All prices correct at
time of press. E&OE.

WE ARE OF COURSE:-

BILLY VEE SOUND SYSTEMS

248 LEE HIGH ROAD, LEWISHAM, LONDON SE13
PHONE 01 318 5755 OR 01 852 1321 (10.00-7.00PM MON/SAT CLOSED THURS)



AIWA
A&R
A.R.
CREEK
CELESTION
DENON
DUAL
HEYBROOK
J.P.W.
K.E.F
LINN
MARANTZ
MERIDIAN
MONITOR
AUDIO
MISSION
N.A.D.
QUAD
NAIM
REGA
REVOLVER
ROTEL
NAKAMICHI
SANSUI
TANNOY
SYSTEMDEK

QED TS22 TRISTAND

QED AUDIO PRODUCTS LTD., UNIT 12, ASHFORD

IND. EST., SHIELD ROAD, ASHFORD, MIDDX TW15 1AU.

TEL: (07842) 46236.

BEST BUY



Available in three sizes the so-called *Tristands* are now the only loudspeaker supports manufactured by QED. In design they broadly mirror the Origin Live model though at under half the price there are inevitable compromises. On the plus side they offer the low centre of gravity and therefore the stability of the OL stand but suffer at the hands of thinner rectangular-section (38mm x 18mm) steel tubing and flat-pack construction.

Bought in two sections, the rear is formed into a tapered rectangle while the front section is welded into something like a skewed C-shape. These are bolted firmly together and the two access holes capped off with handy plastic inserts. A T-frame at the very base of the stand has threaded inserts at each of the three corners for spike adjustment, these incidentally being both long and unusually thin. Because of the upward taper, the T-frame at the top of the stand is considerably smaller. Although there is no top-plate as such, *Blutack* or inverted spikes may be used to support the loudspeaker.

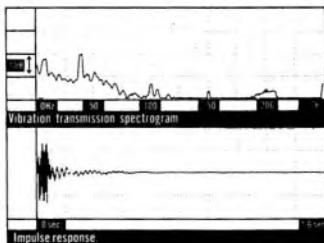
Technically, the impulse results were very similar to those obtained with the Origin Live stand although the presence of weaker mechanical (bolted) joints is reflected in both the

resonance at 38.9Hz (-75dB) and the period of the sinusoid following the impulse. The main bending mode of the frame was measured at a very low frequency of 7.2Hz (-79dB), which was caused by the thin wall and considerable 54cm length of the three unbraced legs. Compared to some other stands, notably the heavyweights, the initial transmission wave could have been rather better attenuated, although the quick decay more than made up for this.

QED's *Tristand* placed less emphasis on the low frequency end of things but encouraged a very fluid and revealing midband. Vocal projection seemed very good with a variety of speakers, including the two Celestions, allowing a deep and broad soundstage to be developed that heightened the sense of instrument separation. Most tracks sounded slightly uplifted or buoyant, never thick nor coloured. A bit on the awkward side, the QED *Tristands* are still Best Buy material!

GENERAL DATA

Support area	190 x 170mm
Weight	2.8kg
Height	450, 500, 580mm
Spikes	B adj./T fix.
Finish	Very Good
Value	Excellent
Typical Retail Price	£50



RATA TORLYTE STANDS

RATA, EDGE BANK HOUSE, SKELSMERGH, CUMBRIA

LA8 9AS. TEL: (053983) 247.

RECOMMENDED



Having applied the lightweight and fairly rigid Torlyte material to virtually all aspects of constructional hi-fi, a stand composed of this material would seem like a logical step. The expense of Torlyte is reflected in the high retail price, although a considerable amount of this wooden honeycomb material has been used in the composition of the Torlyte Speaker Stands.

An 18mm top-plate is supported by two further Torlyte slabs of greater thickness and lying vertically at 90 degrees to each other. Widening towards the baseplate - also Torlyte - these large sheets spread the load very effectively and also lower the centre of gravity ensuring stability against the reactive component. Cross-headed wood screws hold the structure firmly together and three fixed chrome-plated spikes are included top-side for the loudspeaker. Under the base board three larger and sharper spikes level the stand on the floor.

RATA claim Torlyte to be an efficient 'energy path' and judging by the lack of attenuation of the primary impulse, this would seem to be true! The principle loaded Torlyte resonance would appear to be at 14.4Hz (-65dB) while a higher order breakup at 51Hz (-87dB) caused some fre-

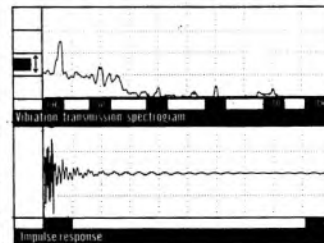
quency modulation of the post-shock decay. Fortunately, the low mass of the stand does not exacerbate or sustain the subsequent ripple.

Heavier wooden loudspeakers tended to excite the Torlyte panels which acted as low-level secondary diaphragms, adding a little reverberation or 'bloom' to the lowest bass notes. The *SL6S* and *SL600s* responded very well, subtle timbral detail was untainted just as well-recorded vocal tracks were projected with a natural ease that enhanced the 'realism' of the performance. A gentle fluidity was enjoyed with most types of music, though at higher levels the speakers lost control a little earlier than expected.

Particularly suited to the lower mass loudspeakers, these unusual stands are hardly discreet but offer a transparent and clean sound much like the Torlyte Table!

GENERAL DATA

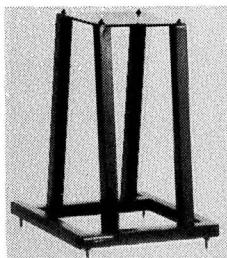
Top-plate area	250 x 210mm
Weight	2kg
Height	480mm
Spikes	B adj./T fix.
Finish	Excellent
Value	Fair
Typical Retail Price	£190



APPOLO
A
System
Supports

*Get Your Sound
Off The Ground
With Appolo Hi-Fi Supports*

A complete range of stands and tables
to suit all your Hi-Fi requirements



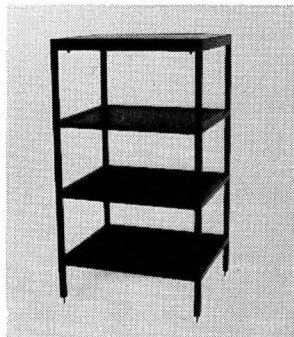
APPOLO STANDS

All stands are fully welded and come complete with adjustable carpet piercing feet. Top plates are threaded for 6mm top spikes, if required. Available as an extra, coated in matt black as standard. The Appolo 10 and 11 have a more substantial 5mm thick top plate.

Appolo 10 – 16"
Appolo 8 – 12", 16" & 20"

APPOLO HI-FI TABLES

All Appolo Hi-Fi Turntable Tables are fully welded for maximum rigidity. Complete with upturned spikes and discs for top platform. Carpet piercing spikes are included, shelves are Black Ash veneered with Teak on reverse. All shelves are 17⁷/₈" – 454mm wide and 14⁷/₈" – 377mm deep.



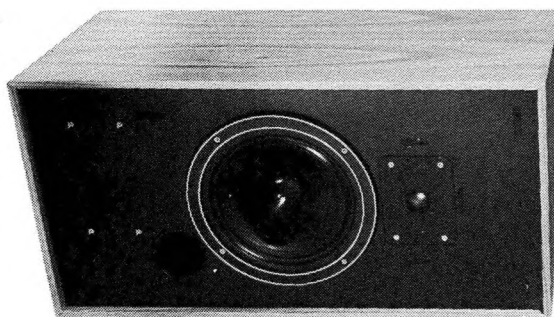
**Unit 2, Princes End Industrial Estate,
Nicholls Road, Batmans Hill, Tipton,
West Midlands DY4 9LG
Telephone: 021 520 5070**

**N. America: 227g Brunswick Boulevard, Pointe Clare,
Quebec, Canada.**

*Please send me details on the complete range of
Appolo stands and tables.*

NAME _____

ADDRESS _____



HL MK4

During our demonstrations at the Penta lift show it was enlightening and enjoyable to meet so many classical musicians and music lovers who own Harbeth loudspeakers.

Proof again that the 'Harbeth formulae' is unbeatable.

The HL MK4 and our new HL Compact advance our long tradition of excellence in design and testing.

Individually made and tested in Britain – Harbeth loudspeakers lead the world for accuracy in sound reproduction.

Please call for our dealer list and more information.

ACOUSTICS



HARBETH

Designers and Manufacturers of Audio Equipment
Triangle Road, Haywards Heath, West Sussex RH16 4HN
Tel: 0444 414439

TARGET HS20

TARGET, UNIT 10A BRITANNIA IND EST., LEAGRAVE

ROAD, LUTON, BEDS LU3 1RJ. TEL: (0582) 424755.



One of a myriad Target loudspeaker stands, the *HS20* adheres to the single-column philosophy, leaving the choice of filling to the user. A small steel top-plate is bolted onto the apex of this 40 x 99mm rectangular-section column in much the same way as the large base plate is connected to the bottom of the column. Spikes are included on the base but are situated at the very corners of the plate and are somewhat more stressed once the pillar is filled with sand or, worse still, lead shot.

Four inverted spikes may be used on the top-plate, if required, and the entire structure is finished off in an attractive tough, dark grey nextel-like textured paint, aesthetically preferable to the black epoxy or powder coatings traditionally used.

Once again, the use of a cheaper bolt together format has compromised the overall structural integrity of the stand. With no sand infill the main top-plate mode is clearly apparent at 9.8Hz (-63dB), being modulated by subsequent resonances at 40Hz and 96.1Hz. However, the pillar having been filled with a dry silver sand, the top-plate 'flapping' was both greater in amplitude and more protracted in decay.

Welded top-plates with cor-

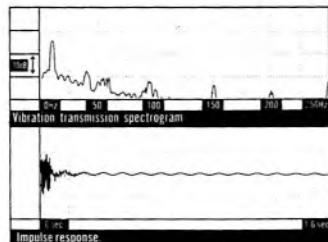
rect edge clamping or reinforcement are preferred with potentially high mass single-column loudspeaker stands. Furthermore, the broad baseplate will encourage greater front-to-back stability, but the plate itself will resonate or buckle momentarily under some conditions.

Subjectively the Target *HS20* stand was preferred with *Blu-Tack* coupling and a sand infill or inverted speaker spikes with no infill. Without sand the tonal balance erred towards the upper midband with a slight forwardness noticeable on most musical passages. The overall sound was quite 'jolly' and buoyant but there was a distinct loss in low frequency definition. Once filled with silver sand the soundstage was reduced in apparent size but stereo images now appeared sharper and more coherent.

These stands look good and represent a fair amount of metal-work for the money, although the competition is tough at this price level.

GENERAL DATA

Top-plate area	190 x 165mm
Weight	5.8kg
Height	530mm
Spikes	T/B adj.
Finish	Excellent
Value	Good
Typical Retail Price	£53



TARGET HJ15/3

TARGET, UNIT 10A BRITANNIA IND EST., LEAGRAVE

ROAD, LUTON, BEDS LU3 1RJ. TEL: (0582) 424755.

RECOMMENDED



An unusual stand primarily designed for the larger enclosures, Target's peculiar naming system relates to both the height and number of pillars used in the stand, hence *HJ15/3*. To all intents and purposes the broad square top-plate and base-plate are the same size, each with threaded holes at every corner to facilitate the use of adjustable spikes. Three 50mm square-section steel tubes are welded to both plates but are mounted in a staggered, triangular array with one post at the front and the other two side-by-side at the back. Also each column is rotated so that one edge - rather than a face - is pointing forwards.

This type of structure helps distribute the loading but large areas of both top and bottom plates remain unclamped. Further stability is gained by pouring silver sand (supplied) into each column, *via* three access holes in the top-plate. The efficacy of the multiple-pillar technique is demonstrated in the time domain plot which shows a very fine attenuation of the primary impulse. However, the remaining expanse of steel plate does resonate quite strongly at 18.1Hz (-65dB) with the loaded bottom plate moving at a lower 12.5Hz (-75dB). Higher frequency harmonics are visible at

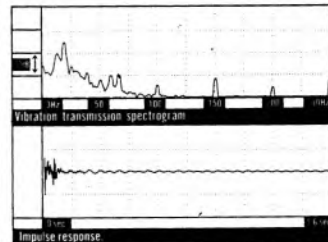
58.8Hz (-95dB) and 65.5Hz (-94dB).

Despite the additional mass afforded by three sand-filled columns, the trailing decay was at an acceptably low amplitude - if the top-plate had been bolted on the 'flapping' it would undoubtedly have been much worse. Overall, this is a good result but one that has potential for improvement by reinforcing the large plates.

The sound quality was basically very good though without the sand infill some loudspeakers may appear a little unbalanced as both bass and treble regions are subjectively pushed forward. If a large box loudspeaker is used, such as a Canton or Celestion *DL8*, sand damping is a must for here the *HJ15/3* maintains a greater degree of poise and control - there was a slight loss of high frequency 'air' but the drier and more neutral tonality was preferred overall. For the most solid bass performance *Blu-Tack* coupling is recommended as, of course, is the stand itself!

GENERAL DATA

Top-plate area	280 x 280mm
Weight	16kg (filled)
Height	400mm
Spikes	T/B adj.
Finish	Very Good
Value	Very Good
Typical Retail Price	£83



Spaldings

ESTABLISHED IN SOUND

A&R ARCAM
DELTA

DENON
DCD1500 II


MARANTZ CD94

MERIDIAN 207

SONY
CDP750

**VISIT OUR TWO
NEWLY COMPLETED
DEMONSTRATION ROOMS**

☎ 01654 12311/2040 - 352/4 LOWER ADDISCOMBE ROAD, CROYDON, SURREY, CR07AF


 MONITOR AUDIO WHARFEDALE A & R CAMBRIDGE CREEK NAD DUAL DENON GALE
 MERIDIAN MICHELL THORENS YAMAHA REVOX REVOLVER ROGERS MARANTZ ROTEL
 AIWA BEARD KOETSU AUDIO RESEARCH MAGNAPLANAR ORACLE HELIUS KRELL
 SONY ES MISSION LINN TECHNICS KEF B&W NAKAMICHI NAIM AUDIO SPENDOR HEYBROOK QUAD AUDIOLAB B&O

Bill Hutchinson

HI-FI, AUDIO & C.D. Centre

* Sales * Service *

ROTEL KENWOOD

marantz **Technics**

ARISTON **Dual** **KEF** **AIWA**

DENON **TANNOY** **JVC**

Mordaunt-Short **AR** **PIONEER**

YAMAHA **ACUSTIC RESEARCH** **MISSION**

*Leading loudspeakers. Plus
all leading brands.* Our aim is to provide the
highest level of service and value available in
the West of Scotland

NEW SHOP OPENING SOON

IN Edinburgh: 43 Clerk St. 031 667 2877

041-248 2857
43 HOPE ST. GLASGOW



**NO 1 FOR
SERVICE
AND VALUE!**



About Sound Hi-Fi Specialists

116 BOLD STREET, LIVERPOOL L1 4JA
Telephone: 051 709 4865

WE OFFER THE BEST IN BRITISH HI-FI
SEPARATES AND ACCESSORIES
DEMONSTRATIONS BY APPOINTMENT -
SINGLE SPEAKER DEM. ROOM

HARMAN KARDON MONITOR AUDIO CAMBRIDGE
 NAGAOKA
 ALPHASON AUDIO TECHNICA ROGERS INVA
 ARISTON MANTRA AUDIO INNOVATIONS
 REVOX MYST
 QED GRADO QUAD CRIMSON
 MUSICAL FIDELITY MARANTZ TARGET ORTOFON
 ZETA CASTLE JOHN BOWERS THORENS

LIVERPOOL'S ONLY TOP TAPE DEALER

TUESDAY - SATURDAY
9.30 till 5.00

WE DO REPAIRS



LOUDSPEAKER STANDS: TECH TALK

Paul Miller gets to grips with the engineering realities behind Loudspeaker supports.

In a perfect world loudspeakers would benefit from inactive and thoroughly immobile cabinets, their drivers executing the required fore and aft movement relative to a *fixed* point in space. But then in a perfect world we would probably have no need of loudspeakers at all.

In our real world the loudspeaker cabinet is subject to many source-dependent forces – forces that are strictly defined by Laws of Physics. Most fundamental of all is Newton's Third Law of Motion which in part states that "every action has an opposite but equal reaction." In this case it is the magnet, frame and cabinet which experience the reactionary force derived from the acceleration of the driver cone or dome. The rate of change of velocity of the drive unit moving parts, combined with their mass, will determine the magnitude of this force, while the mass and coupling of the cabinet will influence its particular reaction.

Secondly, as the driver will not enjoy 100 per cent efficiency in its conversion of electrical to (acoustic) mechanical energy, much of this input is wasted as heat or as a spurious mechanical coupling with the cabinet itself. The spectral content of this noise will be peculiar to the driver itself and the overall linearity of the junction between cabinet and driver.

As always, there remains a practical point to both these transfer functions, because if the loudspeaker cabinet itself moves in reaction to the driver then the effective acoustic output of that driver becomes *modulated* by that movement. (Theoretically, assuming frictionless conditions, if the moving mass of the driver matched that of a freely suspended cabinet and driver basket/magnet, they would each be displaced by the same amount for a given input. There would therefore be a residual or sum (audible) output of zero – in other words you wouldn't hear anything.) In practice of course

the mass of the cabinet and hardware is very much greater than the mass of the driver cone, so the net movement of the cabinet is comparatively very small indeed. Some reactive movement, however, is inevitable.

Both the reactionary moment and uncorrelated non-linear components of the cabinet vibration are influenced by the nature and bonding of the loudspeaker to any supporting structure, in this case the speaker stand. Logically then, if frequency modulation of the music signal is undesirable (which it most certainly is), and if the performance of the stand can modify this 'wobble', then it is clear that the stand itself will indirectly influence the *sound* of the supported loudspeaker.

Nowadays all good quality stands come with an armoury of vicious-looking spikes to prevent the top-heavy structure from rocking on a soft carpet, for instance. Castors, by inference, are most definitely undesirable. We must assume that downward-facing spikes maintain the *base* of the stand in a fixed position, though adjustable spikes with lock-nuts will be less rigid overall. The coupling of sharp spikes to softer wooden floorboards may become unreliable with time so many users may prefer to locate the stand spikes onto the heads of strategically-located Philips (crosshead) screws.

At the apex of the stand the speaker may usually be connected with either three or four up-turned spikes or a similar array of squashed, pea-size blobs of *Blu-Tack*. Under DC conditions the up-turned spikes represent the more rigid coupling, though at audio frequencies the kinematic viscosity of the *Blu-Tack* will render it essentially 'solid'. Despite popular belief, the use of spikes does not provide an efficient 'energy path' down into the stand for, in reality, the wider surface area of the squashed *Blu-Tack* allows spurious vibrations

of a wider bandwidth and amplitude to pass into the framework.

Therefore, the use of *Blu-Tack* to reduce the impedance gradient across the wood/metal boundary can be expected to result in a *larger* subjective change in the tonal balance of the speaker – depending, of course, on the type of stand in use. How the stand responds to this and to the reaction of the moving driver will depend totally on its mass and construction. All supporting structures will resonate, typically below 20Hz, though the mass of the stand will influence how sustained this instability is, just as the structure will determine the principle mode(s) of resonance.

Complex resonances composed of several fundamentals grouped very close together often result in frequency modulation of the resonant decay, complicating the resultant movement of the speaker above. Ideally, the speaker should be isolated from such oscillations, but few stands even approach this required behaviour because both the base and top of the stand are at the mercy of the intermediate frame.

PUTTING THEORY INTO PRACTICE

To achieve maximum subjective/objective correlation, it was important to employ a testing strategy that would be representative of real, listening conditions. (Hitting the stands with a hammer, for instance, is not a representative method.) The range of possible options is of course endless, but for the purposes of this test programme each stand was excited by a Celestion *SL6* loudspeaker, placed atop with *Blu-Tack* and subject to a 50msec gated input (30V). Output was derived from an accelerometer fixed at the front of the top-plate (a total of ten successive pulses, RMS averaged and plotted in both frequency and time domains).

The upper (frequency) graph adopts a linear scaling of 25Hz per division, allowing the nature and amplitude of the structural resonances to be easily observed. As these are measured at the top plate, it is fair to assume the loudspeaker cabinet itself is subject to these same unwanted vibrations and therefore the frontal music output is modulated accordingly. Spurious unwanted peaks may be observed at 100Hz, 150Hz, 200Hz and 250Hz; these are hum components derived from the accelerometer and buffer amp driving the spectrum analyser – it proved impossible to remove such aberrations completely at these low levels. The lower (time) plot demonstrates the recovery of the frame; starting at time zero, capturing the averaged gated 50msec input and finally highlighting the interaction or decay of any excited resonances till time end at 1.6secs.

Ideally, the primary resonances should be well-damped and monotonic, showing rapid stabilisation immediately after the impulse. This reliable technique provides a characteristic 'fingerprint' for each stand which proved to have a significant correlation with the subjective tests. Indeed, the results from this technique paralleled those from complementary tests that examined the reaction of the stand to low frequency musical transients. However, the relative complexity of these latter plots rendered them unsuitable for publication.

For listening purposes a pair of Celestion *SL6S* and *SL600S* loudspeakers were employed, each exhibiting quite different mechanical properties and subsequently responding to each stand in an individual manner. Tandberg *3015A* CD player and PT/SME V/Clearaudio *Accurate* vinyl disc front-ends were used together with Deltec amplification and cabling.

RUSS SHAKES THE FOUNDATIONS

Torlyte Loudspeaker Stands

Although it can be demonstrated that increasing the mass of a loudspeaker *seems* to work - increasing stability and damping the higher resonances of the the metal - it actually stores energy, giving a resonant 'hump' in the low frequency response of the loudspeaker. This 'hump' limits the natural low frequency extension of the speaker and gives a tight, powerful - but totally false - one-note thump to the bass. The effects of stored energy do not stop there, however; mid-range and treble are degraded in clarity, smoothness and information. The three-dimensional stereo image suffers badly, too.

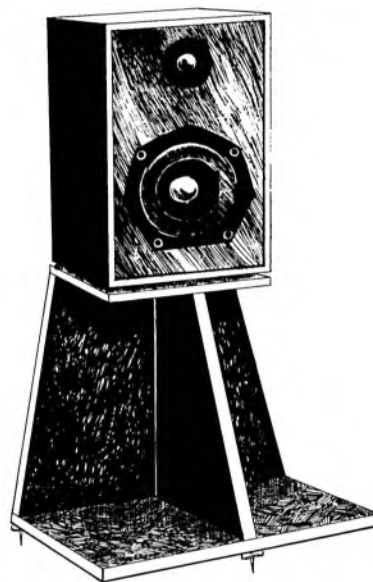
Torlyte is uniquely well-suited to the requirements of the ideal loudspeaker stand. It is ultra light, very rigid and has very good acoustic properties. Torlyte has a low-Q, broadband response, which means that it stores little energy at any one frequency. As a result, it contributes almost no character of its own to the overall response of the system.

The benefits of a well designed Torlyte loudspeaker stand are, of course, the inverse of my criticism of the heavy, metal stand: Clean, extended, tuneful bass; more 'real' mid-range (especially on voices); less 'splash' but more information in the treble (cymbals reveal this well); and the improvement in three dimensional stereo image. The front-to-back depth snaps into focus, the recording acoustic becomes much easier to discern and those subtle, mysterious sounds made by the musicians can be identified with ease.

You may well ask why it has taken us so long to develop this obvious Torlyte product. A very good question to which there are two main answers: First and foremost, we've been rather preoccupied with setting up our own Torlyte manufacturing facility here on our own premises, and putting all our existing products into production again (and improving them in the process!). Second, my early work (pre-Torlyte days) on medite and metal stands clearly seemed to show that loading them with mass improved their performance. This 'experience' prejudiced me to put a low priority on Torlyte speaker stand development. The first prototype Torlyte speaker stand quickly showed me that I had been

barking up the wrong tree! I am suitably embarrassed and must wholeheartedly thank those Torlyte enthusiasts who pushed me into getting on with the job.

The stands are available in a number of sizes, including a version specifically designed for the Linn Isobarik. All have spiked top platforms, with three adjustable, carpet-piercing spikes on the base. The stands are, like all Torlyte products, supplied flat-pack for home assembly and finished in a fetching hue of matt black.



model	height	top(w x d)	price
TSS2	230mm	380 x 415	£199
TSS3	360mm	240 x 210	£185
TSS4	450mm	200 x 200	£190
TSS6	600mm	200 x 200	£195
TSS7	700mm	200 x 200	£199

TSS2 is designed for the Linn Isobarik with a base platform 500mm wide x 520mm deep. All others have bases 400 wide x 300 deep. All sizes in mm. Prices include VAT. Other sizes available to special order.

The loudspeaker stands are available now, direct or through retailers. Stop Press: London Torlyte Centre at KJ Leisuresound, 26 New Cavendish Street (01 486 8262).

Russ Andrews Turntable Accessories Ltd.
Edge Bank House, Skelsmergh, Kendal,
Cumbria, LA8 9AS. Telephone: 0539 83247.



LOUDSPEAKER STANDS: CONCLUSIONS, BEST BUYS AND RECOMMENDATIONS

The use of a gated impulse to replicate the performance of stands under transient conditions has proved very worthwhile, indicating that many supposedly 'rigid' structures are in fact far less stable than they appear. It would seem that there is more to a good stand than black epoxy metalwork and a collection of vicious spikes!

In fact the stand has to combat *two* problems – the reactionary force of the speaker plus the input of broad band noise from the attached structure. The first problem is helped by a low centre of gravity and a high lateral strength in the frame – any stand with base spikes situated directly under the top-plate spikes is likely to be unstable in this particular respect, the situation worsening with increasing stand height. As for the input of low frequency noise, all structures will have one or more resonant modes but the important thing here would seem to be to ensure the vibrational behaviour is at least dispersed and controlled. Higher mass stands fared least

Welded frames are of paramount importance if protracted resonances are to be avoided, just as the use of reinforced/ribbed top-plates (or no plates at all) will raise the resonant 'flapping' frequency while affording a degree of damping. Distribution of mass is also important and it's interesting to note the differences in performance between the high mass pillared stands using one or more than one column, the latter being preferred.

Large differences were noted in the termination of the original impulse (time plots), the lower amplitude systems with minimal post shock decay approaching the theoretical ideal. Nevertheless, it's important to appreciate that the lower amplitude plots were not arrived at due to reflection back into the cabinet at low frequencies. On such occasions there was no relative increase in output from the sides of the wooden cabinet itself, so energy must have been dissipated in the supporting structure.

How the stands coped with this input depended on their construction but *Blu-Tack* at the interface generally provided a more efficient gradient for the movement of energy. Spikes tended to isolate the frame from the speaker but afforded just as much protection from the basic reactionary force. Therefore we can't generalise about the use of *Blu-Tack* for coupling because the efficacy of each will be related to the mass and spurious output of the cabinet together with the resonant behaviour of the stand.

Remember, any movement of the stand – whether due to excitation through the input of spurious cabinet noise or because of scant resistance to the speaker's reactionary moment – will ultimately

modulate the real output of the speaker.

BEST BUYS UP TO £50

Two products really stood out as representing excellent value for



The QED Tristand – excellent value for money.

money, the **Heybrook Point 5** and **QED Tristand** range (both £50). Although of different construction each possessed a natural, transparent balance that put less emphasis on low frequency slam and more on subtlety. Technically though, the *QED Tristand* was the more stable structure – an excellent choice if you have the required floorspace!

RECOMMENDED – UP TO £100

This particular category covers a wide span simply because so few reasonably-priced stands were up to the standards of a Best Buy. Cheapest was the **ISI II** from **Mordaunt Short**, a fairly tall open-frame stand offering great material value and only just falling short of Best Buy performance. This light and breezy stand is highly recommended. **Appolo's A10** (£47) is a short and relatively immobile structure suited to large but not necessarily heavyweight loudspeakers.

Two very similar stands, in the form of **Heybrook's HBS1** (£75) and **Monotrak's M4** (£57.50), are both recommended for their fine overall performance though the costlier *HBS1s* may easily justify the additional expenditure. **Target** are also to be congratulated on the results afforded by their innovative **HJ15/3** (£82.50), a rigid and cost-effective heavyweight that is ideally suited to the very largest enclosures.

RECOMMENDED – ABOVE £100

Two spectacular products emerged in this upper price category, namely the **Origin Live Stand** (£117) and **Foundation Pi** (£250). The former benefits from a fully welded open-frame construction with no resonant top-plate and a very low centre of gravity to prevent 'rocking'. Most speakers perform at their optimum with this unusual stand. Foundation's *Pi* is rather more well-known and somewhat more variable in its reaction to different loudspeakers than the *OL* stand. Nevertheless, with the right combination the *Pis* seem able to extract hidden qualities from appropriate loudspeakers, particularly with respect to bass solidity and impact.

RATA's Torlyte (£190) is rather unusual but offers a worthwhile alternative to other sub-£200 stands, especially if used to support the smaller bookshelf-type speakers. Even more specialised are the '**Maggi**' stands (£159) from **Foundation Audio** which firmly pin the base of most popular panel loudspeakers to the ground. This has the effect of converting the traditional low frequency wobble to a slightly higher frequency whip, a process that enjoys some subjective improvements.



Heybrook Point 5 – clearly a Best Buy.

well in the tests especially if bolts were used to clamp any part of the structure.

PERSPECTIVES

Peter Belt's controversial products and theories are sending shock waves through the hi-fi industry producing divided loyalties and suspicion. Dan Houston takes a look.

PETER BELT

Magic or myth?

On visiting certain hi-fi salons today you could be forgiven for thinking the salesmen were under the influence of a witchdoctor. A safety pin with several small washers bolted through it, may be pinned to their sweaters, and what are they doing with that CD – brushing it with a child's paintbrush? Look closer and you may notice pieces of paper placed under amplifier feet or little squares of transparent plastic between plugs and mains sockets. Then there are the tiny black squares, stuck on to almost anything and every-thing . . .

Welcome to the world according to Peter William Belt, self-styled musical messiah whose inventions and theories are causing commotion and controversy throughout the hi-fi industry. Peter Belt's devices supposedly allow you to improve your hi-fi system without actually having to upgrade it. The purpose behind the inventions relies on small electrical charges which are apparently existent in all buildings with electricity. More so, these charges are supposedly compounded by the amount of electrical equipment with which you surround yourself.

But before you leap from your seat yelling "Necromancer!" or "Charlatan!", it's almost common knowledge that high-voltage power lines can cause illness (especially in children) when they run near housing or a school, say. (The USSR and the USA have ruled against any civilian buildings being sited near such cables.) And last December the *New Scientist* magazine ran an article suggesting that the higher cancer rates in people living near power lines was related to the

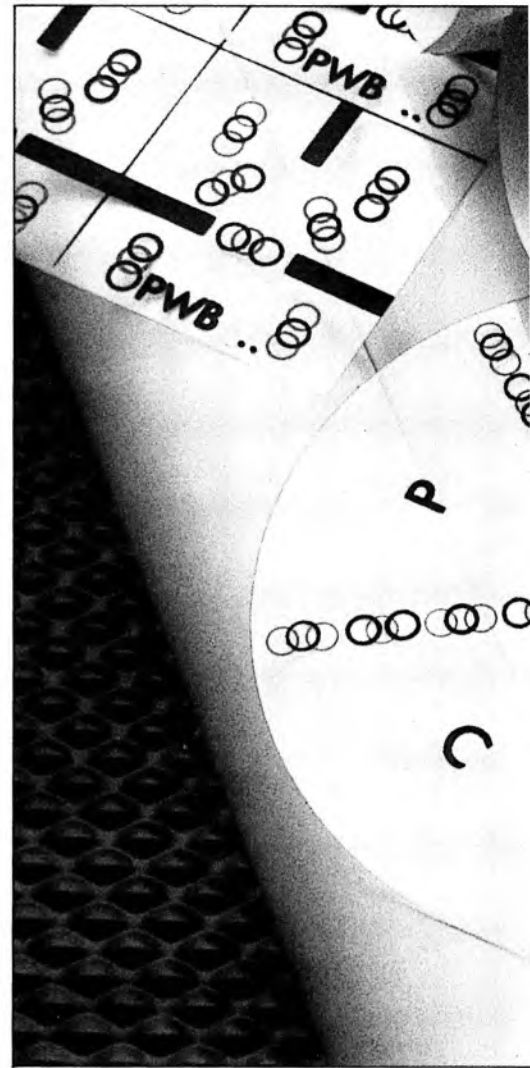
electro-magnetic fields generated by the cables. Peter Belt's theories state that the electrical charge running through a building is not limited to the sockets, cables and equipment it powers, but is omnipresent in barely detectable quantities. These minute charges running at the standard 50 hertz frequency *directly affect human hearing* by acting on the saline solution in the inner ear thereby moving it (even if ever so slightly) and causing different perceptions of sound.

If you had lived in the thirteenth century would you have believed the earth went round the sun?

Peter Belt expands his argument saying that we no longer know how a piano sounds as our ears are always affected by these (new and therefore adverse) charges. If he is right, and very few people dare say he is wrong, then the implications could be very great if he is effectively reversing such charges (assuming they exist). For instance he claims that children are no longer learning language quickly as these tiny charges affect their hearing abilities. Whether you believe Peter Belt or not depends on whether you can hear the mostly slight changes his products make to your hi-fi sound, and had you lived in the thirteenth century would you have believed the earth went round the sun?

THE MAN BEHIND THE MYTH

When one meets Peter Belt he doesn't appear either the fey or Celtic type; nor is

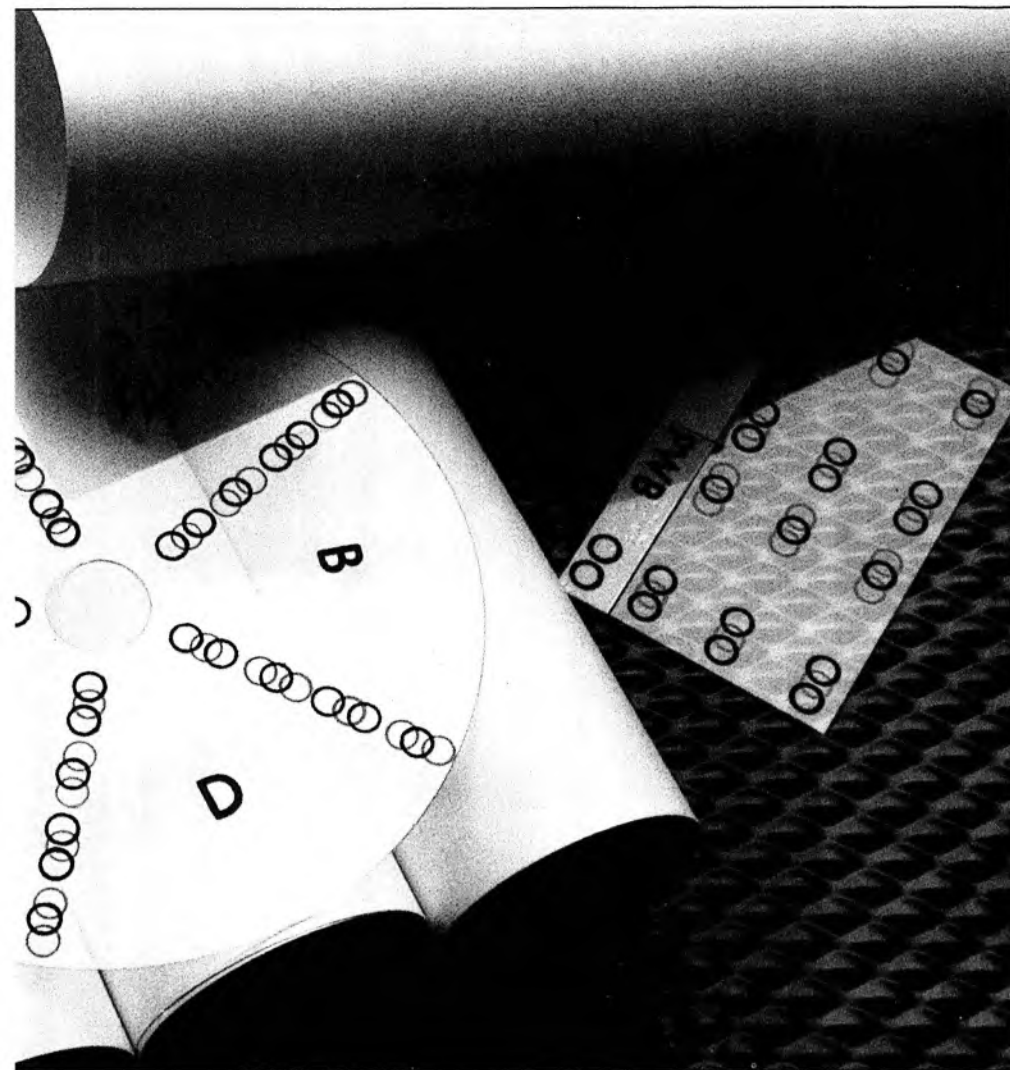


he hot-eyed and intense like a crazed academic with a Catweazle beard. He is a likeable, middle-aged and at first impression an unremarkable middleweight Northerner from Leeds. He has been involved with audio since his RAF days as a radio engineer fitter. After that he opened a retail shop in Leeds and from there branched into loudspeaker design and later electrostatic headphones under the PWB Audio name. "Business doubled overnight when stereo came in," he remembers fondly.

"At that time I was going to a lot of audio fairs and noticing how dreadful the sound was," he said, "and people were just starting to show how the cable or stands could manipulate and make a difference to the sound. I know now that it is the electrical equipment itself which affects the sound. Believe me all that equipment really affects the hearing."

"It may be sound which shall wound – striking the electric chain wherewith we are darkly bound" – Lord Byron.

Peter Belt started experimenting with different materials trying to manipulate sound from his hi-fi. "About four or five years ago, I found that I could take a piece of foam, and stroke the wall, or a door, or a



Clockwise from top: three pin plug barriers, the electret windscreen and the CD mat ... oh, and some rolled up paper.

carpet and thus change the perceived sound," he confided, stroking imaginary surfaces, in a way redolent of scout masters telling ghost stories. "The breakthrough," he pushed on, "was in the perception of sound and *not* in the manipulation of sound equipment. I could even change the sound *outside* the room itself." One begins to see what he is getting at – it is the sound as we hear it rather than the sound *per se*. Mind you a healthy grounding in Descartes will realise that they are one and the same – *I think therefore I hear*.

The next step involved experimenting with magnets which were stuck all over the Belt household, resembling a plague of slugs. Belt became convinced his experiments with magnets were changing the electrical charges in his room environment so that the hi-fi sound was better. But the charges he speaks of are not electromagnetic – he calls them electric but admits that they cannot be measured or

explained by any modern methods.

However he demonstrates a sensitivity to an 'untreated room environment' that could almost classify him as a 'current-diviner' or 'voltage mystic'. It is this unexplained and magical element which endears him to and enrages those who have dealings with the Belt phenomenon. During our interview he explained how these tiny voltages could be compounded or reversed. For instance when he placed a small battery onto a magazine he became visibly agitated and snatched it off. Ham or not?

Experimenting and 'doing research' over a six-year period has resulted in an array of equipment available from PWB Electronics. All of it purports to reverse the 'small' charges in your home (if it uses electricity) and therefore improve your hearing of music. However, the equipment is not cheap, the electret brush for instance (for records and CDs) retails for over £50.

The brush looks the same as ones sold by Woolworth bar the PWB tag. In fact you can buy them from Woolies in packs of three (sorry Mrs. Whitehouse) for 95p. Other pieces are the safety pin with its washers, sold for £25 as a cure-all that can be worn for a party conversation piece, an 'electret clip' for your water (beautiful things happen after a Belt bath), an elec-

tret windscreen to stop those nasty charges flying off your turntable, electret screens for the plugs and a syringe of treated 'oil' (*not snake oil surely?* – Ed) for reaching the parts others can't, the ubiquitous centimetre square black foils (also in red and white) which cost £20 for 50 and can be put into door and window architraves and of course the £750 polarizer – the ultimate in DIY sound improvement.

Some of the latest PWB ideas are free. Belt claims that by putting a piece of paper under one foot of the four on a CD player or amplifier it will make a difference to the sound by reversing the polarity of that equipment. You can extrapolate this and put pieces of paper under all the four-legged things in your home. "It's not that three feet are good," says Mr. Belt, "but three are better than four." This doesn't mean you should tape up the dog's paw of course! Another new idea concerns the 'field' around magazines and books and the PWB ethos suggests putting a piece of paper between all your books to create an odd number of pages (which sound better). Of course you could rip out a page for the same effect. However, perhaps here we are getting into nutty-as-a-fruitcake territory and public librarians must not get too excited. But these things will no doubt have an impact – after all, how many of us are still avoiding cracks in the pavement for fear of an ursine mugger? As yet there are limited outlets for the PWB items although some hi-fi shops offer home polarizations, but the best way to buy equipment is through PWB themselves.



Just listen to this jewellery: safe enough unless you're poor.

However, Peter Belt feels that the theories are lost on the general public and wants to secure a major manufacturer's contract for £50,000 or so. "Sooner or later they'll have to take notice, I'm starting to stop (*flabbergast*) people with what I can do to equipment or to a room."

EXPERIMENTING WITH SOUND

I tried out some of the PWB products in my own home over a three-day period and, like many people who have done the same noticed small and difficult to pin-point changes. My experiments took place before reading anything about PWB or asking anybody for their opinions. I adopted an open-minded approach and set

AT OVER £100 THIS COULD LEAVE YOU FEELING A BIT LIGHTHEADED.



How do we convince you and your wallet to part company with more than a hundred pounds for a set of headphones?

Well, not any old headphones, you understand. These are a bit special (at this price they have to be!)

Do we tell you that the Beyer DT 990 and DT 770 are compatible with compact disc players? Yes, but who doesn't?

Or, do we mention that you can listen to anyone from Mozart to McCartney, while someone else in the room is playing the organ? (an unlikely event, we admit, but you never know what turns people on).

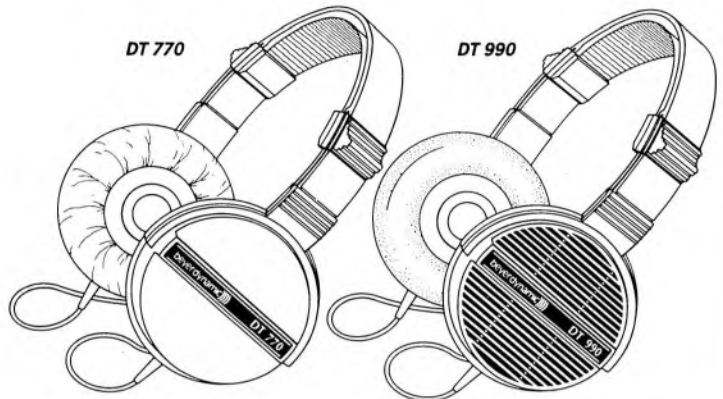
Perhaps we could persuade you that it will go nicely with other status symbols, like your Porsche.

Wait a minute, though, we haven't mentioned the most important thing, yet. The sound.

If we can blind you with science for a moment, here are just a few outstanding features that should help to convince you.

The DT 990 is an open headphone with an unbelievable frequency response of 5-35,000 Hz. The

unique technology used to achieve the very low mass of the diaphragm and moving coil assembly (only 20% of that found on a typical competitor's headphone), results in an exceptionally transient response and a reduction in the non-linear distortion, qualities normally found only in the best electrostatic headphone.



The DT 770 closed headphone combines the latest transducer technology with a unique bass reflex system. This achieves a superb bass response with well defined sound image, plus excellent pulse characteristics.

As you would expect they are both light, very light, and extremely comfortable.

You must hear them to appreciate their real value. You just can't compare them to anything else, simply because there's nothing else quite like them. So get down to your Hi-Fi specialist and listen to the new Beyer DT 990 or DT 770.



Expensive? Yes. Worth it? Yes. Every penny.

Need you hear more.

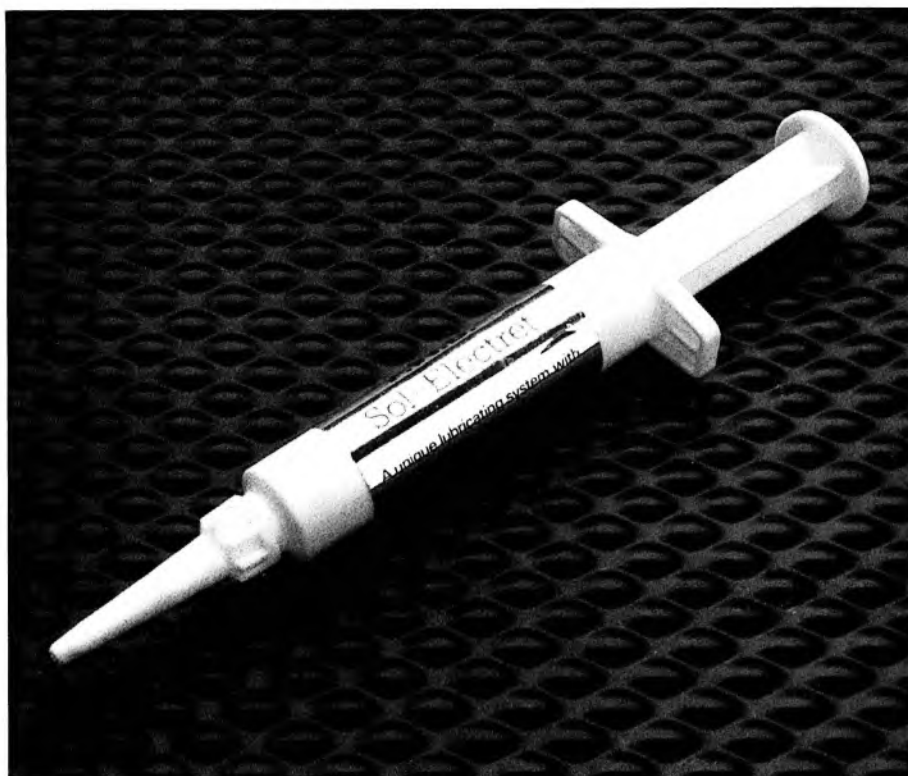


about converting all four-legged things to three (see above) and changing the environment in my East London terrace house. Repeated use of the 'brush' and electret fluid on vinyl records, together with sticking on a black electret foil confirmed small improvements in sound quality. I felt, for instance, that Miles Davis became a little more soulful if that is possible and Vivaldi's *Summer* took me right into a cornfield. The *au pair* also noticed a difference and called it clarity, saying it was more like a CD, but the Duchess of Fife (Grade 8: Flute) said we were imagining it and if there was a difference it was too expensive to be worth it!

Everything got treated. Electret foils were put on the telephone, turntable, curtains, power cables to the hi-fi, the kettle and strip light in the kitchen, the radiators, magazines, the hi-fi separates and speaker fronts, the TV, the fireplace – everywhere. Pieces of paper were slipped into books on each bookshelf but I didn't have time to 'do' every book. I put plastic electrets between the plugs and mains on every socket in the house. I put one and a half turns of *Sellotape* on all the batteries I could find, (this apparently reverses their polarity and makes your life a better experience) and pieces of paper were under everything with four contacting points to the ground. I painted the light bulbs with electret fluid as per PWB instructions, treated the architraves in doors and windows using the recommended combination of foils, and put electret oil onto the cartridge connections and on the record player spindle. And of course, everyone wore a pin. . . . During this whole period I was rather dismayed, considering some of the acrobatics involved, only to hear slight improvements again when I treated the spindle, cartridge and arm (mind you the procedure involves re-setting up the arm).

I also tried the 'water trick' using PWB's electret clip. The idea is to pour a glass of 'untreated water' and then attach the clip (which reverses the polarity of water as it enters your house) to the water pipe at the inlet. You then pour a second glass after running the water for a while and taste the two samples. Here I also noticed a change in sound quality after the first gulp of 'treated water', but no change when I tried the old stuff – I was supposed to hear the sound 'go off'. But when I again drank the treated water I noted a change once more. Call it what you like. . . . I called it spooky. Of course drinking water can be satisfying and relaxing especially if you have been rushing about trying to get the hacks off those little sticky foils. Perhaps readers will try drinking water while listening to see if the swallowing action clears the Eustachian tubes and promotes better hearing.

I also tried a Woolworth brush on vinyl records, at first on its own (which didn't do much) and then with PWB fluid (which



Above: Electret Syringe: you won't even feel a prick. Below: Spot the difference: the PWB brush and fluid alongside the Woolworth's El Cheapo version.

did) but had to admit that where minutiae are concerned the PWB brush just won the match.

So what do other people say about this equipment? Opinion is divided and undoubtedly some have heard changes while others have not.

THE CRITICS

In a recent article in *Hi-Fi News* (March edition) Paul Miller concluded: "I disagree with PWB's contention that unmeasurable manipulation of localised fields – electrostatic, electromagnetic or of PWB's own – will immediately influence

the state of mind of the attendant listener(s) . . . it seems more likely that any sonic change is a direct result in the alteration of the operation of the equipment itself." Miller expressed concern at the 'pseudo-scientific nomenclature' that passes for explanation of the equipment, and felt that the products would deter anyone from entering the serious world of domestic hi-fi. However, over a protracted testing period he recorded changes in sound quality with some equipment caused by the electret foils (although a 'control' of metalised wrapping paper also produced results he claimed) and there were improvements when sol-electret oil was folded into Blu-Tack and squeezed between neutral and earth terminals on mains plugs. Paul Miller also said that the PWB brush could reduce the number of static-induced pops on a record but said that the Woolworth version had much the same effect.

Russ Andrews of Russ Andrews Turntable Accessories in Cumbria tested the PWB equipment in his listening room with four people on a 'blind' session (*ie* he didn't tell them what he was doing). "Our experiences were entirely consistent – nobody could hear anything," he said, "we tried the stick-on foils and then a brooch. I tried to be positive and open-minded about it all and felt that just because there isn't an explanation didn't mean there was nothing there. But I concluded it was a hoax."

The next person we asked was Denis Morecroft of DNM, an amplifier manufacturer about to introduce the Belt techniques into their manufacturing process. "We have decided to try to implement some of the things in production. This is a very new field and a lot is being learned very rapidly," Mr. Morecroft informed us, also stating that DNM would be using 'polarising pens' to treat their products right down to component level. But he added a caveat from his own experience with the PWB items which he has been testing intensively over the past two or three months. "The degree of effectiveness depends on the environment of the listener. If you put the equipment in a 'bad' room, or one with lots of electrical equipment then the results are less encouraging than if you put it into a room with less equipment." The Belt theory works on the idea that the more electrical equipment you have buzzing away the worse the sound will become. "It is also a difficult subject to talk about in a way which would convince another electrical engineer," continued Mr. Morecroft, "they think they know everything; I don't think that is the case. We are convinced about this from our own work on amplifiers." Mr. Morecroft said he believed the PWB products were able to 'damp down' the small electric charge feedback that exists between the mains and amplifier although it is not related to signal. "He can pre-condition, and pre-polarize it (*the amplifier*) to tend to reject AC fields." Mr. Morecroft told us

it was not beyond the bounds of science and reason to see that if electrical charges exist in a room and are emanating from the various electrical outlets they could affect the sensitive fluids in the human ear. These would then be oscillating at 50 hertz causing minor movements in the ear which would distort everything we hear. He cited the case of talking or listening to people in a Television shop. "It is the opposite to when you are in the country air particularly on a damp morning. For instance it has been known for 2000 years that sound travels better through damp air. That's why the Greeks held their theatrical performances in the evening and in an open auditorium – they could hear perfectly well. I'm not saying Peter Belt has anything to do with damp air but it is something to go on."

For Denis Morecroft the PWB improvements to sound enabled him (and others) to see 'deeper into the image' and to feel closer to the musicians. "It is a bit mad, a bit crazy, a bit zany," he concluded "but it is no worse than anything people may have done in the past."

Rumour had it that Mission might be experimenting with the PWB concept but they told us: "if we're looking into it then we're looking into it but it is certainly not going to be disclosed."

"It's an absolute red-hot potato at the moment . . . it's well out of my ball park."

Andy Benham, a journalist working on *New Hi-Fi Sound* has been borrowing one of Peter Belt's £750 Polarizers. "Yes it works under certain circumstances," he offered cautiously, "I have heard phenomenal results with equipment after it has been used." But at his home Benham had only experienced partial success with the polarizer. "It appears to work one day and the next day, nothing." But then he touched on the psychology of the 'effect': "he might be such a good salesman that he can persuade people of the difference; he'll come round to your gaff and start cringing saying 'oh no, oh dear' and then 'ah, that's better' when he starts doing things. And you find yourself saying: 'that's great, that's unreal'."

"It's an absolutely red-hot potato at the moment. It's something on which you have to make up your mind; I haven't made my mind up yet. The price he charges is outrageous, the theories behind it are not based in scientific fact; it's well out of my ball park; but it does work."

Mr. Benham summed up by putting his finger on the button as far as any listener is concerned: "even on a psycho-acoustic basis *it does work* so is it relevant how?"

Our next port of call was to Grahams Hi-Fi in North London. Although they don't actually sell the PWB accessories at present they offer a 'home treatment' with a

Foils, plugs and . . . when is a crocodile clip not a crocodile clip? When it's from PWB of course.



Beautiful things happen after a Belt bath: how to use the electret water clip.



polarizer to their customers but make no charge. Director Michael Lewin, told us: "I have used the treatment in customers' homes and got substantial results. The high prices for PWB stuff represent repayment for Peter's years of research. Yes, it can be held to be cost effective in terms of upgrading equipment and that is applicable throughout the price range, but I don't like the fact that he is giving very little away and as far as I can tell there is no scientific explanation; it's a shame because I don't like things to be mystical – but I wouldn't like to live without it."

Martin Colloms (audio journalist) asked me how much physics I knew. "Up to

Science writer Peter Haynes had also tried PWB products with success: "I seriously believe that Belt has manipulated the effect of low-level magnetic fields in the environment," he told us, "but I would be happier if he was more open about his techniques."

"It's like having a car with flat tyres and you're trying to work on the engine when this major problem is staring you in the face."

The last comment should go to Jimmy Hughes, *Hi-Fi Answers'* chief reviewer, who for seven months has been Belt's literary lieutenant, writing articles extolling the virtues of his products when much of the press chose to ignore them. "Improvements can be heard throughout the hi-fi range but the inferior products tend to come up more in terms of performance," he told us. "I don't know whether it puts high-end audio in the shade, but I am not sure whether people buy high-end equipment because it sounds better or not. I use the things (PWB) because I get better results on my equipment; but, for instance, I've got a pair of Magneplanars upstairs – I'm not as confident about making them sound better as I am a pair of box speakers. I thought, when it came out, that it was going to be very small, very tweaky and just an interesting thing for the odd article but it seems to have grown a lot bigger than that.

"Peter Belt is getting better all the time, his products are improving as well. I've seen him too often to think he's hamming it. He's not a bullshitter; he is very methodical and confident about what he's doing. And he can feel the charges we are talking about, I'm convinced of that, which is why he has been able to come up with the electrets for door architraves for instance. I think that's where he is really clever, knowing where to put his stuff.

"The problem is that people will hear you demonstrate a difference in sound and then the effect wears off. You see them a week later and they doubt they have heard it. Their rationality asserts itself again.

"A lot of people are looking at this thing and hoping it will go away. And firms are trying to improve their equipment the whole time – making better components and products while *this* is viable. It's like having a car with flat tyres and you're trying to work on the engine when this major problem is staring you in the face."

Everyone we talked to agreed that Peter Belt has surrounded his methods in secrecy. Obviously this provokes the cry: "what methods?" So far no-one has been able to enter his audio schloss in Leeds to see the famous slug-festooned ceiling or 'lab'. And as long as he maintains this stance (I'll visit you, not you visit me) then he is going to be met with some professional scorn and not a little derision.

'O' level? Well you are this man's lawful prey. There is five per cent of truth in it; the differences are tiny, but if you become sensitive to them they can become as big as you want them to be. If he can get you

"You bring all sorts of variables into equation when you deal with Peter Belt . . . auto suggestion is a very powerful force."

emotionally involved it is more to do with human psychology than science. We did some tests which showed they do work to a very limited degree, but once you are lis-



tening to the change it is only too easy to hear it. And it is very expensive."

Alvin Gold another audio journalist was more forthcoming: "There is something fairly substantial in it, he (PWB) is perhaps guilty of making a mystery out of what should be a science, and I don't like the lack of explanation but our main job is to hear things. I hear something and it is more than slight but it can be only slight in certain systems. You bring all sorts of variables into the equation when you deal with Peter Belt; it's to do with more than the equipment. Auto suggestion is a very powerful force but I think that when we know what is going on then it will take off."

SELECTED DEALER DIRECTORY

Choosing a good hi-fi dealer is the most vital step in acquiring the system that is right for you. This unique directory gives full information on dealers in your area.


AVON

ABSOLUTE SOUND AND VIDEO, 65 Park St, Clifton, Bristol. (0272) 264975. A&R, Denon, Dual, Linn, Mission, NAD, Quad, Roksan, Rotel, Yamaha, etc. (closed Weds). BADA MEMBER 
PAUL GREEN HI-FI LTD, Kensington Showrooms, London Rd, Bath. (0225) 316197. A&R, Creek, Dual, Heybrook, Linn, Musical Fidelity, Rotel, Systemdek, Wharfedale. Dem facilities available, ring for appointment, car park. Open Tues-Sat, 9-5.30. Home trial facilities, free installation, instant credit up to £1,000. Credit cards: Access, Visa. BADA MEMBER 



BEDFORDSHIRE

ASHTON AUDIO, 6 High Street, Dunstable. (0582) 608003. AR, Akai, Ariston, Cambridge Audio, Denon, Dual, Incatech, JVC, Linn, Monster, NAD, Nakamichi, Proton, Quad, Rotel, Sony, Trio Kenwood. Instant credit up to £1,000. Credit cards: Access, Amex, Diners, Visa. Service department. Open 9-5.30. Open to 6p.m. Friday. No early closing.


BERKSHIRE

READING HI-FI CENTRE, 4-6 Harris Arcade, Friar St, Reading. (0734) 585463. 'The best equipment, advice and service from Berkshire's premier Hi-Fi emporium'. BADA MEMBER 

BUCKINGHAMSHIRE

AUDIO INSIGHT LTD, 53 Wolverton Rd, Stony Stratford, Milton Keynes. (0908) 561551. A&R, Audiolab, Heybrook, KEF, Linn, Mission Cyrus, Musical Fidelity, Nakamichi, Nitech, Rotel. Dem facilities available. Open Tues-Sat. Home trial facilities, free installation, instant credit up to £1,000. Credit cards: Access, Visa. Service dept. BADA MEMBER 
AYLESBURY HI FIDELITY, 98 Cambridge St, Aylesbury. (0296) 28790. Dual, Heybrook, Linn arms, Musical Fidelity, Mission, NAD, Nakamichi, Quad, Rotel. 2 Dem rooms available, ring for appointment. Open 10-6 Mon-Fri, 9.30-5.30 Sat. Home trial facilities, free installation, instant credit up to £1,000. Credit cards: Access, Amex, Diner, Visa. Service dept. BADA MEMBER 



CAMBRIDGESHIRE

CAMBRIDGE HI FI, 1 Hawthorn Way, Cambridge. (0223) 67773. AR, Mission Cyrus, Monitor Audio, Panasonic, Pioneer, Sony ES, Technics, Thorens, Kenwood, Yamaha. Demonstration facilities. No appointment required. Open 9.30-5.30 Mon-Sat. Free installation. Credit facilities. Up to any amount. Credit cards: Access, Barclaycard. Service dept. available. BADA MEMBER 
STEVE BOXSHALL AUDIO, 41 Victoria Rd, Cambridge. (0223) 68305. Quad, Rotel, Dual, Denon, Krell, Nakamichi, Marantz, Monitor Audio, Tannoy. Demonstration facilities. No appointment required. Open 10.00-6.00, Mon-Sat. Home trial facilities, free installation, credit facilities. Credit up to £3,000. Credit cards: Access, Barclaycard, Service dept.

CHESHIRE

ASTON AUDIO, 4 West St, Alderley Edge. (0625) 582704. Wide selection of equipment in N.W. Two year guarantee. Dem facilities: 3 dem rooms, appointment required. Open 10-6 Tues-Sat. Home trial facilities, free installation. Instant credit up to £1,000. Credit cards: Access, Amex, Diners, Visa. Service dept. BADA MEMBER 
DOUG BRADY HI-FI, Kingsway Studios, Kingsway North, Warrington. (Padgate 0925) 828009. 1986 Sony/Hi-Fi News Best Dealer in N.W. England and Wales. 'Largest choice of specialist Hi-Fi in N.W. £100-£20K'. All credit cards. 3 Dem Rooms. Dem facilities. BADA MEMBER 
HI FI CENTRE, Green Lane, Wilmslow SK9 1LQ. Tel: (0625) 522112/524766. B&O, Technics, Sony, Panasonic, Nakamichi, Quad, Revox, Teac, Harman Kardon, Marantz. Demonstration facilities - no appointments required. Open 9-1, 2-5.30 (closed Wed). Open all day


Sat. Home trial facilities, free installation, credit facilities. New customers up to £500 credit. Credit cards: Access, Visa, American Express, Diners Club, Wilmslow Card. Service dept. available.

NEW DAWN HI-FI, 1-3 Castle St, Lower Bridge St, Chester. (0244) 24179. Linn, Quad, Technics, National Panasonic, Denon, Rotel, Dual, Meridian, Aiwa, Philips. Dem facilities: 2 dem rooms. Open 9.00-5.30 Mon-Sat, closed Wed. Free installation, instant credit. Credit cards: Access, Visa, Trustcard. BADA MEMBER 
SWIFT OF WILMSLOW, 4-8 St Annes Parade, Wilmslow. (0625) 526213. A&R, Aiwa, Denon, Dual, Marantz, Mission, Monitor Audio, Pioneer, Trio, Yamaha, NAD. Dem facilities available. Open Mon-Sat 9.15-5.45. Closed 1-2 Lunch. Home trial facilities, free installation, instant credit up to £1,000. Credit cards: Access, Visa. Service dept. BADA MEMBER 

CORNWALL

TRURO HI-FI & E.T.S. Ltd, 25 King St, Truro (0872) 79809. A&R, Denon, Dual, Heybrook, Linn, Mission Cyrus, Nad, Quad, Rotel, Thorens. Dem facilities: Single speaker studio. Open Mon-Sat 8.45-5.30. Home trial facilities, credit up to £1,000. Credit cards: Access, ETS Visa. Service dept.

DERBYSHIRE


ACTIVE AUDIO, 12 Osmaston Rd, The Spot, Derby. (0332) 380385. Meridian, Mission, Denon, Yamaha, Rotel, A&R Cambridge, Monitor Audio, Trio, Marantz. Demonstration facilities. Open 9.30-6.00 - early closing Wednesday. Home facilities: credit up to £1,000. Credit cards: Access, Barclaycard, Diners, American Express. Service dept. BADA MEMBER 

DEVON

PETER RUSSELL HI-FI ATTIC, 58 New George St, Plymouth, Devon (0752) 669511. Quad, Linn, Mordaunt-Short, A&R Cambridge, Revolver, Heybrook, Denon, Harmon-Kardon. Dem facilities - no appointment required. Open Mon-Sat 9.30am-5.30pm. Home trial facilities. Free installation. Credit facilities. Credit cards: Visa, Access. Service dept.



ESSEX

A.T. LABS, 442/4 Cranbrook Rd, Gants Hill, Ilford. (01) 518 0915. Open Mon-Sat, 10-6. Two single speaker dem rooms. Credit cards: Access, Amex, Visa.

BADA MEMBER 
BEECHWOOD AUDIO, 6 Market St, Braintree. (0376) 29060. A&R, Ariston, B&W, KEF, Meridian, Musical Fidelity, NAD, Nakamichi, Pink Triangle, Quad, Rotel. Dem facilities 2 single speaker rooms. Open Mon-Sat, 9.30-6.00. Home trial facilities. Free installation, instant credit up to £1,000. Credit cards: Access, Amex, Diners, Visa. BRENTWOOD MUSIC & HI-FI CENTRE, 2 Ingrave Rd, Brentwood. (0277) 221210. Alphason, B&W, Cambridge Audio, Denon, Harmon Kardon, Marantz, QED, Quad, Yamaha. Dem facilities available. Open Mon-Sat 9.30-5.30 (Thurs from 10am, Sat from 9am). Home trial facilities, free installation, credit facilities. Credit cards: Access, Visa, Hi-Fi Markets. Service dept.

LYON AUDIO, 16 Peartree Business Centre, Peartree Road, Stanway, Essex CO3 5JN. (0206) 560259. QED, Rogers, Denon, Systemdek, Nad, Rotel, Pink Triangle, J.A. Michell, Quad, Gale Marantz. Dem facilities available. Open Mon-Sat 9am-6pm. Home trial facilities, free installation, credit facilities up to £1,000. Credit cards: Access, Visa, Amex, Diners Club, Hi-Fi Markets, Eurocheque. Service dept available.


GLOUCESTERSHIRE

ABSOLUTE SOUND AND VIDEO, 40/42 Albion St, Cheltenham. (0242) 583960. A—R, Denon, Dual, Linn, Meridian, Mission, NAD, Rotel, Technics, Yamaha, etc. (Closed Wed). BADA MEMBER 
AUDIO EXCELLENCE, 58 Bristol Road, Gloucester. (0452) 300046. Audio Research, Dual, Krell, Linn, Magneplanar, Naim, NAD, Yamaha and lots more. Closed Mon. BADA MEMBER 

ROBBS OF CHELTENHAM, 3 Clarence St, Cheltenham. (0242) 584404. Sansui pure hi-fi, Kenwood, Sony ES, Dual, Technics, QED, Heybrook. Dem facilities. Open 9-5.30 Mon-Sat. Instant free credit. Credit cards: Visa, Access. Service dept.


HAMPSHIRE

ABSOLUTE SOUND AND VIDEO, 4 Feathers Lane, Basingstoke, Hants RG21 1AS. (0256) 24311. A&R, Audiolab, Denon, Dual, Linn, Mission, NAD, Rotel, Technics, Yamaha. Dem facilities. Open: Mon, Tues, Thurs, Fri 9.30-6.00. Sat 9.30-5.30. Closed Wed. Home trial facilities. Free installation. Credit facilities. Credit cards: Access, Barclaycard, Connect, Amex, Diners. Service dept.

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

TRUE-FI SOUND AND VISION, 10/12 Grosvenor Rd, Aldershot. (0252) 26390. Akai, Aiwa, B&W, Nakamichi, Hitachi, JPW, Mission, Mordaunt-Short, Nagaoka, Sony, Technics. Dem facilities available. Open 9.30-6.00 Mon-Sat. Free installation, instant credit up to £1,200. Credit cards accepted: Access, Barclaycard. Service dept.

HERTFORDSHIRE

ACOUSTIC ARTS Ltd, 101 St Albans Rd, Watford, Herts. (0923) 45250. A&R, Audiolab, Denon, Magneplanar, Quad, Rogers, Meridian, TDL, Jadis, Krell. Dem facilities: 2 dem studios, ring for appointment. Open Mon-Sat 9.30-5.30. Home trial facilities, free installation. Instant credit up to £1,000. Credit cards: Access, Visa. Service dept. BADA MEMBER 

THE AUDIO FILE, 40 Hockerill St, Bishops Cleeve, Herts. (0279) 506576. Linn, Roksan, Rega, Naim, A&R (Camb), Heybrook, Rotel, Denon, Epos, QED. Demonstration facilities, no appointment required. Open 9.30-5.30 Mon-Sat. Home trial facilities. Free installation, credit facilities up to £1,000. Credit cards: Access, Visa, Diners, Amex. Service dept. available.

W. DARBY & CO. Ltd, St Peter's St, St Albans. (0727) 50961. B&O, SonyES, Quad, A&R Cambridge, Revox, Denon, Yamaha, Luxman, Ariston, Thorens. Demonstration facilities, no appointment required. Open Mon-Sat 9.00-5.30. Home trial facilities, free installation, credit facilities. Credit cards: Access and Barclaycard. Service dept.


ISLE OF MAN

ISLAND COMPACT DISC CENTRE, Parliament Square, Ramsey. (0624) 815521. Musical Fidelity, Sugden, Celestion, Harman Kardon, Teac, Castle Acoustics, Philips, A&R, JBL, Luxman. Open Mon-Sat 9.00-5.00pm. Dem facilities. Home trial facilities, free installation. Full credit, no limit. Credit cards: Access, Visa, 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 facilities available. Open Mon-Sat 9.00-5.30 closed Thurs. Home trial facilities, free installation, instant credit up to £1,000. Credit cards: Access, Visa, Creditcharge. Service dept.


LANCASHIRE

CLEARTONE HI FI, 235 Blackburn Rd, Bolton. (0204) 31423. Best makes, Linn, Creek, NAD, etc. Dem studios. Laser vision and compact disc centre. BADA MEMBER 


HI-TECH AUDIO, 7 Moor Lane, Clitheroe, Lancs B5B 1BE. (0200) 26563. Mission, Audio Innovations, Rogers, Quad, Rotel, NAD, Elite Rock, B&W, Castle, Wharfedale. Dem facilities, appointment required. Open 9.30-5.00, closed Wednesdays. Home trial facilities, free installation, credit up to £1,000. Credit cards: Access, Visa,


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

LEICESTERSHIRE


SOUND ADVICE, The Sound Factory, Duke St, Loughborough LE11 1ED. (0509) 218254. A&R, Creek, Linn products, Epos, Mission Cyrus, Naim, Rega, Roksan, Rotel, Yamaha. Dem facilities, domestic size and furnished studios. Callers welcomed. Demonstrations by appointment. Open 9.30-6.00 Mon-Sat. Free installation. Credit facilities. Credit cards: Access, Visa, Amex. Service dept. BADA MEMBER 


LONDON

A.T. LABS, 159 Chase Side, Enfield, Middlesex. (01) 367 3132. Open Mon-Sat 10-6. Two single speaker dem rooms. Export worldwide. Service dept, car park. Amex, Visa, Access. BADA MEMBER 

AUDIO T, 190 West End Lane, London NW6. (01) 794 7848. Open Mon-Sat, 10-6.00. Two single speaker dem rooms. Access, Amex, Visa. BADA MEMBER 
CORNFLAKE SHOP, 37 Windmill Street (just off Tottenham Court Road), London W1. (01) 631 0472. 10am-7pm, Mon-Sat. Cambridge, DNM, Epos, Koetsu, Naim, PS Audio, Roksan, SME, Van den Hul. Excellent demonstrations, 2 demo rooms, full delivery and installation service. Full credit facilities. Credit cards: Access, Visa.

COVENT GARDEN RECORDS, 84 Charing Cross Road. (01) 379 7635/7427. Quad, B&W, Meridian, Mission, Yamaha, Sony, Philips, A&R Cambridge, Nakamichi, Rotel. Dem facilities - no appointment required. Open Mon-Sat 10am-7.30pm. Home trial facilities, free installation - to suit the customer. 7.30am-11.30pm weekdays, 9am-9pm weekends. Credit cards: Access, Visa, American Express, Diners Club. Service dept.

DOUG BRADY HI-FI, 18 Monmouth St, London WC2H 9HB. (01) 379 4010. Wide range of top specialist hi-fi from Britain, America and Japan. Dem facilities. 3 Dem rooms. All credit cards. BADA MEMBER 

GRAHAMS HI-FI, 86-88 Pentonville Rd, London N1. (01) 837 4412. 'FBA Dealer of the year 1985'. Linn, Naim, Rega etc. £300-£3,000-£13,000. BADA MEMBER 

H.L. SMITH & Co Ltd, 287-289 Edgware Rd, London W2 1BE. (01) 723 5891. Aiwa, B&W, Denon, Dual, KEF, Ortofon, Panasonic, Sony, Technics, Yamaha. Dem facilities available. Open Mon-Sat 9.5.30, Thurs 9.1, instant credit up to £1,000. Credit cards: Access, Visa, Diners. Service dept.

KJ WEST ONE, 26 New Cavendish St, London W1M 7LH. (01) 486 8262. A&R Cambridge, Audio Lab, B&W, Audio Res - Krell, Rogers, Gale, Musical Fidelity, Linn, Magnea Pan, Nakamichi. Dem facilities available - appointment required. Open Mon-Sat 10am-6pm. Limited home trial facilities. System Design & Installation. Credit facilities - Credit cards: Visa, Access. Service dept available. BADA MEMBER 


SUBJECTIVE AUDIO LTD, 12 Park Avenue, Palmers Green, London N13 5PF. (01) 882 4975. Air Tangent, Apogee & Alphason, Audio Research, Koetsu, Krell, Magnephanar, Meridian, Nakamichi, Oxford Acoustics, Tandberg. Dem facilities: 2 single speaker dem rooms, appointment required. 10.6 Tues-Fri, 9.5 Sat. Home trial facilities. System design & installation service. All major credit cards. Service dept.

TELESONIC LTD, 92 Tottenham Court Rd, London. (01) 636 8177. A&R, B&O, B&W, Hafler, Luxman, KEF, QED, Quad, Nakamichi, Rogers. Dem facilities available. Open Mon-Fri 9-6, Sat 9.30-4. Home trial facilities, free installation, credit facilities. Credit cards: Access, Amex, Diners, Visa. Service dept.

THE SOUND ORGANISATION Ltd, No. 1, Cathedral St, London Bridge, London SE1 9DE. (01) 403 2255/3088. Counterpoint, Denon, Exposure, Koetsu, Linn, Naim, PS Audio, Roksan, Rega, SME and others. Dem facilities


available, ring for appointment. Open Tues-Sat, 10-7. Free installation. Credit cards: Access, Visa. Service dept. BADA MEMBER 

MANCHESTER

CLEARSTONE HI-FI, 62 King St, nr. Kendals. (061) 835 1156. Best makes, Linn, Creek, NAD, Naim, etc. Dem studio, Compact Disc centre, video and TV. BADA MEMBER 

MERSEYSIDE

ABOUT SOUND, 116 Bold St, Liverpool L1 4JA. (051) 709 4865. Mordaunt-Short, Musical Fidelity, Myst, Quad, Revox, Sansui, Sugden, Thorens, Walker, Yamaha. Dem facilities, single speaker room. Ring for appointment. Open Tues-Sat 9-5.30. Free installation, instant credit up to £1,000. Credit cards: Access, Diners, Visa. Service dept.

W.A. BRADY & SON, 401 Smithdown Rd, Liverpool. (051) 733 6859. 'Largest choice of specialist Hi-Fi in N.W. £100-£20K'. All credit cards. 3 dem rooms. BADA MEMBER 

NORFOLK

SOUND APPROACH, 161 Unithank Road, Norwich. (0603) 622833. Ariston, AR, Claymore, Castle, Elite Rock, Haybrook, Matra, Musical Fidelity, Revolver, Yamaha. Dem facilities. Open 9-6.30 Mon-Sat. Home trial facilities. Free installation. Credit up to £1,500. Credit cards: Visa, Access, Diners Club. Service dept available.


WEST MIDLANDS

SOUND ADVICE, 162 Alcester Road, Moseley, Birmingham B13 8HS. (021) 449 3328. A&R, Creek, Linn, Epos, Mission Cyrus, Naim, Rega, Roksan, Rotel, Yamaha. Dem facilities, domestic size and furnished studios. Callers welcomed. Demonstrations by appointment. Open 9.30-6pm Tues-Sat. Free Installation. Credit facilities. Credit cards: Access, Amex, Visa. Service Dept.

BADA MEMBER 
ALTERNATIVE AUDIO Ltd, 93-95 Hobs Moat Rd, Solihull. (021) 742 0254 (sales), 0248 (service). A&R, Audiolab, Denon, KEF, Marantz, Meridian, Mission, M.A., The Source, Philips. Dem facilities available, appointment required. 10-6 Tues-Sat, closed Mon. Home trial facilities, 3 demo rooms, service dept, free installation, instant credit. Credit cards: Access, Visa, Amex.

FIVEWAYS HI-FIDELITY Ltd, 12 Islington Row, Edgbaston, Birmingham. (021) 455 0667. A&R, Denon, Dual, KEF, Meridian, Musical Fidelity, Nakamichi, Philips CD, Quad, Revox, etc. Dem facilities. Single speaker dem room. Open 9.30-6 Tues-Sat. Home trial facilities, free installation, credit facilities. Credit cards: Access, Visa. Service dept.


GRIFFIN AUDIO Ltd, 94 Bristol St, Birmingham. (021) 692 1359. Linn, Naim Audio, Rega, Creek, Denon, Nakamichi, Quad, Mission, Monitor Audio, Rotel. Dem facilities 2 single speaker rooms. Open Mon-Sat 9.30. Home trial facilities, free installation, interest free credit up to £1,000. Credit cards: Access, Visa.

BADA MEMBER 
NORMAN H. FIELD LIMITED, 35-37 Hurst Street, Birmingham B5 4BJ. (021) 622 2323/3619. AR, B&W, Denon, Dual, Monitor, Audio, Kenwood, Mordaunt-Short, NAD, Technics, Yamaha. Dem facilities available. Open 9.15-6.00, Saturday 9.00-6.00. Closed Weds. Home trial facilities on selected systems. Credit up to £1,500. Credit cards: Access, Visa. Service dept.

OXFORDSHIRE

ABSOLUTE SOUND AND VIDEO, 19 Old High St, Headington, Oxford. (0365) 65961. A&R, Denon, Linn, Mission, NAD, Rotel, Yamaha. Also 256, Banbury Rd, Summertown. BADA MEMBER 

ASTLEY AUDIO LTD, 3 Market Place, Wallingford. (0491) 39305/34349. AR, Dual, Kenwood, Mordaunt-Short, Mission, Monitor Audio, Philips, Technics, Tannoy, Yamaha. Open Tues-Fri 9-5.30, Sat 9-5. Records, tapes and 1000+ CDs. Service dept. Access, Visa, Diners.

WESTWOOD AND MASON, 46 George St, Oxford. (0865) 247783. Linn, Naim, Rega, A&R, Heybrook, Dual, Mordaunt-Short, Spendor, Tannoy, Quad, etc. BADA MEMBER 

WITNEY AUDIO, 28 High St, Witney, Oxford. (0993) 2414. A&R, Aiwa, Akai, Dual, KEF, Mordaunt-Short, Pioneer, Philips, Sony, Yamaha. Dem facilities. Open Mon-Sat 9-5.30. Free installation, instant credit up to £1,000. Credit cards: Access, Visa. Service dept.

SHROPSHIRE

AVON HI-FI Ltd, 12 Barker St, Shrewsbury. (0743) 55166. A&R, B&W, JBL, Dual, NAD, Nakamichi, Revolver, Trio, Quad, Yamaha. Dem facilities available. Open Mon-Sat 9-5.30, closed Thur. Home trial facilities, free installation, instant credit up to £1,000. Credit cards: Access, Visa. Service dept.

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 facilities available. Open Mon-Sat 9-1, 2-5.30, Wed 9-1. Home trial facilities, free installation. Credit up to £1,000. Credit cards: Access, Visa. Service dept.


STAFFORDSHIRE


GRANGE HI-FI LTD, 153 Branston Road, Burton-on-Trent. (0283) 33655. Pink Triangle, Systemdek, Denon, Audio Innovations, A&R, Cambridge, Quad, Rotel, Elite Rock, Snell. Dem facilities - no appointment required. Open Mon, Tues, Thurs, Fri, Sat. 9-6.00pm, Wed 9-1.00pm. Free installation. Credit facilities. Credit cards: Visa, Access. Service dept.

SUFFOLK

EASTERN AUDIO, 41 Bramford Rd, Ipswich. (0473) 217217. Quad, Audio Lab, Denon, Dual, Marantz, Mission, Nad, Nakamichi, Technics, Arcam. Dem facilities available. Open Mon-Sat 9.30-6.00pm. Free installation. Credit facilities - Credit cards: Access, Visa. Service dept available.


SURREY


AERCO Ltd, 11 The Broadway, Woking. (04862) 4667. A&R, Ariston, Exposure, HK, A.R., Heybrook, JBL, KEF, Magnum, NAD, Pt. Quad, Revox. BADA MEMBER 
TRU-FI SOUND AND VISION, 2 Cromwell Rd, Redhill, Surrey. (0737) 66128. Akai, Aiwa, Band W, Nakamichi, Hitachi, JPW, Mission, Mordaunt-Short, Nagaoka, Sony, Technics. Dem facilities available. Open Mon-Sat 9.30-6.00. Free installation, instant credit up to £1,200. Credit cards: Access, Visa. Service dept.

UNILET PRODUCTS Ltd, 35 High St, New Malden, Surrey KT3 4BY. (01) 942 9567. Mon-Sat 9-6. Thurs 9-7. Credit cards: Amex, Access, Diners, Visa. Dem facilities. Large stock. BADA MEMBER 

SUSSEX (EAST)

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.

BADA MEMBER 
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.

BADA MEMBER 
HASTINGS HI-FI, 31-32 Western Rd, St Leonards On Sea. (0424) 442975. A&R, B&W, Mission/Cyprus, NAD, Nakamichi, Quad, Rotel, Systemdek, Tannoy, Yamaha. Dem facilities 2 single speaker dem studios. Open Mon-Sat 9-6. Home trial facilities. Free installation. Credit facilities. Credit cards: Access, Amex, Visa. Service dept.

SUSSEX (WEST)

BOWERS AND WILKINS Ltd, 1 Becket Buildings, Littlehampton Rd, Worthing. (0903) 64141. B&W, Dual, JVC, KEF, Nakamichi, Philips, Shure, Quad, Sony, Technics. Dem facilities 2 dem rooms. Open Mon-Sat 9-

SELECTED DEALER DIRECTORY

5.30, Weds 9-1. Home trial facilities free installation, instant credit up to £1,000. Credit cards: Access, Visa. Service dept.
CHICHESTER HI FI, 40 Little London, Chichester PO19 1PL. Tel: (0243) 776402. Linn, Naim, Rega, Creek, Nakamichi, A&R, Denon etc. Demonstration facilities available - no appointment required. Open Tues-Sat, 10-1, 2-5.15 (closed Mon.) Free installation. Credit cards: Access + Visa. Service dept. **BADA MEMBER**

TYNE & WEAR

RED RADIO SHOP AND HI-FI CENTRE, 11 Olive St, (Off Park Lane) Sunderland. (Sunderland) 5672087. Aiwa, Bose, Denon, JVC, Luxman, Michell, Pickering, Spondor, Thorens, Trio. Dem facilities available. Open Mon-Sat 9-5.30. Free installation, interest free credit. Credit cards: Visa. Service dept.

WILTSHIRE

ABSOLUTE SOUND AND VIDEO, 60 Fleet Street, Swindon. (0793) 38222. A&R, Denon, Dual, Linn, Meridian, NAD, Rotel, Technics, Yamaha. (Closed Wed). **BADA MEMBER**
PR SOUNDS, 5 King St, Melksham. (0225) 708045. Pioneer, Akai, JBC, Dual, Ortofon, Philips, Toshiba, B&W, Celestion. Open Mon-Sat 9.00-6.00pm. Dem facilities, home trial facilities, free installation. Full credit up to £1,000. Credit cards: Access. Service dept.

YORKSHIRE (NORTH)

ELITE HI-FI, 178 Kings Road, Harrogate HG1 5JG (0423) 521 831. Voyd, Elite Rock, Systemdek, Celestion, Helius, Audionote, Snell Acoustics, JPW, Nakamichi, Teac. Dem facilities - 2 dem rooms. Open 7 days a week 9-6. Free installation. Service dept. **BADA MEMBER**
THE SOUND ORGANISATION, 36 Gillygate, York. (0904) 27108. Linn, Naim, Rega, Roksan, Epos, Ruark, Gale, Denon, Rotel, Mantra. Dem facilities available. Open Tues-Sat 10-6. Home trial facilities, free installation, instant credit (written details on request). Credit cards: Access, Amex, Visa, Diners. Service dept. **BADA MEMBER**

YORKSHIRE (WEST)

AUDIO PROJECTS, 45 Headingley Lane, Leeds. (0532) 304565. A&R, Audiolab, Creek, Heybrook, Linn, Musical Fidelity, Naim, Quad, Rega, Rogers. Dem facilities available, ring for appointment. Open Tues-Fri 9.30-6, Sat 2.30-5.30. Home trial facilities, free installation, instant credit up to £1,000. Credit cards: Access, Creditcharge, Visa. Service dept. **BADA MEMBER**
ERRICKS, Hi-Fi Experience, Fotosonic House, Rawson Square, Bradford. (0274) 309266. Dem facilities. Sales/service agents for A&R, Linn, Quad, Naim, Nakamichi, Mission etc. **BADA MEMBER**
HUDDERSFIELD HI-FI CENTRE, 4 Cross Church St, Huddersfield. (0484) 544668. V.W. Loudspeakers, Kenwood, Harman Kardon, Denon, Duo, A&R Cambridge, Musical Fidelity, Quad, NVA, Audio Lab, and many more. Dem facilities - appointment required. Open Mon-Sat 9.00-5.30. Thursday 9.00-8.00. Closed Wednesday. Free installation. Credit facilities. Credit cards: Access, Barclaycard. Extended guarantee facilities.
IMAGE HI-FI Ltd, 8-10 St Annes Rd, Headingley, Leeds. (0532) 789374. AR, Audio Lab, Denon, Linn, Marantz, Meridian, Mission, Monitor Audio, NAD, Quad. Three dem rooms. Open times: Mon-Fri 9.30-6.00. Sat 9.00-6.00. Home trial facilities. Free installation. Instant credit up to £1,000. All major credit cards accepted. Service dept. **BADA MEMBER**

IRELAND

CLONEY AUDIO, 34 Main St, Blackrock, Co. Dublin. 0001 889449. Linn, Roxan, Naim, Rega Research, Rogers, Spondor, Musical Fidelity, Cambridge Audio. Open Tues-Sat 10-6.00pm. Thurs & Fri open till 9.00pm. Free installation. Credit cards: Visa, Access. Service dept.

SCOTLAND

ANGUS
ROBERT RICHIE HI-FI, 102 Murray, Montrose, Scotland.

(0604) 73765. A&R, Creek, KEF, Linn, Naim, Quad, Rega, Sony, Technics, Wharfedale. Dem facilities available, ring for appointment. Open 9-1, 2-5 Mon-Sat, Wed 9-1. Home trial facilities, free installation, instant credit. Credit Cards: Access, Visa. Service dept.

EDINBURGH

BILL HUTCHINSON Ltd, 43 Clarke St, Edinburgh. (031) 667 2877. AR, Aiwa, Denon, Dual, JVC, Mission, Mor-daunt-Short, Omar, Technics, Yamaha. Dem facilities available. Open Mon-Sat 10-6. Free installation. Instant credit. Credit cards: Access, Visa. Service dept.

GLASGOW

BILL HUTCHINSON Ltd, 43 Hope Street, Glasgow. (041) 248 2857. A.R., Aiwa, Denon, Dual, JVC, Mission, Mor-daunt-Short, Omar, Technics, Yamaha etc. Dem facilities available. Open Mon-Sat 10-6. Free installation, instant credit. Credit cards: Access, Visa. Services dept.

WALES

CLWYD

ACTON GATE AUDIO, 4 Ruabon Road, Wrexham. (0978) 364500. Quad, Rotel, Nad, Onkyo, AR, B&W, Sansui, Revolver, Castle, Target. Opening times: Mon-Sat 9.30-5.30pm, closed Wed pm. Dem facilities available. Home trial facilities, free installation. Full credit, credit cards: Access, Amex. Service dept.

GLAMORGAN

AUDIO EXCELLENCE, 134 Crwys Road, Cardiff. (0222) 28565. Audio Research, Dual, Krell, Linn, Magneplanar, Naim, NAD, Yamaha and lots more. Closed Mon. **BADA MEMBER**
AUDIO EXCELLENCE, 9 High St, Swansea. (0792) 474608. Audio Research, Dual, Krell, Linn, Magneplanar, Naim, NAD, Yamaha and lots more. Closed Mon. **BADA MEMBER**

AT-95E

A no-nonsense moving magnet cartridge...



...the award winner for less than £20



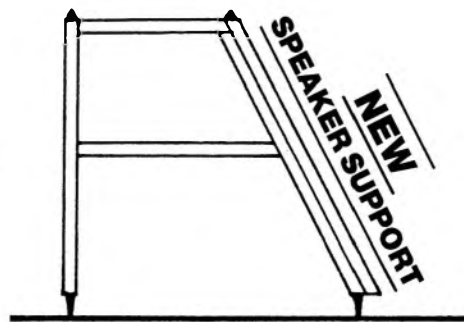
FOR MORE DETAILS CALL 0532 771441.



audio-technica

INNOVATION PRECISION INTEGRITY

RADICAL!



"The excellent new stands from Origin Live... I was greatly impressed... and can highly recommend them." HI-FI REVIEW Jan/Feb 88

Not heavyweight - not damped - not bolted together - not fully welded - not imitation or copied - not just steel welded together.

Now widely recognized in the field of special high performance frames Origin Live have applied their expertise to the vital aspect of good speaker support. The new stands are rigid - very stable - low resonance and stylish - the requirements to get the best from your speakers.

AVAILABLE DIRECT OR THROUGH DEALERS
 FOR INFORMATION SEND COUPON BELOW

TO: ORIGIN LIVE
 87 CHESEL CRESCENT
 BITTNER, SOUTHAMPTON
 SO2 4BT (0703) 671237

Please send me information
 NAME
 ADDRESS

THE SPECIALISTS

Rayleigh Hi-Fi

44a High Street,

Rayleigh

Tel: 0268-779762
747571

216 Moulsham Street, On-the-Parkway,

Chelmsford

Tel: 0245-265245



*WE ARE PLEASED TO ANNOUNCE THE ARRIVAL OF THE
NEW CYRUS ELECTRONICS RANGE FROM MISSION*



CYRUS II AMPLIFIER

NEW Cyrus I Amplifier **£179.90**

NEW Cyrus II Amplifier **£299.90**



CYRUS PSX POWER SUPPLY

NEW Cyrus PSX Power Supply **£199.90**

NEW Cyrus Tuner **£199.90**

*THIS SUPERB NEW RANGE WITH IMPROVED PERFORMANCE,
FACILITIES AND FINISH NOW ON DEMONSTRATION*

THE NEW ROKSAN NOW IN STOCK

HIGH QUALITY HI-FI FROM:

A&R ★ AUDIOLAB ★ BEYER ★ BLQ ★ CREEK ★ CYRUS ★ CELESTION ★ DENON ★ DNM ★
DUAL ★ EPOS ★ GALE ★ GRACE ★ HEYBROOK ★ INCA TECH ★ ION SYSTEMS ★ LINN
PRODUCTS ★ MANTRA ★ MISSION ★ MONITOR AUDIO ★ MORDAUNT SHORT ★ MUSICAL
FIDELITY ★ NAD ★ NAIM AUDIO ★ NAGAOKA ★ NAKAMICHI ★ ONKYO ★ QED ★ QUAD ★
REGA ★ REVOX ★ REVOLVER ★ ROGERS ★ ROTEL ★ ROYD ★ SUPEX ★ SYSTEMDEK ★
YAMAHA ★

0% FINANCE AVAILABLE FOR LIMITED PERIOD ONLY. DETAILS ON REQUEST

Visit either of our superb showrooms and discuss your requirements with our enthusiastic and knowledgeable staff who will be pleased to tailor a system to suit you.

3 YEARS PARTS AND LABOUR GUARANTEE ON HI-FI SYSTEMS



LICENCED CREDIT BROKERS - FULL FINANCE FACILITIES AVAILABLE - DETAILS ON REQUEST - APR 26.5%

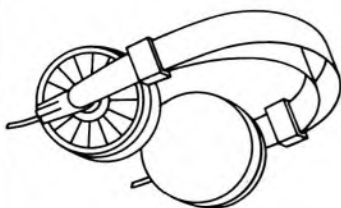


THE SPECIALISTS



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 electronic 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 ahead of other criteria.

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 such as valve gear or second-hand items, and unusual even here. Meanwhile the subtle 'fine-tuning' of component matching is almost exclusively the preserve of the specialist, and a major reason for the superior sound of the well chosen separates system. Indeed, the delicate art of 'supercompatibility'



really takes over the major role at a 'super-fi' level, and might be regarded as the key to 'real' hi-fi.

Superficially the pre-packaged system offers better value, purely in terms of the features available for the price. But the buyer who takes the trouble to analyse his or her needs and preferences will often come to the conclusion that step-by-step building of a separates system will provide greater long-term satisfaction, giving flexibility for future upgrading if so desired.

A QUESTION OF PRIORITIES

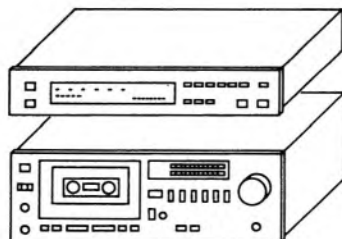
The key advantage of separates is

the opportunity to choose one's own preferences as priorities. Taking the trouble to try and establish these, leads most people to give up, assuming that they don't know enough even to start. But the process needn't be that difficult.

Begin by establishing whether you like to choose your own music, or have it chosen by someone else. This helps sort out what priority should be given to radio, but bear in mind that the best radio music is live radio music, which is very rare and often quite esoteric; when radio is merely an alternative source of pre-recorded material, the results will inevitably be inferior to those obtainable directly from the same source in the home, given a reasonably decent 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 radio tuner when funds permit.

There will always be controversy over the relative qualities of LP, CD and cassette, with earnest protagonists often trying to advance their prejudices by rubbishing rivals. LP is still the choice for ultimate sound quality – particularly for those prepared to



spend a substantial sum on a good quality turntable system. Furthermore the vinyl repertoire is still the cheapest, largest and most varied, especially if one acknowledges a secondhand market extending back 30 years. However, LPs remain tied to the home, are prey to warps and surface noise even when purchased new, and do not survive

rigorous physical abuse at all happily. Though bulky and heavy to store, the 12-inch cover has been turned to good use for artwork and liner notes, creating a pride of ownership somehow un-matched by CD or musicassette.

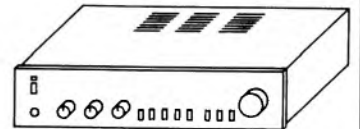
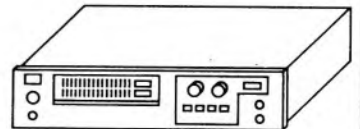
Cassette has never really challenged vinyl's potentially superior quality, but it is a multiple role format, offering 'go anywhere' flexibility, a uniquely useful recording capability, plus a broad catalogue of pre-recorded musicassette material. Although there are several potential rivals for recording from radio or pirating copyright material, the cassette still wins on convenience and compactness, though the sudden rise in popularity of double mechanism 'dubbing' decks remains mysterious. 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, while any such home recording is inevitably poorer than the original.



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. Though such opportunities are rarely possible or practical, a live recording onto cassette using good quality microphones can be the hi-fi equal of any other source.

CD is the new 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. Player prices are still on the high side (typically £200), but dropping. However, disc prices are still nearly twice those of LP and cassette, (they're expected to drop in the New Year) which is a significant disincentive for the music lover who is effectively starting from scratch. A major influence over signal source priority will be how many LPs, tapes and CDs a person already owns. To replace even the key items of a large LP collection with CDs will cost a great deal of money.

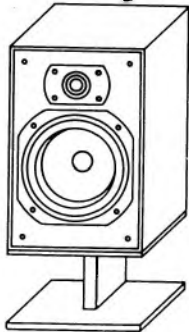


A MATTER OF PRECEDENCE

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).

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. Recently, 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, even though these are used all the time whatever the source. And such an argument applies just as strongly to those who wish to



record their LP records on to cassette, for convenience and use elsewhere.

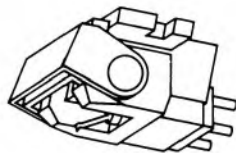
MAXIMISING POTENTIALS

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. Just lining the components up along a shelf or sideboard is a recipe for mediocrity, however much has been spent on the individual components themselves.

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. Though it is not really practical to move the walls around (and stud type walls behave differently from brick ones in any case), the odd strategically

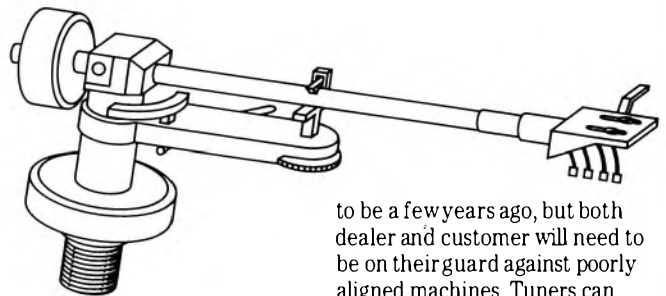
placed wall-hanging, say above a fireplace, can work wonders in removing an unpleasant 'flutter echo' effect, while a decent carpet is almost mandatory. 'Live' rooms are usually those that are sparsely furnished with hard wall coverings, so the overall live/dead acoustic balance can often be modified according to the furniture (or even the number of people) present.

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 will be designed to operate close to a rear wall, others a metre or so out into the room, but all loudspeakers seem to benefit from being closely



mechanically coupled *via* proper stands to the floor.

There is some debate about the best form of fixing, and in some instances the floor resonances themselves can become excited, particularly if a single concrete casting, and this may cause undesirable side-effects. However, adjustable spikes through to the floor proper or seated into the tops of cross-head screws are generally regarded as the best solution in most circumstances, and seem to give the best rigidity. Some speakers will work best with another set of spikes operating upwards into the loudspeaker itself, but small pieces of Blu-tack are a popular alternative. There is no need for paranoia about using spikes through normal pile carpets because the holes will be almost impossible to find when the stands are removed, but polished wooden floors do present a problem here,



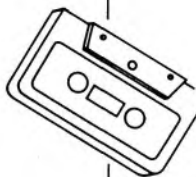
and hard plastic studs may be the only satisfactory solution.

Most decent quality turntables are fairly immune from feedback from loudspeakers, so it should not matter too much if these items are sited fairly close to each other. Indeed it is debatable whether any advantages gained from keeping the turntable well away are not lost through the need to use longer connecting cables. Turntables are usually susceptible to footfall shock, so one solution may be to use a wall bracket, but these do not sound as good as a floorstanding table as a rule. It may sound unlikely, but amplifiers and CD players (and presumably cassette decks too) can also benefit sonically from carefully stand- or bracket-mounting in a high quality system.

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.

Getting the best from a cassette deck is usually a question of making sure first of all that your deck does a decent job of replaying a good quality music cassette, and then finding out which tapes in the different price groupings give the best record/replay performance. The most common problem with cassette decks is in their alignment: matters are better than they used

to be a few years ago, but both dealer and customer will need to be on their guard against poorly aligned machines. Tuners can occasionally suffer similar problems, though this is even more unusual; most radio difficulties are likely to come from an inadequate or inappropriate aerial, after skimping on the less glamorous part of the budget. CD players have fewer consistency problems than analogue systems, though it is mildly ironic that they too seem to derive some sonic benefit from spiked stands or tables in a high quality system, and a poorly aligned machine may give poor disc tracking.



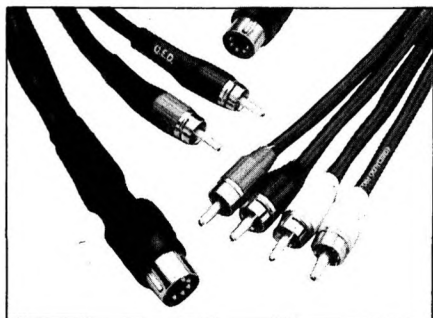
THE FINAL LINK

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, without trying to cram his own particular prejudices down your throat. To some extent the customer's task must be to discover for himself whether the dealer in question is competent or not. Membership of trade organisations like BADA can be a worthwhile pointer to a degree of professionalism, but the bottom line is whether the dealer in question can create a good sound in his own shop. If he can't, there is precious little chance of him doing so in your home. The best dealers should lay on demonstrations so you can hear the differences between components for yourself, and hear the sort of improvements which can be had at different price strata. You can then establish the sort of performance you are prepared to accept within whatever budgetary constraints you have set.

Proven Accessories

from QED

INCON Interconnect Cables



New technology cables using OXYGEN FREE HIGH CONDUCTIVITY copper conductors. HI-FI Answers (May 84) commenting on INCON "With INCON the sound was sweet, open, transparent, tuneful and very easy to follow. Both sonically and musically the QED cable transformed the sound."
Prices from £9.95 for a half metre pair of phono to phono cables or cable off the reel at £1.20 per metre.

QED 79 Strand The BEST BUY of Speaker Cables

Over 4 million metres of genuine QED 79 strand speaker cable has so far been sold, making it the most popular speaker cable ever produced. HI-FI Answers (Nov 82) concluded that, "Changing from bell wire or mains lead to QED 79 STRAND SPEAKER CABLE is the cheapest upgrade you will ever make."

PRICE
90p
per metre

A new addition for this season is a flat configuration 79 Strand cable (a profile of only 2.5mm). This makes it ideal for concealing under carpets.
£79 Price per metre £1.20.

NEW

Switching & Control



A full range of Amplifier, Speaker, Tape C.D. and Phono switching units together with Volume Controls and Headphone Adaptors. The range now includes a new 2 way Speaker Switching Unit (SSU2) which will accept QED 79 strand speaker cable and a new 4 way unit (UHSS4) that will accept Monster and C38 type cables.

PRICES FROM
£9.95

C.D. Switching Unit



A C.D. player needs a special input to work properly, but many (otherwise very good amplifiers) do not have such a dedicated C.D. input.

This need not be a problem with the QED COMPACT DISC SWITCHING UNIT, because not only does it switch between tuner and C.D. it also adjusts the level for optimum performance.

PRICE
£18.50

Input Expander



As the name suggests, the IX 4 is designed to expand both the 'tape' and 'line' inputs of a 'minimum facilities' pre-amplifier or integrated amplifier. Provision is made for the connection and control of two tape decks, with full record, playback and tape to tape functions, plus two line inputs. The line inputs are marked 'video' and 'aux/C.D.'

PRICE: IX-4
£39.95
IX-4 GOLD
£49.95

SDR SOUND DEFINITION RANGE

This year sees a whole new range of premium accessories from QED under the Sound Definition range banner. These products are designed to maintain the maximum possible signal integrity from input to output and features the following

- Full independent earth wiring.
- Switches with silver plated contacts.
- Non-Ferrous casework (aluminium) to avoid any sonically degrading electromagnetic effects.
- Professional quality gold plated phono sockets.
- Special 'gold' solder to ensure the best possible electrical joints.

QED Products are recommended by all leading manufacturers and importers of HiFi Equipment. They are available from around 1000 HiFi retailers throughout the U.K. Alternatively, order direct and we will despatch your order within 24 hours (subject to availability). Post and packing free*. All prices include V.A.T. @ 15%.

*Add 50p to orders under £5.00.

For technical and nearest dealer information ring 0784 246236

QED Audio Products Ltd., Unit 12, Ashford Industrial Estate, Shield Road, Ashford, Middlesex TW15 1AU.
North American Distributor: May Audio Marketing Ltd., 646, Guimond Blvd., Longueuil, QUE. J4G 1P8
Tel (514) 651-5707

A QED Accessory Catalogue is a must - send for yours now!

FOR MORE INFORMATION

Please send me your latest Catalogue No. 10 and the name of my nearest dealer.
I enclose a First Class stamp.

NAME _____

ADDRESS _____

POST CODE _____

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 the 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
Akai APA201 £80	Poor Average-	It 'lived down' to our expectations sounding 'dead' and 'smeared', with little depth and poor bass	Solid, auto return, direct drive, 5g P-mount		48
Alphason Sonata/HR-1DOS-MCS £645/£349	Excellent Very Good	Highly capable audiophile system with real resolution and control. Bass is powerful and dynamic ability unbridled	Manual, subchassis, belt drive, 10g	R	55
Ariston D-Deck £140	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	55
Ariston RD60 £219	Good Good	With the Enigma arm, this balanced and communicative turntable falls only slightly short of the RD90 on sound quality	Manual, belt drive, subchassis, 11.5g	BB	48
Ariston RD40 D/Enigma £388	Average+ Good	Worth considering for stylish appearance and decent performance, but undermined by RD60 in value for money terms	Man/electronic, belt drive, subchassis, 11.5g		48
Bang and Olufsen TX2 £288	Average+ Average+	Fully automatic, it can interface to B&O's remote control system, is attractively styled and even sounds respectable!	Automatic, belt drive, subchassis, 6g (B&O carts only)		48 (Summary)
Dual CS503-1 £125	Poor Average	Slated as a replacement for the CS505, the 503-1 needs careful system matching to mask rumble and microphony, but is good enough to benefit from a better cartridge	Semi auto, belt drive, low mass arm	R	55
Dual CS5000 £200	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
Heybrook TT2 turntable & arm £279/£249	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	55
Linn Axis £345	Good+ Good+	Setting new performance-for-price standards this cleverly engineered and competent deck has many of the qualities of the Sondek LP12	Electronic, belt drive, semi subchassis, 13g	BB	48/Coll
Linn Sondek/Ittok (Troika) £471/£399 (£625)	Excellent Excellent	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	Manual subchassis player, belt drive, 14g	R	55
Logic Tempo/Datum II £240	Good Good+	The general character is lively and exciting, if a little full, with solid, clear open midband, and good stereo staging	Manual/electronic, decoupled plinth, 15g	BB	48
Lux PD250 £167	Average Average	For the non-critical user who likes Lux styling and who requires a basic turntable	Semi automatic, direct drive, 10g		40
Manticore Mantra £300/£350 (Arm)	Good+ Good+	Fitted with a Rega RB250 arm variant and AT95E cartridge the Mantra fared very well indeed with a fine midrange and good focus	Subchassis, 12g, manual	BB	48/Coll
Mission 775LCT £200	Average+ Average+	Gives a tidy, coherent and well-integrated sound; a punchy performer if a bit bass light	Solid plinth, manual, 12g		40
NAD 5120 £90	Average Average-	Offering near hi-fi quality on a suspended sub-chassis deck fitted with an Ortofon OM10 cartridge can't be bad at this price	Semi-automatic, subchassis, 9g	BB	48
Oak/Moth £175	Average- Average-	Despite the excellent Moth tonearm, motor vibration on the Oak makes for a sonically poor performer	Solid, manual, 12g		48
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 'wellie'	Manual, solid, belt drive, unipivot, 11g		55
Rega Planar 2 £135	Average+ Good	A remarkable product at the price, surprisingly articulate and confident	Integrated turntable, manual, 11.5g	BB	48
Rega Planar 3 £188	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	Integrated turntable, manual, 11.5g	BB	48
Revox B291 £629	Average- Average-	Sound quality ranks as below average. Subjective bandwidth is narrow and the music lacks grace and energy. Ease of use however is unrivalled	Automatic, remote controllable, direct drive parallel arm, prefitted cartridge		55
Rotel RP-830 £160	Average Average	Reasonable sound, but nothing to get excited about. Bass quality not well integrated, but control OK; mid/top are fine	Manual, integrated, belt drive, solid, inc cartridge	R	55
Source/Odyssey RP1 From £1,884	Very Good	Mixed. The turntable has tremendous power and authority, but as tested suffered pitch imprecision. The arm is rather ill controlled and lacks resolution and focus	Manual, belt drive, subchassis, motor, outboard PSU, 15g		55
Systemdek II £139	Good+ Good	Rating above average for its price the II sounded open and clear, if a bit soft in the bass	Manual/electronic, belt drive, subchassis, 15g	BB	48
Systemdek IIX £139	Good+ Good	The more conventional appearance of the IIX has made it popular, performing competently, but essentially sounding similar to the II	Manual/electronic, subchassis, 15g	BB	48
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 DD33 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 TD280 £159	Average Average	Not impressive in the context of other Thorens models. The sound was considered lively if somewhat coarse and brash	Electronic, solid plinth, 12.5g		48
Thorens TD166III £179	Good Good	Old turntables never die, this revived 166 yet again takes its place near the top of its class	Auto lift, subchassis, 7g	BB	48

TO ORDER BACK ISSUES OF HI-FI CHOICE SEE PAGE 50

DIRECTORY

INTEGRATED TURNTABLES

NAME PRICE	LAB SOUND	COMMENTS	FEATURES ARM EFF. MASS	VALUE	BACK ISSUE FULL REVIEW
Thorens TD316 £219	Good Good	A competent, well built if not dynamic sounding machine, ably holding its own in its price category	Electronic, subchassis, 4.5g	R	48
Thorens TD320 £319	Good + Good	The top of the range and a solid performer providing a stable focused sound, and not critical of siting	Electronic, subchassis, 7g (available without arm)	R	48

MOTOR UNITS

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Ariston RD90 Superior £900	Good + Good	Good but slightly damped sound quality, with powerful and stable bass. The pro-pro is a certain lack of <i>pace, energy</i> and resolution	Belt drive, subchassis, electronic		55
Audio Labor Konstant £2,560	Good + + Very Good	The space-station-like solid alloy frame needs a substantial shelf, but absolute stability renders a confident, neutral sound	Belt drive, subchassis	R	48/Coll
Elite Rock £350	Good Good	Tight, tidy sounding player which works with a wide variety of (non-tangential) arms, giving almost CD like precision and clarity. Good bass depth, but dry balance	Manual, belt drive, solid, arm damping, various optional extras	R	55
Goldmund Studio £2,350	Very Good Excellent	A reference point for high end audio, only exceeded by the even more extravagant Reference. Currently being reworked into a more competitive(!) package	Electronic, direct drive, solid subchassis	R	Coll
Logic Gemini £700	Good Average +	Innovative twin-motor design but insufficiently developed. Rates good overall but sounds a bit slow and lacking authority	Subchassis, electronic		43
Michell Synchro £235	Good Good	A particularly happy blend of qualities endows the Synchro with a blend of subtlety and force – the mailed fist in the velvet glove. Easy on the ear in the best sense	Manual, belt drive, suspended motor unit	R	55
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
Pink Triangle PT T00 £539	Very Good Very Good	A substantial improvement on its predecessor, the T00's new outboard power supply and motor gave a neutral sound with fine depth and detail	Electronic, subchassis	R	48/Coll
Roksan Xerxes £335	Excellent Excellent	This unique design cuts a swathe through the conventions of turntable design, providing superb resolution and stereo. <i>Setting up is critical, and for experts only</i>	Manual, belt drive, solid/decoupled	R	55
SEE Revolver £127	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		43
Systemdek IV £148	Good + Good +	Clarity and definition in the midrange and treble were outstanding. It was better for firm support; less happy on floor tables	Electronic, belt drive subchassis	R	43
Thorens TD160S Mk IV £225	Average Average +	Good value suspended sub-chassis turntable which doesn't need specialist setting up, and which performs consistently and well. Bass is a little over-warm	Manual, belt drive, subchassis motor unit	R	55
Thorens TD521 £625	Average Average +	Nice product. Unexciting, rather undynamic and insubstantial sound quality, but facilities compensate	Manual, belt, suspended motor unit, 78rpm, pitch control, 12" arm/16" records		55

TONEARMS

NAME PRICE	LAB SOUND	COMMENTS	ARM EFF. MAS	VALUE	BACK ISSUE FULL REVIEW
Airtangent £1698	Very Good Very Good	This linear tracking air-bearing tonearm delivers the goods despite its extravagant price	7.5g (vert)	R	48/Coll
Alphason Opal £110	Good Average	This is a straightforward adequate sounding low cost arm, priced just above where it rightly belongs	10g		55
Alphason Delta £165	Good Average +	A highly competent design from Alphason gives good sound quality but with slight blurring and treble fizz	16g	R	48
Alphason Xenon £210	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 £395	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 AT1120 £132	Good Average +	This low effective mass (5g) arm suits fairly high compliance MM cartridges; gives pleasant tonal balance with good stereo imagery	5g		35
Decca International £49	Average + Average +	This uni-pivot design gives a rather rich tonal balance and some bass muddling. Could be good with Decca cartridges, but not well built	12g		48/Summary
Eminent Technology £960	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 £3850	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	Very expensive but with a performance that merits recommendation	12g	R	48
Kusma £349	Very Good Very Good	A classic performance: solid and dynamic with exceptional bass weight and speed, if a little 'untidy'	14.5g	R	48/Coll
Linn LV Plus £129	Good + Good	The fixed headshell provides an improvement over the LVX resulting in better clarity, detail and punch	13g	BB	48
Linn Ittok LVII £399	Very Good Very Good	Suitable for many turntables this top-quality arm performs best with the LP12, the combination exceeding the sum of both parts	13.5g	R	48/Coll
Logic Datum 2 £230	Very Good Good + +	Rated sonically very good with fine depth focus and transparency, good air and life, albeit slightly 'untidy'	15g	R	48/Coll
Mission Mechanic £600	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 £65	Good Good +	The ultimate budget arm? Refined, detailed, sweet and natural – performance improves in line with the rest of the system	12g	BB	55
Rega RB300 £90	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	48/Coll
SME 3009 Series III S £156	Good Average +	A simplified less flexible (as regards adjustment) Series III with a similarly 'soft' sonic character	5g		48

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

DIRECTORY

TO NEARMS

NAME PRICE	LAB SOUND	COMMENTS	ARM EFF. MAS	VALUE	BACK ISSUE FULL REVIEW
SME 3009 Series III £216	Good Average +	Comprehensively adjustable and very well made, suited to MM and high compliance MC cartridges	5g		48
SME 3009R £272	Average + Average +	A higher mass version of the Series III designed for low compliance MC cartridges	12g		48
SME Series IV £675	Excellent Very Good	Superb engineering and finish with a finely balanced sound giving impressive stereo focus and low coloration	10.5g	R	55
SME Series V £1138	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	48/Coil
Souther Tri-Quartz £850	Average Good	A unique parallel tracking arm that makes up for what it lacks sonically in its unusual appearance	3-4g		48
Well Tempered Arm £545	Good + + Good + +	The overall performance of this arm "grows" on the listener, justifying the possible mounting complications and radical styling	6.8g	R	48/Coil

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 AMP MATCHING	VALUE	BACK ISSUE FULL REVIEW
A&R C77 £20	Average + Average +	A sensible moving magnet package with good bounce at a competitive price	6-16g Normal	BB	48
A&R P77Mg £47.50	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	R	48
A&R E77Mg £57.50	Average Average	Our sample had a disappointing stylus, but gave a coherent, rich and laid back sound, with good 'scale'	3-8g Normal	R	48
ADC TRX1 £49.90	Average Average	Sounding bright and "tinkly" but with a rich bass this model may endear itself to those who like canaries and gongs. Now quite competitively priced	6-15g Normal		38
ADC TRX II £69.60	Average Average +	Comments like "fiercely exciting" treble and "plummy" bass made this cartridge seem overpriced, though price reductions now make it more competitive	6-15g Normal		38 (Summary)
Audionote 102VDH £795	Good Very Good	One of the best, giving "an extraordinarily relaxing midrange clarity". But it picked up a bit of surface noise and dust and needs a transformer	8-18g Very low (transformer)		43
Audioquest MCS £200	Average Average	Offers high-output benefits but the drooping frequency response and severe VTA error preclude recommendation	10-20g Normal		54
Audioquest 404BL £299	Average Average	Lateral stereo imaging is thwarted by huge VTA error and the meagre tracking margins do little to help. Sound quality is not competitive	8-20g Low		54
Audio Technica AT 105 £13.95	Average Average	Tight budget people may enjoy this cartridge whose "overall performance was very good for the price"	6-16g Normal		43
Audio Technica AT95E £14.95	Average - Average	Clear, dynamic if richly balanced, the magnetic '95E is a definite Best Buy	8-14g Normal	BB	48
Audio Technica AT 115E £27.95	Average Average	Clear and detailed sound quality although a bit on the "heavy" side. Sonically lagged the cheaper 110E!	5-16g Normal		43
Audio Technica AT3200XEI £42.95	Average + Average	This high output MC sounds better than it looks, with a decent 'laid back' sound quality	6-18g Normal	R	43
Audio Technica ATF30CC £70	Good Good	Slight generator asymmetry but low overall distortion and broad arm matching, plus a lively balanced sound	8-18g Low	BB	54
Audio Technica AT 140ML £99.95	Average Average	Pricy product this. Prefers low-medium mass arms and low capacitance loading, and is sonically unremarkable	6-12g Normal		43
Audio Technica ATF50CC £100	Average + Good	Decent output, good channel balance and a thoroughly refined sound sets the standard at £100	9-20g Low	BB	54
Audio Technica AT33ML £238.95	Average + Good	A little expensive but technically competent, and sonically pretty good; low output MC with rather garish gilt finish	6-16g Low		43
Audio Technica ATOC7 £245	Good + Good +	Technically and subjectively this cartridge represents a new dawn for AT, in the twilight of analogue audio	6-13g Low	R	54
Azden YM10VE £12.50	Average Average -	A good tracker. Sounds rather bunched-up but not totally incoherent – for very basic systems only	5-15g Normal		54
Azden GM1E £30	Average - Average -	Of academic interest only, this high o/p mc is seriously flawed in sonic terms	8-18g Low/normal		54
Azden GMP5L £99	Average + Average +	Although no P-mount system will do this cartridge justice, it can still be enjoyed in its universal mode. The subtle balance may prove irresistible to some	4-10g Low	R	54
B&O MMC5 £21	Average + Average	Cheapest in the family – smooth treble and good focus, but the bass was left in the wings	5-15g Normal		38 (Summary)
B&O MMC4 £33	Good Average +	Solid and well balanced in the midrange, the '4 lacks bass impact	5-15g Normal		48
B&O MMC3 £50	Good Average	Slightly "laid back" sound quality but a good performer for the price. Best suited to B&O equipment	5-15g Normal		48
B&O MMC2 £75	Good Average +	Only a modest improvement on its cheaper brothers (and sisters)	5-15g Normal		48
B&O MMC1 £97	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		48
Cello Chorale £799	Good Very Good	Looking like a piece of NASA gadgetry the Chorale's transparent treble delicacy was without equal. A serious audiophile choice	4-10g Low o/p	R	48/Coil
Clear Audio Gamma £285	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		54

TO ORDER BACK ISSUES OF HI-FI CHOICE SEE PAGE 50

DIRECTORY

CARTRIDGES

NAME PRICE	LAB SOUND	COMMENTS	ARM AMP MATCHING	VALUE	BACK ISSUE FULL REVIEW
Clear Audio Delta £450	Average + Good	Midway between the Gamma and exotic Pradikat, the Delta sounds like neither! Nevertheless, it delivers the goods	6-17g Low	R	54
Clear Audio Pradikat £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		Coil
Denon DL110 £60	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	BB	48
Denon DL160 £80	Average + Good	Although listeners just preferred the 110 its brother here proved a twin in lab tests and is still “thoroughly competent”	6-16g Low		43
Denon DL 103 £90	Average Good	This classic spherical stylus model gives a lively sound with powerful bass, and is popular in broadcast studios	6-16g Low	R	48
Dynavector DV-50X £60	Good Average	A high-output MC model with impressive lab performance, but whose tip and sound quality both disappointed	6-14g Normal		48
Dynavector DV10X IV £60	Average Average +	Fine sounding and realistically priced, damping is recommended to ensure successful tracking ability	8-18g R Normal	£	48
Dynavector DV23RS £150	Average + Good	Sound quality was described as “shut-in”, lacking energy and sparkle but with some “edginess” in high frequencies	10-22g Low		28
Glanz MFG 110EX £24	Average Average	A little bright but giving detailed bass and clear treble this was competitive at the price	6-16g Normal	R	Systems
Glanz GMC20E £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		48
Goldring Epic £18	Average – Average	An unpretentious “punchy” partner to a budget system, giving decent dynamics and focus	6-14g Normal	R	48
Goldring 1010 £33.95	Average + Average –	Listening results were a disappointment for a design which “looks right” in many respects	8-16g Normal		43
Goldring G1010 £34	Average Average	A bit fiddly to set-up but rewarding once accomplished. The big and bouncy sound belies its price Sensitive to amp loading	10-20g Normal	BB	54
Goldring 1020 £49.95	Average + Average –	This one strutted finely onto stage but couldn’t project to the “gods”	8-16g Normal		43
Goldring 1040 £74.95	Average + Average –	High frequency extension was improved by the van den Hul tip, nice looking model – no great actress	8-16g Normal		48
Goldring Eroica L £89	Average Average +	Open and relaxed sounding, the L version is just that bit more refined than its high output brother	7-18g Low	R	54
Goldring Electro II £135 complete	Average Average +	A pretty decent allrounder that did not excel sufficiently to warrant recommendation	8-16g Normal		43
Goldring Electro 111Z Boron £199 complete	Average Average +	Well balanced sound but lacking low frequency authority, midrange focus and “punch”	12-20g Low		38 (Summary)
Grace F9E II £240	Good Good	For lively presentation, excellent separation and generally satisfactory sonic delivery – consider this model	5-10g Normal		48
Grado XTE + 1 £20	Average – Average	Bass and treble are a trifle coloured but the midband proved highly enjoyable. Ideal for budget systems	6-13g (damping) Normal	R	54
Grado XF3E + £45	Average – Average	Downtilting balance disguises the brightness of this cartridge; bit of a mixed bag at this price	9-20g (damping) Normal		54
Highphonic MCA3 £320	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		43
Kiseki Blue Silver Spot £395	Average + Good	Solid performance from a very solid cartridge but lacks some of the magic of other Kisekis. Compliance too high	5-12g Low		54
Kiseki Purpleheart Sapphire £675	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		Collection
Koetsu Black K £550	Good + Good +	Impressive in scale and dynamics but with some criticism of bass muddling and high treble fizz. Listen before deciding	6-18g Low	R	48/Coil
Koetsu Red £835	Good + Very Good	Named like a rare, and perhaps dangerous, little oriental fish this famous cartridge sounded “almost larger than life”	10-25g Low	R	48/Coil
Linn Basik £18	Average – Average	This goes much further in delivering the goods than its price tag might indicate	6-14g Normal	BB	48/Systems
Linn K9 £69	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	BB	48/Coil
Linn Asaka £279	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	R	48/Coil
Linn Karma £435	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	R	48/Coil
Linn Troika £625	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		Coil
London Maroon £109	Poor Average +	Utterly different from other cartridges, the Maroon combines Heaven and Hell with good bass and midband but poor top-end control	8-16g + damping Normal		48
London Super Gold £248	Average – Good +	Sometimes a bit fierce in emphasising record surface faults, it is perhaps best at revealing the excitement and tension in music	8-20g + damping Normal	R	48/Coil
Madrigal Carnegie One £685	Average + Good	Looks like a duck but sounds much better, certainly worth auditioning. Compliance too high	5-11g Low		54
Milltek Aurora £198	Good + Good +	An overall feeling of relaxed ease characterised this clear and atmospheric Kiseki-built cartridge	8-16g Normal	R	48/Coil
Milltek Olympia £298	Average + Good +	Warm and detailed sound – packs the punch of the best m-cs with high output as a bonus	12-20g (damping) Normal	R	54
Mission 773HC £150	Good Good	A sufficiently well-balanced and competitively priced “old-timer” which still warrants recommendation	6-16g Low	R	38
Monster Alpha 2 £479	Good Good +	In the final analysis this fine allrounder is insufficiently exceptional in any specific respect to justify fully its high price	6-14g Low		Collection
NAD 9100 £12	Average – Average	Clearly a Best Buy model for rock music fans, opera and choral music lovers might do better to avoid its tracking (in)abilities	10-20g Normal	BB	38
NAD 9200 £26	Average – Average –	Although competent in many respects, overall the 9200 must be considered an undistinguished contender	6-19g Normal		28
Nagaoka mm4 £8	Average – Average –	Clear punchy sound that delivers the rudiments of a good performance	6-16g Normal	R	54

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

HI-FI CHOICE

Readership Survey Part Two

It is our policy to continually up-date and improve *Hi-Fi Choice* and to assist us in this we would like to know a little more about you and what you think of us. Please help us by taking a few minutes to fill in the form below.

THE MAGAZINE

1. Do you find the reviews:
Too technical _____
Not technical enough _____
Just right _____

2. Would you like to see:
More reviews _____
More features _____
You're happy with the balance _____

3. Which area of *Choice* do you find most interesting? Please mark in numerical order of importance

News _____
Show reports _____
Aspirations _____
Perspectives _____
Letters _____
Market Response _____
Competitions _____
Reviews _____
Directory _____

4. If you read other hi-fi magazines which other areas do you read avidly?

Music reviews:
Pop/Jazz _____
Classical _____
Sales and Wants classified sections _____
Artist Profiles _____

Other _____

5. Would you like to see more competitions in *Choice*?

Yes _____
No _____

6. How long have you been a reader of *Choice*?

Under a year _____
1-3 years _____
4-10 years _____
Over 10 years _____

7. Do you purchase *Choice* specifically to buy equipment? Yes No
If yes, how much do you intend to spend?

Up to £ _____

8. How many copies did you buy in the last year?

1-3 _____
4-6 _____

7-9 _____
10-12 _____
Only this one _____

9. Do you think *Choice* is good value for money? Yes No

10. How many people read your copy _____

ABOUT YOU

11. What age are you?

Under 18 _____
18-24 _____
25-34 _____
35-44 _____
45-54 _____
Over 55 _____

12. Sex:
Male _____
Female _____

13. What is your annual income?

Under £5,000 _____
£5,001-£7,500 _____
£7,501-£10,000 _____
£10,001-£13,000 _____
£13,001-£16,000 _____
£16,001-£20,000 _____
£20,001-£25,000 _____
Over £25,001 _____

14. What other pastimes, hobbies, sports etc do you enjoy?

SOFTWARE

15. Which software do you buy most frequently?

CDs _____
Vinyl _____
Cassette _____

16. Approximately how many of the following have you bought in the last year:

CDs 1-10 11-20 21-40 41-50 Over 51
Vinyl 1-10 11-20 21-40 41-50 Over 51
Cassettes 1-10 11-20 21-40 41-50 Over 51

YOUR HI-FI SYSTEM

17. How much did your current system cost?

Under £299 _____
£300-£499 _____
£500-£749 _____
£750-£999 _____
£1,000-£1,499 _____
£1,500-£1,999 _____
Over £2,000 _____

18. Where did you purchase your system?

Department store _____
High Street chain _____
Discount warehouse _____
Specialist hi-fi dealer _____
Second hand _____

19. How long is it since you last bought some hi-fi equipment?

1-2 years _____
2-3 years _____
3-5 years _____
Over 5 years _____

20. Which of the following items do you already have in your system?

Turntable with arm _____
Turntable with separate arm _____
Integrated Amplifier _____
Pre/power amp combination _____
Tuner _____
Cassette deck (single) _____
Cassette deck (double) _____
Compact disc player _____
Loudspeakers _____
Loudspeaker stands _____
Specialist cable _____
Headphones _____
Walkman _____

21. Which items do you intend to update this year?

Turntable _____
Arm _____
Cartridge _____
Amplifier _____
CD Player _____
Cassette Deck _____
Tuner _____
Loudspeakers _____
Stands _____
Cables _____

22. Which kind of music do you listen to most frequently?

Classical _____
Rock _____
Jazz/funk _____
Pop _____
Country _____
Soul _____
Reggae _____
Folk _____
MOR/Light _____

All information will be treated in strictest confidence.

NAME _____

ADDRESS _____

**THANK YOU FOR HELPING US WITH OUR SURVEY
NOW PLEASE CAREFULLY TEAR OUT THIS PAGE,
FOLD AS INDICATED AND SEND IT OFF TO US (no
stamp required).**

Fold One

Fold Two

NO STAMP
NEEDED
IF POSTED
IN THE UK

HI-FI CHOICE
FREEPOST 7
London W1E 4EZ

Fold Three and Tuck In

DIRECTORY

CARTRIDGES

NAME PRICE	LAB SOUND	COMMENTS	ARM AMP MATCHING	VALUE	BACK ISSUE FULL REVIEW
Nagaoka MP10 £17	Average Average	High frequencies sounded "shut-in" with this spherical-stylus model, but mid and bass were energetic, bouncy and punchy	5-13g Normal	R	48
Nagaoka MP11 Boron £38	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	BB	48
Nagaoka MP10SB £40	Average Average+	Stilton's mods have improved the fine detail resolution of this popular budget model	5-15g Normal	R	54
Nagaoka MP11 Gold £45	Average- Average+	There were mild criticisms directed at most areas, but in general the sound was clear, open and even	3-8g Normal	R	48
Nagaoka MP11 Gold SB £70	Average- Average	Excessive price loading for a blob of aluminium	2-6g Normal		54
Ortofon VMS5E II £14	Average Average	Sound quality was thought fair for the price, though a little 'untidy'	8-18g Normal		38 (Summary)
Ortofon DM5E £16	Average- Average-	The DM10 is a hi-fi cartridge – the DM5E is not	5-16g Normal		43
Ortofon DM10 £21	Average Average	One of the leading "cheapies", this gives a fine level of sound quality for the price, with good matching compatibility	5-15g Normal	BB	48
Ortofon VMS 10E II £21	Average- Average-	Some of its stablemates fared rather better, and showed less evidence of tracking problems to boot	Normal		38
Ortofon VMS20E II £35	Average Average	One of the most popular cartridges ever, sound quality was a bit laid-back and tracking could have been better	3-10g Normal		48
Ortofon DM20 £45	Average Average+	This turned out to be the listening panel's favourite among Ortofon's moving magnet models	5-16g Normal	R	48
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		48
Ortofon VMS30E II £52	Average+ Average	Rather an old soldier in relation to turntable technology, it will perform undemandingly in demanding circumstances	5-13g Normal		38
Ortofon MC10 Super £65	Average Good	"What a delightfully sweet-sounding cartridge this is..." we said	5-15g Low	BB	48
Ortofon DM40 £75	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		48
Ortofon X3 £75	Average Average	A lack of bass power, definition and a "zitty" top end makes this competent but uninviting	5-15g Normal		48
Ortofon MC20 Super £180	Average+ Good+	An "inviting" sound quality, polite rather than exciting it approaches much more expensive models, but does not better them	6-15g Low	R	48/Coil
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		Coil
Ortofon MC2000 £450	Very Good Good+	There are few grounds on which to fault the MC2000, but extremely low output means the expense and aggravation of a transformer	5-10g Very low (transformer)		38
RATA RP20 £22	Average- Average	Good integration, a clear dynamic midrange and the beginnings of fine stereo imagery merits clear recommendation	6-14g	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	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's stylus	6-14g Normal		43
Rega RB100 £38	Average Average+	Remarkable mechanical performance in the right system context, but "try before you buy"	5-12g Normal	R	48
Shure M92E £15	Average- Average	Though lacking depth, the overall sound quality was competent, but treble was not its forte	10-15g Normal		43
Shure M99E £24	Average- Average-	Sister to the 92E this is a solid but not particularly exciting cartridge	5-10g Normal		38 (Summary)
Shure ME75ED £24	Average Average-	Rather bright and splashy in the high frequencies but nevertheless a competent model	5-10g Normal		38
Shure M104E £32	Average- Average	Capable in many ways, but giving no substantial improvement over the 92E in our view	5-15g Normal		38
Shure ME97HE £43.95	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	R	48
Shure M105E £45	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		38 (Summary)
Shure M110HE £55	Average Average	Sound quality was thought eminently presentable, but not exciting, smooth clear high frequencies, but a loss of bass definition	5-10g Normal		38 (Summary)
Shure M111HE £67	Average Average	Early reviews of this cartridge complained principally of the price – which has since come down	5-10g Normal		38 (Summary)
Shure ML120HE £95	Average+ Average+	Quite decent sound quality and a generally fine balanced performance	6-18g Normal		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		43
Shure V15 VMR £195	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		38
Shure Ultra 500 £452	Good Good	There was no doubting the accomplishments of what could well be the finest moving magnet cartridge around	6-14g Normal		48
Supex SM100E £115	Average Average+	Delivers as much musical information as many moving coils – the bass in particular having an attractive bounce	6-15g Normal		38
Supex SD900IV £350	Average+ Good+	The 900 is an inherently fine cartridge, but despite a recent update it is beginning to show its age	10-18g Low		48/Coil
Supex SD901IV £375	Average+ Good+	This high output model delivered sufficient subjective and objective performance, plus good compatibility, to justify its price tag	8-18g Normal	R	48
Supex SDX2000 £651 L £721 H	Good Good+	The high-o/p 2000 was preferred on listening tests to the low-o/p model, which even so has a unique place among the top designs	6-16g Either		48
Van Den Hul MC10 £699	Good Good+	A neutral balanced performer giving transparent midrange, fine depth and focus with firm extended bass Gosh!	5-10g Low	R	48/Coil
Van Den Hul MC One £799	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	R	48/Coil

TO ORDER BACK ISSUES OF HI-FI CHOICE SEE PAGE 50



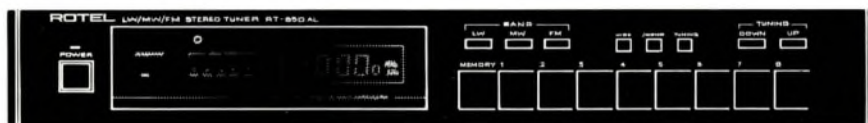
RC850 STEREO CONTROL AMPLIFIER



RB850 50W STEREO POWER AMPLIFIER

The connoisseur's choice. Incorporating much of the UK technology of the famous "BX" series amplifiers: Large well engineered power supplies ● High current capability ● Selected close tolerance high quality components ● Low noise integrated circuits ● Dual mono construction of the power amplifier ● Direct speaker wiring ● No degrading protection circuitry ● High quality phono stages ● Direct signal paths.

Technical features which combine to give music a sense of weight and effortlessness that smaller amplifiers can only aspire to. The twin box construction offers enormous flexibility in system building and the ability to run two power amplifiers either in bridged mode (150W per ch.) or to B1-amp loudspeakers. Higher power requirements can be achieved with Rotel's new RB8708X 100W and RB890 160W power amplifiers which are also bridgeable to provide 300W or 480W per ch. respectively.



RT850AL LW.MW.FM STEREO TUNER

The definitive tuner is its class. UK designed to provide very high standards of radio performance and music quality with the convenience of push button tuning and 16 preset stations. Winner of the "Best Buy" Award from Hi-Fi Choice and now winner of What Hi-Fi?'s prestigious Award for Best Tuner of 1988, the RT850L has now been restyled to match Rotel's new appearance design and also now features LED station indicators. Also available is the more affordable RT830AL Analogue Tuner, offering the same performance.



RCD820BX2 DIGITAL STEREO COMPACT DISC PLAYER

The very latest 16 bit 4 times oversampling technology combine with Rotel's own UK product development expertise to provide a C.D. signal source of fine resolution, definition and musical performance. With full numeric remote control, programming and full feature display the RCD820BX2 offers fine value. This special "BX" version incorporates additional UK designed circuitry and separate regulated power supplies effectively removing the digital hash from the audio circuits resulting in a cleaner audio signal with much improved dynamics and definition.

These fine components are but a small selection from Rotel's award winning range of real Hi-Fi products which offer very high standards of technical performance and musical enjoyment. All are based upon Rotel's UK balanced design concept which ensures that within the resources available, each aspect of the products design has been optimised. To find out why Rotel has now received What Hi-Fi?'s prestigious awards for 1988 for Best Turntable, Best Radio Tuner, Best Loudspeaker and Best Hi-Fi System (amplifier - Tuner - C.D. Player - Loudspeakers) call Rotel for details of your nearest dealer.

UK DESIGN & DEVELOPMENT

ROTEL® *hi-fi*

DIRECTORY

AMPLIFIERS

The amplifier sits at the heart of the system, processing the outputs from all the various music sources as necessary and then driving the loudspeakers. These two (quite separate) functions are integrated into a single box at the low-to-middle price points, separated pre- and power amplifiers become increasingly common as one moves upmarket. At the upper end of the specialist market, valve amplifiers provide a popular alternative to the transistor types amongst enthusiasts.

There is a substantial difference between specialist (sound quality oriented) amplifiers and the consumer electronics style models. The former

are bleakly simple, avoiding all unnecessary features to provide the most direct signal path in the interests of best sound quality. The latter range from models with just basic tone controls and tape recorder switching, to those with elaborate facilities such as graphic equalisers, remote control (including volume), surround sound options etc. etc.

Lab measurement provides some useful data, particularly in regard to an amplifier's ability to drive a wide range of different types of loudspeakers, but this is only obliquely related to sound quality. We also include our measured power output (RMS, 8ohm load, 1 channel driven) – but

again, paradoxically, this doesn't necessarily correspond to the loudness capability of the amplifier, which has as much to do with the elegance of the overload characteristics within a given system (valve amplifiers invariably sound more powerful than their rating would suggest). The listing of **features** provides some indication to the complexity of an amplifier: many users prefer to retain the option of tone controls to 'shape' the overall sound according to taste, many others have found living without tone controls surprisingly easy, with additional benefits in terms of transparency.

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
A&R Arcam Alpha £149.90	Average+ Fair	This good all-rounder sounds musical if slightly softened. Good build and presentation	5 inputs hdph MM/MC tone controls 30W	R	50
A&R Arcam Delta 90 £329.90	Good Fair	Well balanced and sweet-natured in any given system with MC capability, but pricey	70W MM/MC 5 inputs tone controls		50
Albarré M408 II £595 pr	Good+ Good+	Unusually styled transistor monoblok power amplifiers reintroduced with improved performance and sound quality. Needs good warm-up for best sweetness and clarity	40W Power amp only	R	56
Audio Research SP9 £1700	Very Good Very Good	This new high performance valve FET hybrid preamplifier sets a high standard for versatility, build quality and sound	5 inputs, MM/MC	R	57
Audio Research SP8 £1998	Very Good Good+	The sound from this valve pre-amp was good enough to do justice to the finest ancillaries	5 inputs MM	R	39
Audio Research M100 £2850 each	Good+ Excellent	These high end valve monoblok power amps justify their cost by providing near state of the art sound quality. Our reviewer was so excited he bought them	100W	R	50
Audio Research SP11 £5250	Very Good Excellent	Current state of the valve pre-amp art. A reference point	Straight line MM/MC Disc + phase invert	R	50
Audiolab 8000C £300	Very Good Good+	Bettering the high standard set by the integrated 8000A this pre-amp sounds more tidy and refined, if a little clinical and cold	5 inputs MM/MC Disc hdph tone controls	R	50
Audiolab 8000A £325	Very Good Good+	A strong contender using high grade circuitry and providing good sound quality on all inputs. Hard to fault at the price	5 inputs MM/MC disc 50W hdph tone controls	BB	50
Audiolab 8000P £465	Very Good Good+	A gutsy performer providing high levels into both 8 and 4ohm loads. A power amp to keep the competition worried	100W	R	50
Beard P35 £695	Good Good+	A superbly built and engagingly rhythmic valve power amp, sounding sweet and slightly soft in the classic valve style	35W	R	50
Beard 506 £995	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	R	50
Beard M70 £1595 pair	Good Good+	A substantial British monoblok power amplifier, but not a great deal more impressive than the P35 at half the price	70W	R	50
Burmester 838 £1490	Very Good Good	A disc-only minimalist pre-amp, strong points include excellent build, extreme neutrality, dry clean bass and notably sharp stereo focusing	MC only, MM option		Collection
Burmester 846 £1599	Very Good Good+	Usually coupled with the 838 this high-level pre-amp provides many and versatile input facilities	6 inputs	R	Collection
Burmester 850 £3995	Good+ Good	Each of these mono power amplifiers contains separate high current 25W amps giving a refined coherent sound over most of the frequency range	100W	R	Collection
Cambridge Audio P40 £200	Good Good+	A very fine sounding integrated amplifier with simple facilities and MC cartridge capability	5 inputs 40W MM/MC straight line	BB	50
Cambridge Audio C75 £279	Good+ Good+	Whilst not quite on par with its A75 companion this pre-amp provided excellent stereo imagery but was a touch "heavy" in character	MM/MC disc	R	50
Cambridge Audio A75 £299	Very Good Very Good	This strong power amplifier sounded open and effortless, with fine bass drive and dynamics, albeit a touch grainy and harsh at high frequencies	100W	R	50
Cello Audio Suite £6000+	Excellent V Good/Excellent	Cello's pre-amp represents a whole new ball game in flexibility and sound quality (or war of attrition on your wallet)	Optional inputs MC etc	R	50
Conrad Johnson P+7 £799	Very Good Good	This beautifully finished quality preamplifier performed well, delivering a musically relaxed sound though not offering especial value for money	5 inputs, MM disc		57
Conrad Johnson MV50 £1795	Good+ Good+	Coupled with the PV5, this CJ power amp performed well on audition	50W	R	Coll
Conrad Johnson PV5 £2010	Good+ Good+	The PV5 is a classy sounding valve pre-amp, and natural partner to the MV50	5 inputs MM	R	Coll
Conrad Johnson Motif MC-8 £2500	Very Good Very Good	A cheaper alternative to the '7, this pre-amp is an undoubted success in maintaining the Motif sound but does not compare on sound quality	MM/MC	R	50
Conrad Johnson Premier Three £3775	Good+ Very Good	The Three is a musically accurate and graceful pre-amp which proved versatile on a wide range of inputs	5 inputs MM/MC		Coll
Conrad Johnson Premier Four £3900	Good+ Very Good	Ambience was the Four's forte – this power amp proved exceptionally revealing of instrumental locations	100W		Coll
Copland Pre and power amps £649 each	Good+ Fair	At £649 each this simple Danish valve pre/power combination is expensive, though the power amplifier sounds very easy on the ear	3 inputs MM, 12W		50
Counterpoint SA7 £747	Average+ Good	Simple valve Californian pre-amp offering inspiring transparency for the price	4 inputs straight line MM/MC	R	Coll
Counterpoint SA12 £1250	Good+ Good+	A real power-house power amp, beefy and load-tolerant although like the SA7 a trifle untidy at frequency extremes	100W	R	Coll
Creek 4040 £145	Average+ Fair	This simple integrated model had a controversial sound, liked by some, plus an acceptable lab performance	4 inputs MM 12W	R	50
Creek CAS 4140 £199	Good+ Good	Redesigned for '88, this is a fine allrounder with good moving-coil input, plain presentation	40W MM/MC 3 line inputs	BB	56
Croft Micro £150	Average+ Good	A real upsetter, this excellent valve pre-amp put the cat among the pigeons proving good sounds can be made at budget price levels	4 inputs MM straight line	R	Coll
Croft Super Micro A £500	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) £730	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

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

SOUNDSTYLE

AND



RA820A INTEGRATED STEREO AMPLIFIER

Latest in the famous 820 series amplifiers from Rotel, offering dynamic power far in excess of its conservative 30 watt rating. The RA820A has benefited substantially from Rotel's UK product development programme with significant improvements to sound quality, useful features and improved appearance design to match Rotel's new product line. First choice for many on the road to serious sound reproduction.



RT830AL LW.MW.FM. STEREO TUNER

The thinking man's affordable tuner; where its modest looks and operating simplicity belie the sophisticated circuitry employed to produce an unusually open and musical sound. In its latest guise, the new appearance design RT830AL takes over from the critically acclaimed RT830L. Also available is the RT850AL offering digital tuning with 16 preset stations.



RCD820B DIGITAL STEREO COMPACT DISC PLAYER

The very latest 16 bit 4 times oversampling technology combine with Rotel's own UK product development expertise to provide a C.D. signal source of fine resolution, definition and musical performance. With full numeric remote control, programming and full feature display the RCD820B offers fine value and is easy to use. For the more adventurous the RCD820BX2 provides the music lover and enthusiast alike, with stunning performance whilst remaining eminently affordable.



RL850/II LOUSPEAKERS

These modestly sized loudspeakers offer an unusually high musical performance for their cost. In its latest form, the RL850/II benefits from an improved tweeter and crossover which have further refined its performance. With black ash finish and complete with black cloth grills (shown here without grills) they blend into any room environment. Possibly the most acclaimed loudspeaker in the UK today. (Recipient of Hi-Fi Choice's Best Buy Award for the last four years, as part of Rotel's Best system Award from What Hi-Fi? for the past four years, and now winner of What Hi-Fi?'s prestigious award for Best Loudspeaker of the Year for 1988.)



These fine components are but a small selection from Rotel's award winning range of real Hi-Fi products which offer very high standards of technical performance and musical enjoyment. All are based upon Rotel's UK balanced design concept which ensures that within the resources available, each aspect of the products design has been optimised. To find out why Rotel has now received What Hi-Fi?'s prestigious awards for 1988 for Best Turntable, Best Radio Tuner, Best Loudspeaker and Best Hi-Fi System (amplifier - Tuner - C.D. Player - Loudspeakers) call Rotel for details of your nearest dealer.

UK DESIGN & DEVELOPMENT

ROTEL[®] hiFi

25 HEATHFIELD, STACEY BUSHES, MILTON KEYNES, MK12 6HR. TEL: (0908) 317707

DIRECTORY

AMPLIFIERS

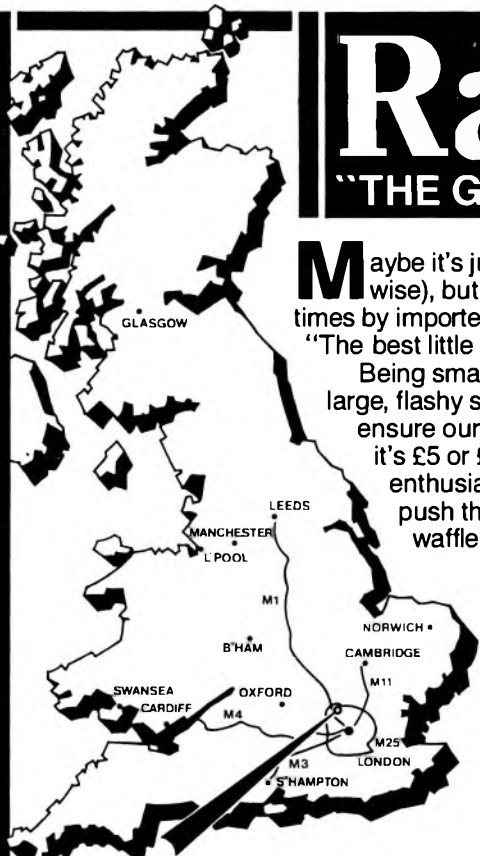
NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Croft Series IVSA £1000	Good Very Good	Featuring tuned components chosen for their sound quality, the 'A' variant is an impressive example of Croft's technique in valve design	60W special supply regulation	R	57
DBX CX3/DX3 £1500	Good Fairly Good	Versatile separates majoring on 4-channel surround sound and high power. Garish presentation and unexceptional sound	125W MM/MC 7 inputs, tone, 4-channel surround		56
Deltec DPA 10DS £1900	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-250 £125	Good Fair	As a "budget-plus" integrated amplifier the '250 gave an open sound with lively dynamics and should appeal to a wide range of tastes	30W MM hdph	R	50
DNM 3 £1000	Good+ Good+	The DNM3 in its acrylic case is a remarkably revealing and neutral state of the art pre-amp	5 inputs MM/MC twin vol controls	R	44
Exposure VIII £310	Very Good Good+	This power amplifier created a good impression of speed and power, but was a trifle fierce in the treble	50W	R	50
Exposure VII £340	Very Good Good	A double mono transistor pre-amp with a notably dynamic and punchy character, though not suited to all tastes	3 inputs MM/MC	R	50
Grant G6DAMS £948 pr	Good Very Good	This neat and compact 60W valve monoblok gave good sound on the 8ohm tap, better still on 4ohms. The midrange was particularly natural	60W monobloks 41 8ohms	R	57
Hafner DH12D kit form £295	Fair	We didn't build one; see below	60W		44
Hafner DH12D 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		44
Harman Kardon 640 Vxi £225	Good+ Good	Moderately priced but built to HK's high standards, good value and good load tolerance	50W MM, 5 line inputs tone controls	R	56
Harman Kardon 655 Vxi £449	Very Good Good	Plenty of well built integrated amplifier for the money, with lots of power to drive almost anything, plus versatile inputs	100W MM/MC 6 line inputs tone controls	R	56
Hitachi D07 £299	Good+ Fair	Decent but unexceptional performance and sound quality, plus good facilities; represents a worthwhile improvement from Hitachi	75W MM 6 line inputs tone controls		56
Inca Tech Dirk £215	Good+ Good+	This tiny, minimalist model is effectively a power amplifier with volume control, providing inputs for CD player and tape recorder but not tuner!	50W, 2 line inputs, straight line		56
Inca Tech Claymore £345	Good+ Good+	Limited facilities but a strong, clear, well-focused sound results in auspicious Choice debut for this relatively young company	50W MM/MC 3 line inputs straight line	R	56
IVC AX-22 £110	Average Poor	Serves a market that buys on features rather than sound quality. Includes special "flashing light" power meter	55W MM tone controls		50
Kenwood KA-55D £130	Good Fair	Decent sound quality and build at an affordable price, it also has a capable moving coil input - something of a rarity among the competition	40W ndph Tone controls MM/MC	R	50
Krell PAM5 £1589	Very Good Good	Superbly built, the Pam 5 pre-amp gave good definition throughout the frequency range with a good measure of excitement	MM/MC	R	50
Krell KSA50 Mk2 £2540	Very Good Good+	This power amp still holds its own with good depth and ambience and excellent stereo focus	50W	R	50
Krell KMA-100 II £5996 pr	Excellent Excellent	A genuine reference standard power amp, capable of justifying a wildly extravagant price tag in an appropriate system	100W, Monoblok	R	Coll
Le Tube £585	Good+ Good	If moving coil sensitivity is not required then this pre-amplifier will offer a clean view with very good stereo	3 inputs MM	R	44
Linn LK2 £373	Good+ Fair	This pre-amp was marginally less successful than the LK1 but the pair (of Linns) worked well together and are well worth considering	5 inputs MM/MC		50
Linn LK1 £425	Good+ Fair	A durable tolerant power amp, setting a respectable standard on both lab test and audition	60W		50
Linx Stratos £999	Good+ Good	Facing strong competition in the UK this New Zealand pre-/power combination gives good sound quality... but not exceptional at the price	120W MM/MC straight line		50
Luxman LV100 £205	Good Fair	Nicely finished modern integrated amplifier, generally competent though not exceptional	45W MM 4 line inputs tone controls		56
Luxman LV-105 £599	Very Good Fair	Superbly finished and built, in a sense this model managed to capture the "valve" sound with an easy musical quality and good bass register	85W MM/MC		44
Lux LV105u £635	Very Good Good	This very well equipped and beautifully finished Japanese integrated amplifier has two valves in the early section of the power amplifier. Pleasant and musical it sets no value for money record here	9 inputs 80W, MM/MC tone controls		57
Magnum A100 £1995 pair	Good+ Good+	Given their massive power rating a pair of A100's make a fine stereo power amp, ideal for high levels and with a wide dynamic range for digital programme	320W	R	50
Marantz PM26 £110	Average Poor	Well built and attractively presented this just manages recommendation, though sonically falling somewhat short of the best examples of its type	30W MM sliding tone controls	R	50
Marantz PM35 £160	Very Good Good	This new generation Marantz is a good allrounder, and shows that extra care is being taken over sound quality; well equipped and versatile	45W MM/MC 3 line inputs tone controls	R	56
Marantz PM45 £200	Good+ Fair	Generally pleasant and polite with above average clarity; there was some softening in the bass, restricting dynamic output somewhat	40W MM/MC tone controls	R	50
Meridian 201/205 £550/£395 each	Very Good Good+	A fine pre-amp 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	56
Mission Cyrus One £150	Good Good	A reference standard amplifier for its price category the Cyrus 1 attained a high sonic standard. A stylish, neutral performer	5 inputs MM - medium MC 30W straight line	BB	50
Mission Cyrus Two £300	Good+ Good+	A significant improvement on the already competent 'One, the 'Two remained neutral and confident over the whole frequency range	50W 5 inputs MM/MC Disc straight line	BB	50
Mission Cyrus Two with PSX £500	Good+ Good+	Although making the 'Two more powerful, the PSX power supply does not offer significantly better sound quality	A power supply, see above		50
Musical Fidelity A1 £249	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
Musical Fidelity B200 £299	Very Good Good+	Running cooler than other MF's, the B200 delivered fine musical and dynamic sounds with plenty of power	80W MM/MC 4 line inputs straight line	BB	56
Musical Fidelity A100 £439	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	56
Musical Fidelity Pre 3/P140 £299/£299	Very Good Very Good	Delivering true audiophile sound quality well ahead of their price, both components shine in their own right	70W MM/MC 4 line inputs straight line	R	56
Musical Fidelity P170 £499	Very Good Very Good	Acquitted itself well, later samples showing steadily increasing refinements	85W	R	50

TO ORDER BACK ISSUES OF HI-FI CHOICE SEE PAGE 50

Radlett Audio

"THE GREATEST LITTLE SHOP IN THE COUNTRY"

CONSULTANTS



Radlett Audio Consultants
141 Watling Street, Radlett, Herts.
09276-6497

Maybe it's just an opinion (we're too modest to suggest otherwise), but during our 10 years here we have been told many times by importers, manufacturers and customers, that we are "The best little shop in the country."

Being small has advantages. Without the vast overheads of a large, flashy shop, we can devote as much time as it takes to ensure our customers get the best for their money, whether it's £5 or £5,000. Furthermore, we are all knowledgeable enthusiasts (not salesmen on commission) with no need to push the most profitable lines. And we never rush, hassle or waffle—we like to keep our customers as friends.

Our demonstration studio is furnished as a sitting room, but stocked with one of the finest ranges of Hi-Fi in the country. Each and every item is ruthlessly chosen for its sound quality, performance, reliability and value. If it's worth having, we probably stock it and would be delighted to demonstrate why. So, give us a ring or drop in—you'll be very glad you did.

We stock fine equipment from:—
LINN PRODUCTS • REGA • PROAC • AUDIO RESEARCH • CROFT
• AUDIO INNOVATIONS • COUNTERPOINT • KOETSU • CREEK •
AUDIOLAB • VTL • VOYD • J.A. MICHELL • EPOS • KRELL • QUAD
• SNELL • SD ACOUSTICS • MAGNEPAN • ORACLE • ELITE •
PINK Δ • HEYBROOK • MUSICAL FIDELITY • SME • HELIUS •
TANNOY • DENON • B+W • KEF • A+R • CAMBRIDGE • YAMAHA
• MONITOR AUDIO



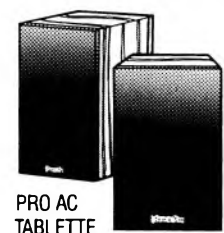
LINN LP 12



AUDIO RESEARCH D70



KOETSU RED



PRO AC
TABLETTE

ALL YOU NEED IS IN ESSEX JUST OFF THE M25

Over 300 Separates & Systems in Stock
Extensive Range of Hi-Fi Accessories

- | | | |
|-----------------------|---------|-------|
| Alphason | Ariston | AR |
| British Loudspeakers | Castle | B&W |
| Cambridge Audio | Cemac | Bose |
| Citation | Denon | Dual |
| Elite Rock | Logic | Gale |
| Goodmans | Luxman | JBL |
| Harman/Kardon | Onkyo | NAD |
| Infinity Loudspeakers | Proton | QED |
| Manticore | Rotel | Quad |
| Kenwood | Ruark | Teac |
| Marantz | Sansui | Trio |
| Mordaunt-Short | Tannoy | ADC |
| Musical Fidelity | Yamaha | AKG |
| Nakamichi | Chord | Beyer |
| Philips (CD) | Decca | DNM |
| Revolver | Jecklin | Glanz |
| Spendor | Kiseki | Grado |
| Thorens | Maxell | Hunt |
| Wharfedale | Miltek | Koss |
| Avance Loudspeakers | Nagaoka | MDM |
| Audio Technica | Ortofon | Rata |
| Foundation | Target | Ross |
| Goldring | Tiffany | Shure |
| Sennheiser | Vecteur | TDK |
| Van den hul | | |

BRENTWOOD MUSIC & HI-FI CENTRE

Ground & First Floor
2 Ingrave Road, Brentwood, Essex
Corner of Brentwood High Street and Ingrave Road (A128)
Tel: (0277) 221210
Shop & Home demonstrations
On-site customer parking by appointment

WEST MIDLANDS AUDIO HI-FI CONSULTANTS



Nakamichi CR-4E

- Rotel • Inca Tech • Harman Kardon • Denon • SME • KEF •
Koetsu • Ortofon • etc . . .

158 Ombersley Rd., Worcester, WR3 7HA
OPEN 9.30 am to 8.30 pm

Tel: WORCESTER (0905) 58046

DIRECTORY

AMPLIFIERS

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Musical Fidelity MVT Mk 3 £1199	Very Good Excellent	The MVT pre-amp was "simply a knockout in its class", providing competition for £2000-plus amplifier systems	MM/MC 5 inputs	R	50
Musical Fidelity P270 £1199	Very Good Excellent	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
Musical Fidelity A370 £2199	Very Good Excellent	Arguably the finest sounding power-amplifier manufactured in the UK	185W	R	50
Myst TMA3 £288	Very Good Fair	This excellently-constructed, no-frills, dependable amplifier should offer long life with above average sound quality	35W MM/MC 4 inputs		50
NAD 3020e £110	Good Fair	A little light in balance and "weight" but superior to run-of-the-mill budget amplifiers	20W MM/MC 4 inputs	BB	50
NAD 2200 £339	Good ++ Fair	Not recommended on grounds of sound quality, but worth serious consideration for its exceptional power output	100W		44
Naim NAIT £258	Average + Fair	Well built with good load tolerance the NAIT delivered a fully competitive sound in spite of its modest measured power output	15W pc MM 3 inputs	R	50
Naim NAC 32 £425	Very Good Good	A natural partner to the Naim power-amps, with power supply options offering a spread of sound quality at different prices	MM/MC, 5 inputs	R	50
Naim NAP 250 £966	Very Good Good	Well-matched to the Naim pre-amps, and capable of high quality sound levels over the whole dynamic range	70W	R	50
Nakamichi CA7E/PATE £2500/£1700	Very good Good/Good+	Exceptional build and finish, plus good general performance, remote control and versatility, but expensive	200W MM/MC 6 line inputs, remote, tone controls		56
Nikko NA700 £189	Good ++ Poor	Disappointing sound quality at an above budget price. Inescapably old fashioned	60W MM/MC 4 line inputs tone filters		56
Nuance £795	Very Good Good	A subtle civilised pre-amp though a little lacking in resolution and detail; suited to some tastes but not top-drawer	4 inputs MC	R	50
Orell SA-D40 £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
Pereaux SA3 £690	Very Good Fair	This exotic New Zealand-built pre-amp did not really offer the sort of sound quality expected at the price	4 inputs MM/MC		44
Perreux 1850 £990	Very Good Fair	This power amp's musical qualities were disappointing, though powerfully delivered. Build and finish were exemplary	180W		44
Philips FA860 £249	Very Good Fair	Well balanced model from Philips' Japanese factory, with versatility, good build and finish	70W MM/MC 5 line inputs tone controls		56
Philips FA960 £299	Very Good Good	Japanese built high quality integrated model with versatile features and plenty of power	110W MM/MC 8 line inputs tone controls		56
Pioneer A331 £150	Good ++ Fair	A new face for Pioneer, with improved standards of sound quality and value alongside traditional strengths of build and finish	50W MM 4 line inputs tone controls	R	56
Plenitude £795	Very Good Good+	Rating slightly higher than its Nuance partner, this power amp provided a tight, controlled sound, if somewhat lacking in scale and grace	80W	R	50
PS Audio PS4.5 £696	Very Good Good+	Sonically the best pre-amp in its class, but on the bright side, so purchasers should try it with their prospective equipment	MM/MC	R	50
QED A240 CD II £169	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	56
QED A240 SA II £219	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	56
Quad 34 £269	Very Good Fair	This well-built durable pre-amp 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
Quad 405 £329	Very Good Fair	Not an impressive power amp but easy on the ear if not pushed and very reliable	100W		44
Quicksilver Mono £1495	Good Good +	Moderately improved for '88 the Quicksilver still rates well despite up and coming competition	60W monoblok 4/8ohms		57
Radford SC25 £598	Very Good Very Good	A very fair price for a solid, well built valve pre-amp, combining good allround performance and a neutral sound	5 inputs, MM, straight line	R	57
Radford MA75 £776	Good Very Good	A fine quality valve monoblok with good load tolerance and a neutral accurate sound, offering significant gains in power and focus over the STA25	75W monobloks	R	57
Radford STA25 Renaissance £897	Good Good +	Offering superb midrange performance if not quite as good at the extremes, the Renaissance valve power amp is a genuine audiophile product	25W	R	50
Revox B250 £1128	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
Robertson Forty Ten £987	Very Good Good	Here is a neat little power amp (60W) you can fit and forget; it proved most satisfying over long listening sessions	60W		Coll
Rotel RAB20A II £125	Good ++ Good	This series II version of an established budget favourite delivers the goods sonically and is fine value for money	35W MM 4 line inputs tone controls	BB	56
Rotel RB/RC850 £130/£119	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	R	56
Rotel RAB70BX £325	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	BB	56
Sansui AU-G11X £139	Good + Fair	Tightly controlled if somewhat congested and lightweight, but a reasonable compromise between features and sound quality	25W MM hdph 4 inputs, tone controls	R	50
Sansui AU-G30X £199	Good ++ Fair	A very competent amp with no glaring faults, performing well with phono and compact disc inputs	4 inputs MM 45W tone controls Hdph	R	50
Sansui B2301 £1880	Very Good Good +	Rating better than the pre-amp and providing generous power output, this amp could not be considered competitive in its price bracket	300W		Coll
Sansui C2301 £2306	Excellent Good	Sansui's flagship pre-amp did not really rate well given its price, but is not short on features	All facilities		Coll
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 hdph tone controls MM/MC		50
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
Tannoy SR-840 £1713	Very Good Good	A "muscle" power amp, capable of impressive levels into difficult loads while remaining quite subtle and revealing	250W	R	50
Technics SU-500 £100	Average Poor	Technics have something of a knack in creating models which just border on what we regard as the minimum standards for Hi-Fi. This is an example of that	40W MM hdph tone controls		50
Technics SUV55A £200	Very Good Good	A typically well built modern allrounder, with good versatility and sound quality	65W MM/MC 6 line inputs tone controls	R	56

The best systems in BIRMINGHAM

DISCOUNT SYSTEMS

DUAL 505/2, ROTEL RA820, AR8BX, or DL4 or 7011 or MS15 or TRENT	POA
DUAL 505/2, ROTEL RA820BX2, AR8BX etc.....	POA
DUAL 505/2, NAD 3020E, AR8BX etc.....	POA
DUAL 505/2, NAD 3130, AR8BX etc.....	POA
DUAL 505/2, ARCAM ALPHA PLUS, AR8BX etc.....	POA
DUAL 505/2, ACOUSTIC RESEARCH A04, AR8BX etc.....	POA
DUAL 505/2, YAMAHA AX300, AR8BX etc.....	POA
DUAL 505/2, YAMAHA AX400, AR8BX etc.....	POA

All systems supplied with connecting leads and 10 metres of 79 strand cable

EXTRA FOR THE FOLLOWING LOUDSPEAKERS:

ACOUSTIC RESEARCH AR18BX.....	POA
ACOUSTIC RESEARCH AR22BX.....	POA
HEYBROOK HB1.....	POA
MISSION 700LE.....	POA
MISSION 707.....	POA
MONITOR AUDIO R100.....	POA
MONITOR AUDIO R252V.....	POA
MORDAUNT-SHORT MS25ti.....	POA
MORDAUNT-SHORT MS35ti.....	POA
TANNOY MERCURY MkII.....	POA

EXTRA FOR THE FOLLOWING TURNTABLES:

ARISTON 'Q' DECK with cartridge.....	POA
ACOUSTIC RESEARCH EB101 with cartridge.....	POA
DUAL 505/2 DELUXE with cartridge.....	POA
NAD 5120 with cartridge.....	POA
ROTEL RP830 with AT110E cartridge.....	POA
REVOLVER with REVOLVER arm & cartridge.....	POA
THORENS TD166 MkII (without cartridge).....	POA
THORENS TD316 (without cartridge).....	POA
THORENS TD318 (without cartridge).....	POA

COMPACT DISC PLAYERS

ACOUSTIC RESEARCH CD04.....	POA	PHILIPS CD160.....	POA
ARCAM DELTA 70.....	POA	PHILIPS CD360.....	POA
CAMBRIDGE CD1.....	POA	PHILIPS CD850.....	POA
CAMBRIDGE CD2.....	POA	PHILIPS CD960.....	POA
DENON DCD 300.....	POA	PHILIPS EM2080 Remote control.....	POA
DENON DCD 500.....	POA	ROTEL RCD820.....	POA
DENON DCD 900.....	POA	ROTEL RCD820BX.....	POA
DENON DCD 1300.....	POA	TECHNICS SLP111.....	POA
DENON DCD 1500.....	POA	TECHNICS SLP220.....	POA
DENON DCD 1700.....	POA	TECHNICS SLP320.....	POA
DENON DCD 3300.....	POA	TECHNICS SLP520.....	POA
MARANTZ CD273SE.....	POA	TECHNICS SLP720.....	POA
MARANTZ CD65.....	POA	TECHNICS SLP1000.....	POA
MARANTZ CD75.....	POA	TECHNICS SLP1200.....	POA
MARANTZ CD94.....	POA	TECHNICS SLPJ30.....	POA
MERIDIAN CD207.....	POA	TECHNICS SLPJ22.....	POA
MERIDIAN 209 Remote control.....	POA	TECHNICS SLPJ44.....	POA
MISSION PCM 4000.....	POA	YAMAHA CDX5.....	POA
MISSION PCM 7000.....	POA	YAMAHA CDX500.....	POA
NAD 5220.....	POA	YAMAHA CDX700.....	POA
NAD 5240.....	POA	YAMAHA CDX900.....	POA
NAD 5330.....	POA	YAMAHA CDX1100.....	POA

The widest range of quality hi-fi in the West Midlands. Please send for our latest price list, or phone for your demonstration THOUSANDS OF COMPACT DISCS IN STOCK from £6.95

AGENCIES FROM

ACOUSTIC RESEARCH, AIWA, ARCAM, ADC, AKG, AUDIO TECHNICA, AKAI, ARISTON, AUDIOLAB, ALPHASON, BEYER, CAMBRIDGE, CASTLE, CELESTION, DENON, DUAL, ELITE, EXPOSURE, FUJI, GALE, GRADO, GOODMAN'S, GOLDRING, GOLDBUG, HARMAN KARDON, HELIUS, HEYBROOK, JBL, KEF, LNB, LINX, MANTRA, MISSION, MUSICAL FIDELITY, MARANTZ, MONITOR AUDIO, MORDAUNT-SHORT, MERIDIAN, MAXELL, NAD, NAGAOKA, ORTOFON, PHILIPS, PINK TRIANGLE, PROTON, MONSTER, JECKLIN, QED, QUAD, ROGERS, ROTEL, SUGDEN, REVOLVER, SOURCE, TECHNICS, SENNHEISER, SHURE, TARGET, TDK, THATS, THORENS, TANNOY, ONKYO, VAN DEN HUL, WHARFEDALE, YAMAHA, etc...

ALTERNATIVE AUDIO LTD.

95 Hobs Moat Road
Solithull
West Midlands B92 8JL

Open from:
TUES to SAT
10.00 — 6.00 pm
DEMONSTRATIONS
BY APPOINTMENT
PLEASE

Sales: 021 742 0254
Service: 021 742 0248



Precision Audio Consultants

INTRODUCING TO YOU



ELITE ROCK



ROKSAN XERXES

WITH BURMEISTER AND PROAC ALSO
THE STUNNING NEW SUMO FROM
CALIFORNIA ALONG WITH OTHER
TOP-END EQUIPMENT. FULL SYSTEMS
PLANNING FROM £600 TO £60,000

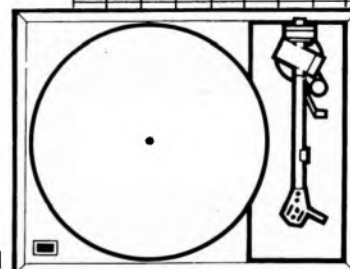
Nationwide delivery and installations
Home demonstrations arranged
Tel: (0472) 698015
for appointments

the sound gallery

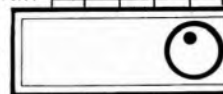
The finest equipment available to give you the finest sound achievable.

Now exhibiting:-

- Audiolab • B&W
- Creek • Celestion
- Denon • Heybrook
- Ion • Linn • Meridian
- Mordaunt-Short
- Naim • Nakamichi
- Rega • Rotel



LINN



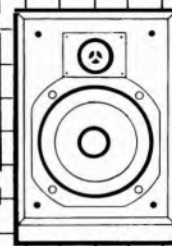
NAIM



- Credit Card Facilities
- Mail Order • Book a Demonstration Now •
- Mon-Sat 9-30am-6:00pm

the sound gallery

65, Castle Street, High Wycombe, Bucks. HP13 6RN. Tel. (0494) 31682



MORDAUNT-SHORT

AMPLIFIERS

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Technics SUV85A £350	Very Good Good	Similar to '55 but with more power and better sound quality still	110W MM/MC 9 line inputs tone controls	R	56
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
VTL Minimal £340	Good Good	Providing decent sound quality at the price, this basic pre-amp sounded open and clear in mid and treble	3 inputs (MM)	R	50
VTL 50W £1150	Good Good	Rating good on audition and providing complementary characteristics to the minimal pre-amp, these monoblok power amps sounded a little slow and unrevealing	50W 3 inputs	R	50
Yamaha AX-300 £120	Good Fair	A lively and dynamic performer, offering a credible if bright sound at a competitive price	30W hdph tone controls (MM)	R	50
Yamaha AX500 £200	Very Good Good	A well built versatile performer with generous power, decent sound	90W MM/MC 5 line inputs tone, var loudness	R	56
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

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.

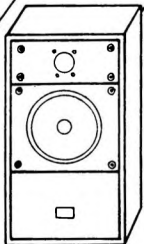
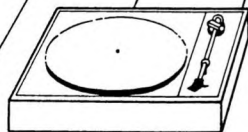
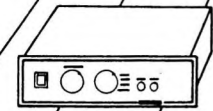
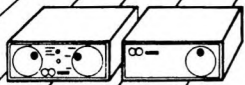
Careful placement of the loudspeakers within the room is as important as the initial choice of model. For good stereo they need to be more or less the same distance from nearby walls, and preferably on similar rigid stands. The listener should be about the same distance from and listening angle to each 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 Research 8BX £100	Average Average -	Spacious and informative sound quality with bass well under control. Not that there was much bass to control	40 x 25 x 19cm shelf or 50cm stand near wall	88 5dB/W 70Hz		53
Acoustic Research 22BX £170	Average Average	Basically well-engineered with sound "nicely out of the box". Some of our "ears" were less enthusiastic	47 x 29 x 22cm shelf or 50cm stand near wall	89 5dB/W 55Hz	R	53
Acoustic Research 35BX £250	Average Average -	This is quite loud, with some boom and tizz, making it suitable for supine strummers of imaginary guitars perhaps	58 x 26 x 27cm free space on 40cm stands	91 5dB/W 55Hz		53
Apogee Scintilla £4950	Good Very Good	These take-me-to-your-leader speakers gave exceptional transparency and can achieve excellent results in a true audiophile system	145 x 88 x 9cm free space on floor	79dB/W 20Hz	R	46/Coil
A&R 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
A&R Arcam Two £250	Good Average	Most things to most men this compact is unlikely to disappoint with its lively "ballsy" character though lacking weight... a bit	38 x 23 x 28cm near wall shelf or 40cm stands	88dB/W 55Hz		53
A&R Arcam One £349.90	Good Average +	Some boxiness in the midrange and fizz in the upper treble prevented this from getting the "R" tag	47 x 27 x 33cm open stands, free space	88dB/W 55Hz		46
Audiostatic ES200 £1495	Average Average +	Sounding forward and unbalanced with limited bass power, these excelled in transparency and detail, and might suit some tastes	150 x 53 x 23cm low (10cm) stands away from wall	79dB/W 45Hz		46
Audiostatic ES300 £1995	Average + Good	Marred by similar problems to its cheaper ES200 stablemate, this line source electrostatic was superb in the upper-mid and treble but lumpy in the bass	44 x 5 x 93cm free standing	82 5dB/W 30Hz		46
Avance 120 £279	Average + Average +	This unusual "after eighties" looking speaker has the recipe for success, but not quite the right seasoning yet	42 x 30 x 30cm 30cm from wall on 40cm stands	86 5dB/W 60Hz		53
B&W DM100i £119	Good + Average	This market leader has recently been 'improved' - though the original was good enough	37 x 22 x 22cm open stands near wall	89dB/W 75Hz	BB*	46
B&W DM110i £159	Good + Average +	Another established favourite, it has recently been 'improved', but not yet checked by us	49 x 26 x 25cm open stands	89 5dB/W 56Hz	BB*	46
B&W LMI Mk II £249	Average + Average	Probably one of the best 'micros' ever made, worth considering for special applications (boats or vehicles). Upgraded since our review	24 x 15.5 x 20cm shelf or flush mount	86 5dB/W 80Hz	*	31
B&W Matrix 1E £595	Very Good Good +	There was enthusiastic and consistent praise for these speakers with their "revealing and seductive" mini-ange	41 x 23 x 32cm free space on 35cm stands	85 5dB/W 50Hz	R	53
BBC LS3/5A £265	Good + Average +	As a working tool it does its job but as a piece of value engineering this old-timer is beginning to look a bit grey-haired	30 x 18.5 x 16cm open stands, free space	81 5dB/W 57Hz	R	Coil
Boston A4011 £110	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
Castle Clyde £129	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 Durham £179	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 £269	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
Celestion DL4 (II) £119	Average + Average	Strong stereo and controlled bass gave BB status, 'shrill' top end only real criticism (Now in untested Mk II form)	38 x 21 x 23cm stands near wall	89dB/W 85Hz	BB*	46
Celestion DL6 (II) £149	Average Average +	The control and power sets it well apart from the run-of-the-mill. It has since been updated	45 x 25 x 25cm open space on stands	88 5dB/W 60Hz	R*	46
Celestion DL8 (II) £199	Good Good	An easy speaker to live with that will not 'close up' when driven loud. (Also updated since our review)	50 x 28 x 27cm on stands open space	88dB/W 55Hz	BB*	46
Celestion SL6S £350	Good Good +	A luxury compact speaker that gives a sweet treble sound with fine musical detail	37.5 x 20 x 27cm free space on 40cm stands	84dB/W 50Hz	R	46
Celestion SL600 £700	Good Good + +	Clearly an exceptional device in terms of design and transparent sound quality. An audiophile miniature	37 x 20 x 25.5cm open space on stands	83dB/W 55Hz	R	46

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

The Audio File

HI-FI IN PERSPECTIVE ...



Demonstrations
Free Installations
Service Department



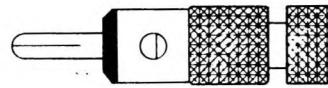
0% Finance
Instant Credit
All major credit cards

27a HOCKERILL STREET
BISHOPS STORTFORD
HERTS
0279 506576

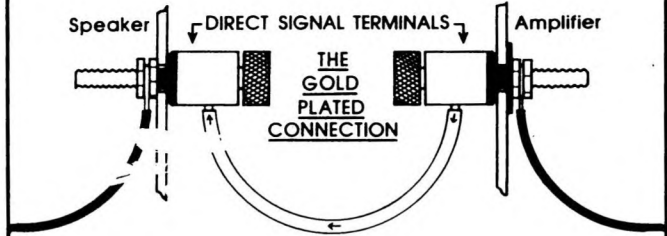
- Audio Technica
- AR
- A&R
- B&W
- Cambridge
- Audio
- Castle
- Creek
- Dean
- Denon
- Dual
- Epos
- Gale
- Goodmans
- Heybrook
- Irica Tech
- Linn
- Mantra
- Mission
- Monitor
- Audio
- Naim
- Nakamichi
- Phillips CD
- QED
- Quad
- Rega
- Roksan
- Rotel
- Ruark
- SME
- Tannoy
- Thorens
- Wharfedale
- Yamaha

THE MICHELL CONNECTION

"The ultimate connectors for all quality speaker cables"



BANANA PLUG



SPEAKER CLIP ADAPTOR

You ain't heard nothin' yet, folks! GET THE CONNECTION!

For details please write:

J A Michell Engineering Ltd
Dept NHS, 2 Theobald Street, Borehamwood, Hertfordshire, England
Telephone 01-953 0771

Audio Projects

FOR ALL THE BEST BUYS

WE STOCK A RANGE OF SELECTED COMPONENTS FROM:

A&R (CAMBRIDGE) AUDIOLAB,
CREEK, DEAN, DENON,
HEYBROOK, LINN PRODUCTS,
MUSICAL FIDELITY,
NAIM AUDIO, QUAD, REGA

Home demonstrations our speciality.

Open 9.30-6.00 Tues-Friday.
2.30-5.30 Saturday.

45 Headingley Lane, Leeds, LS6 1DP. Tel (0532) 304565



- A&R ▼ AUDIOLAB ▼ B&W ▼ CELESTION
- CREEK ▼ DENON ▼ DUAL ▼ ELITE ▼ GALE
- HELIUS ▼ HEYBROOK ▼ ION ▼ KEF ▼ LINN
- LOGIC ▼ MERIDIAN ▼ MICHELL
- MONITOR AUDIO ▼ MORDAUNT SHORT
- MUSICAL FIDELITY ▼ MYST ▼ NAKAMICHI
- ROGERS ▼ PINK TRIANGLE ▼ QED ▼ QUAD
- ROTEL ▼ SONDEX ▼ SPENDOR ▼ SYSTEMDEK
- TANNOY ▼ WHARFEDALE

▶ AUDIO INSIGHT ◀

53 Wolverton Road, Stony Stratford
Milton Keynes MK11 1ED. ☎0908 561551

DIRECTORY

LOUDSPEAKERS

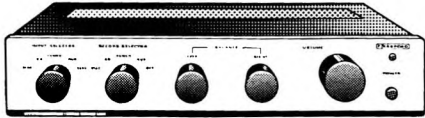
MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	BACK ISSUE FULL REVIEW
Celestion 6000 £1470	Very Good Very Good	A genuine fullrange audiophile quality speaker system – with Star Wars styling to suit a high tech environment	Complex, on floor in free space	82 5dB/W	R	Coil
Gale 301 £259	Average Average +	Of unusual, distinctive appearance this produced a mixed response, being lively but lacking depth	44 x 23.5 x 22cm on stands quite near wall	86 5dB/W 63Hz		46
Gale GS402 £599	Average + Average +	Clean but rich and powerful bass; stereo focus was not a strong point, but it is worth considering	61 x 35.5 x 28cm on matching stands near wall	88dB/W 48Hz		46
Goodmans Maxim Two £80	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	85dB/W 85Hz	BB	53
Goodmans Point 3 £90	Average + Average –	Recommended as good value for money, but our listeners' differing opinions mean your ears should judge for themselves	47 x 25 x 20cm shelf/high stand near wall	90dB/W 80Hz	R	53
Goodmans Point 7 £170	Average + Average	Basically competent performance-mix and a lot of speaker for the money, but a certain lack of refinement nonetheless	69 x 33 x 26cm free space on 35cm stand	89dB/W 47Hz		53
Harbeth HL Mk 4 £475	Good + Good +	Recommended for the good results at its price, and only mildly criticised for heavy bass and a mild 'chestiness'	64 x 33 x 30cm free space on 46cm stand	89dB/W 40Hz	R	53
Heybrook HB1 £169	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 HB2R £269	Average + Average	Criticism of the mid and treble balance made this dynamic model less attractive on listening test than was hoped	41 x 23 x 23cm on stands, tilted, near wall	88dB/W 61Hz		46
JBL TLX-3 GI £130	Average Average –	Lively and punchy but also untidy this little speaker may have deviated from the Hi-Fi standard but cannot be summarily dismissed	38 x 25.5 x 22cm free space on stands	87dB/W 55Hz		46
JBL L 60T £370	Good + Good	Well balanced and offering realistic value for money, the fine treble and extended bass make it suitable for larger rooms	78 x 30.5 x 26.5cm low stands or floor	88dB/W 40Hz	R	46
JBL 18Ti £559	Good + Good	Beautifully engineered, well finished miniature with many good points, but unexceptional overall. Try the cheaper L20T	34 x 24 x 22.5cm 50cm from wall on rigid stands	85 5dB/W 53Hz		46
JBL 250Ti £3300	Good + Good +	In general this speaker did not show the required level of dynamic presentation transparency and stereo depth expected of a pricey flagship model	132 x 57 x 36cm free space on floor	89dB/W 53Hz		46
JPW AP2 £145	Good Average +	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	BB	53
JPW AP3 £210	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
JWS Quintet £100	Poor Poor	Poor stereo focus with up to 3dB channel difference, coloration, boom, "sting" and the grille rattled	46 x 19 x 19cm close to wall head height	86dB/W 55Hz		53
KEF C10 £94	Good Average –	Listening panelists gave this a poor reception	30 x 20.5 x 17.5cm stand near wall	87 5dB/W 75Hz		46
KEF C40 £209	Average + Average –	Criticisms were made of a lack of fine detail and loss of depth and transparency, but it could handle power well	65 x 24.5 x 26.5cm free space on stands	90dB/W 55Hz		46
KEF 103/3 £630	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) £800 (£900)	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	53
KEF 107 £1890	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	Coil
Linn Kan £271.95	Average – Average –	The acid test of "blind listening" may dissolve the Kan's high status with strong criticism, but the answer, as always, is: "suck it and see"	30.5 x 19 x 16.5cm back to rear wall on rigid stands	85dB/W 30Hz		41
Linn Isobarik £1568	Good Good + +	Exceptional capabilities in the dynamic range and bass performance; demands serious consideration as a state of the art contender, but odd stereo	76 x 33 x 41.5cm low stands against rear wall		R	Coil II
Magneplanar SM6a £697	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		46
Magneplanar MG11a £2750	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		46
Marantz LD20 DMS £130	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
Meridian M30 £725	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
Mission 70 II £109	Good Average	Lively and transparent, the 70 II was favoured for its speed, though the sound had a mildly 'thin' tonal balance	35 x 21 x 21cm on stands or shelf near wall	89dB/W 68Hz	BB	46
Mission 700LE £139	Good Average	Mission re-submitted this popular model and again got a positive review – which proclaims their (and our) consistency	38 x 21 x 21cm straight ahead stand near wall	89dB/W 66Hz	R	53
Mission 737 £249	Average + Average	To its credit the 737 was generally articulate and well integrated but stereo was poor and it could sound loud and hard	54 x 25 x 27.5cm low stands near wall	89 5dB/W 58Hz		46
Mission Argonaut £700	Good Good	Perhaps not the most subtle or sweet these were recommended for their excitement, drama, power handling and good looks	95 x 23 x 31cm floor-standing near wall	91dB/W 40Hz	R	53
Monitor Audio R100 £130	Average + Average –	Tonally quite neutral, but with small box character, negligible low bass and a rather 'hard' midrange	40.5 x 25 x 21cm free space on stands	87 5dB/W 70Hz		46
Monitor Audio R252 £150	Average + Average	Rating well for its price this model displayed a rather rough top end and a generally dry character helped by good detail and focus	47 x 25 x 24cm stands quite near rear wall	89dB/W 62Hz	R	46
Monitor Audio R352 £250	Good Average	Well-built and finished, 'sensitive' speaker which is easy to drive and capable of extracting good results from any good amplifier	54 x 25 x 32cm on stands in free space	90dB/W 50Hz	R	46
Monitor Audio R700 MD £269	Average + Average +	Lively and involving with good, punchy, if rolled off bass. The metal dome speaker gives a clean and open treble	32 x 21.5 x 25cm on stands 0.4m from wall	87 5dB/W 62Hz	R	46
Monitor Audio R352 MD £280	Good Average +	Better suited to CD than vinyl perhaps, this is clearly good value for money. But some found it coarse while others praised its cleanliness	64 x 25 x 32cm 25cm stands in free space	89dB/W 42Hz	R	53
Monitor Audio R652 MD £369	Average Average +	Mild bass and crossover weaknesses were criticised, but the sound was quite well liked and it is decently built	51 x 20 x 26cm free space on 40cm stands	86 5dB/W 45Hz		53
Mordaunt Short MS10 II £90	Average Average –	One of the best miniatures around. A borderline Best Buy because of the bass limitations, which may depend on your taste	29 x 20 x 17cm wall bracket	86dB/W 75Hz	BB	53
Mordaunt Short MS100 £179	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
Mordaunt Short 45Ti £220	Good Average	A sensitive tandem-bass number that can be driven loud but loses its balance a bit and can be unsuitable	63 x 26 x 30cm low (20cm) stand near wall	90 5dB/W 52Hz		53

TO ORDER BACK ISSUES OF HI-FI CHOICE SEE PAGE 50

The Radford Renaissance range of Valve Amplifiers

For over 25 years, Radford valve amplifiers have been held in the highest regard by enthusiasts and music lovers worldwide. Even today, many vintage examples are in use—a 'glowing' tribute to the Radford name.

With Arthur Radford's blessing, Woodside Electronics have introduced the Renaissance range.

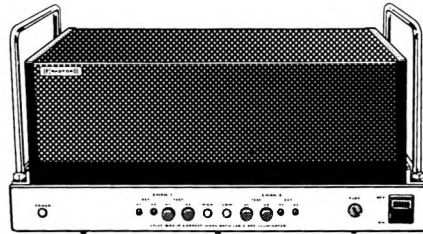


Hand built to the highest standards these new amps. incorporate much of today's thinking

Manufactured and distributed under licence by:

Woodside Electronics

Kimberley Road, Clevedon, Avon. BS21 6QJ. Telephone: 0272 877611.



on circuit layout and use the latest high specification components to bring performance right up to date.

The Renaissance range includes the SC 25 valve pre-amp, STA 25 50 watt stereo and M 75 75 watt mono amplifiers.

For full specifications and colour

leaflet, post the coupon or contact your Radford dealer today.

"The STA 25 generates a generous and precise soundstage with genuine audiophile standards of imagery and dynamics."

Hi-Fi Choice, The Collection II.

"Internal construction is some of the finest I've seen in any valve amp, regardless of vintage or country of origin."

Hi-Fi News, U.K. May 87.

"Perhaps the strongest points of the Radford Renaissance is it's bass – surprisingly good for a tube power amp."

Stereophile, U.S.A. September 87.



Please send full details of the Radford Renaissance valve amplifiers with dealer list to:—

Name: _____

Address: _____

HFC/5/88

Tel: _____

USA. & Canadian distribution:

Tercel Audio Marketing

P.O. Box 147, 7723 Yonge Street,
Olde Thornhill Village, Ontario,
Canada L3T 3N1.
Telephone: (416) 731-9708.

IN HI-FI

YOU ALWAYS HAVE A CHOICE

You can shop around for the cheapest price (but you may worry about after sales service). You may shop in a chain store (but worry that you seem to know more about hi-fi than the sales assistant). Or you can find a store where the staff are helpful and knowledgeable; where demonstrations allow you to decide what is best for you; where the price is competitive.

Yes you have guessed it. In Hi-Fi is such a store. Come to In Hi-Fi and see for yourself why our customers nominated us "Best Dealer" in both the '86 and '87 Hi-Fi News/Sony awards.

763 GEORGE STREET, EDINBURGH
TEL: 031-225-8854
Mon-Sat 9.30-6. Evenings by appointment.

We have an excellent selection of some of the best CD players on the market. From the budget to the exoteric. Arrange your audition now.



Cambridge CD2



Denon DCD1000 700

Choose from:—
Roksan, Mission,
Musical Fidelity,
Denon,
Cambridge
Audio, Yamaha,
Quad, Rotel,
Technics and
more . . .

NEW CYRUS NOW IN STOCK



**MOORGATE
ACOUSTICS LTD**



2 Westgate, Rotherham (0709) 370666

DIRECTORY

LOUDSPEAKERS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	BACK ISSUE FULL REVIEW
Mordaunt Short MS300 £309	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
Mordaunt Short 442 £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	53
Quad ESL-63 £1458	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 wall clear of wall	84dB/W 34Hz	R	46
Rogers LS2 £170	Good Average+	A coherent and polite speaker considered more suited to classical music. Tonally well balanced, neutral and with good power handling	36 x 23 x 22cm on stands near wall	85.5dB/W 51Hz	R	45
Rogers LS6 £240	Good+ Good	Sonically fitting in between the LS2 and 7, the 6 was a consistent success on audition - well balanced with an open and informative nature	51 x 27 x 28cm open stands, free space	87.5dB/W 50Hz	BB	46
Rogers LS7t £360	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	53
Roksan Darius £1150	Average Poor/Very Good	A controversial speaker which when set up right can deliver impressive performance, but with a far from neutral balance	98 x 31 x 51cm integral stands near side walls	88dB/W 50Hz		53
Rotel RL850 II £120	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	53
Royd A711 £99	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		53
Royd A25 £100	Average+ Average-	Receiving mixed reactions on audition, the A25 is flawed but offers a lot of speaker for the money	51 x 29.5 x 24cm, stands near wall	87dB/W 52Hz	R	46
Sony APM 10ES £100	— Average	An obvious Best Buy at its highly competitive price point, it can do justice to a good hi-fi system of Sony or specialist origins	40 x 25 x 20cm, 40cm stands 40cm from wall	87dB/W 55Hz	BB	53
Spendor Prelude II £350	Good+ Good	Good clarity and detail were evident everywhere in this speaker. Though a little boxy or muddy in the midrange it is strongly recommended	50 x 26 x 28cm open stands in free space	88dB/W 52Hz	R*	46
Spendor SP2 £450	Very Good Very 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	46/Col
Spendor SP1 £680	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	46/Col
Spendor SA3 Passive £1400	— Good+	Same as Spendor SA3 active	85 x 38 x 46cm low	89dB/W 32Hz	R	46
Spendor SA3 Active £2708	Good+ Very Good	Substantial speakers designed to deliver high sound levels and killer bass. Suited to larger rooms and power hungry ears	85 x 38 x 46cm low rigid stands in free space	89dB/W 32Hz	R	46
Spica TC-50 £595	Average+ Good	These American wedge-shaped-cabinet speakers just merit recommendation at their price and were detailed and clear	40 x 33 x 28cm free space on 50-60cm stands	85dB/W 48Hz	R	53
Tannoy Mercury II £150	Good Average+	This genuine allrounder represents an exceptionally accurate free-space system for the money	50 x 25 x 23.5cm open space; 45cm stands	88dB/W 55Hz	BB	53
Tannoy Westminster £3300	n/a Good+	These awesome horn loaded speakers are remarkably controlled and impressive, if only suited to a few pucks and rooms	Huge, flat against rear wall, away from corners	96dB/W (manuf.)	R	Col
Technics SBC 250EK £130	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
Wharfedale 504 £139	Average+ Average	Acquitting itself well on audition, the 504 produced a clear, reasonably balanced sound with above average treble	21 x 18.5 x 20cm stands, near wall	85dB/W 75Hz	R	46
Wharfedale Delta 50 £99	Average+ Average-	Given the price this was a mild disappointment - there is nothing obviously wrong but it just seemed a bit mundane	48 x 27 x 19cm near wall on 40cm stands	88dB/W 55Hz		53
Wharfedale Super Diamond £140	Average Average-	Although there are improvements on the basic "legendary" model, listening panelsists did not get airborne about this upgrade	24 x 19 x 19cm close to wall at head height	88dB/W 57Hz		53
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 dependant 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
Aiwa AD-F260 £90	Good Poor	Well equipped conventional budget recorder measured rather better than it sounded	Dolby B, C, bias adjust		52
Aiwa AD-F360 £110	Good Average	Soft, somewhat amorphous sounding deck which is, however, very easy to use	Dolby B & C, bias adjust, 2 Head		57
Aiwa AD-R460 £149	Average Average-	Some worthwhile features but sound quality was not especially liked	Auto reverse, Track search, Dolby B, C, bias adjust		52
Aiwa AD-WX707 £180	Poor Average	Not bad value for a twin deck, but marginal from the high fidelity viewpoint. The review sample was poorly set up.	Dual deck, auto-reverse, Dolby B & C, bias adjust		57
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	BB	57
Akai GX-52 £249	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 Drilly	Dolby B, C, HX Pro, track local features	BB	57
Akai GX-6 £329	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

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

DIRECTORY

CASSETTE DECKS

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Denon DR-M07 £140	Average+ Excellent	Despite minor operational and measured shortcomings, sound quality is excellent for the price	Dolby B, C, bias adjust	R	52
Denon DR-M12HX £220	Good Good+	Well constructed and pleasant to use, a lack of true pitch constancy kept it from sounding superb	Track search, Dolby B, C, HX Pro, bias adjust	R	52
Denon DR-M24HX £290	Good Good+	This deck will slot into many high grade systems without disgracing itself – or the cassette medium. Very presentable high resolution sound with good stereo with or without Dolby	Dolby B, C, HX Pro, bias adjust, 3 Head	BB	57
Denon DR-M30HX £319	Good Good+	Ergonomically fine with infra red remote, the M30 fared well on pre-recorded material and was at its best with ferric tapes	Dolby B, C, HX Pro, bias adjust, 3 Head, remote control	R	52
Denon DR-M44HX £400	Excellent Excellent	A well designed deck that also performed fine sonically, working very well with ferric and metal tapes	Real-time counter, Dolby B, C, HX Pro, tape alignment adjust, remote control, 3 Head	R	52
Harman Kardon TD202BL £249	Average Average	A competent middle-ranking performer but lacks sonic incisiveness and is a bit expensive	Dolby B, C, bias adjust		52
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		52
Hitachi D-003 £199	Average— Average—	Dry, slightly 'wobbly' sound quality but suitable for many non-critical applications. The manual tape direction switch is poorly designed	Dual deck, auto reverse, Dolby B		57
Hitachi D-007 £300	Average— Poor	This double 'dubbing' deck proved a mixed bag – good in parts but disappointing overall	Dual deck, auto reverse, track search, Dolby B & C		52
Kenwood KX550HX £150	Average Average+	This well-laid-out and attractive deck ultimately lacks the edge to stand out in a competitive field	Track search, Dolby B, C, HX Pro		52
Luxman K-100 £199	Average+ Average+	Poorly laid out but it fared quite well on metal tapes. Commercially recorded tapes sounded bright and cramped, however	Dolby B & C, remote control		52
Luxman K-105 £349	Average Average	Rating quite well for an auto reverse deck, and featuring complex track search facilities, it was not sonically competitive on price	Auto reverse, track search, Dolby B & C, remote control		52
Luxman K-112 £349	Average Average	Build quality is not truly consistent with the price. Nor is sound, which veers on the warm, lousy side of neutral	Dolby B, C, HX Pro, bias adjust, 3 Head		57
Marantz SD-35 £169	Good Good+	Rock steady tape transport gives very competitive sound quality for the price, but the slightly bright replay may not appeal to some	Dolby B & C, bias adjust	BB	52
Marantz SD-4511 £209	Good+ Good+	Well built and dynamic sounding player, working better as a recorder than with musicassettes	Dolby B & C, bias adjust Auto selection	R	52
Marantz CP230 £260	Average Average	This is a competitively priced portable recorder though not suited to replay of musicassettes	Dolby B, bias adjust	R	52
Marantz SD-55 £349	Good Very Good	Slightly tacky feel and restricted signal/noise performance are the main shortcomings of an excellent sounding piece of kit	Real-time counter, track search, Dolby B/C/HX Pro, bias adjust, 3 Head	R	57
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 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-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	52
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		52
Nikko D-80II £309	Average Average	Easy and rewarding to use (apart from the mannered aesthetics), but sound quality is below par for the price, especially with dbx	Real-time counter, auto reverse, track search, Dolby B, C and dbx, bias adjust		57
Onkyo TA 213D £140	Average+ Average+	Rating fairly well on both pre-recorded and record/playback, ergonomics were a little poor but overall performance was generally consistent	Track search, Dolby B & C, bias adjust	R	52
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 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-88D £130	Average+ Average	Fair sound quality, veers in direction of maximising information, not sophistication. But output varies with tape-to-head contact and speed stability is iffy	Track search, Dolby B & C		57
Pioneer CT-138DWR £400	Good Good	Impossibly clumsy ergonomics are the main snag. There are plenty of features, some quite useful, and sound quality is detailed and lively	Dual deck, auto reverse, track search, Dolby B & C, remote control	R	57
Proton AD-200 £139.50	Poor Poor	Sound quality is essentially on a par with many portables, and has nothing to do with high fidelity. The main problems are an unremitting hardness and an almost total lack of detail	Dolby B & C		57
Proton AD-300 £249.50	Average— Poor	High levels of flutter give sound a roughness and coarseness that rules it out for high quality work. The record and replay electronics certainly deserve better	Auto reverse, Dolby B & C		57
Revox B215 £1461	Good Average+	Superb engineering and good sound, but lacking the subjective qualities that characterise the very best hi-fi equipment	Real-time counter, Dolby B & C, tape alignment adjust, remote control		52
Rotel RD-830 £110	Average— Poor	A pretty fundamental if slightly dated design with little sonic merit but an attractive enough price	Dolby B		52
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
Sony TC-FX 15D £90	Average+ Average+	Recording and playing back on this deck itself gave acceptable results, whereas prerecorded stuff was a joke. But it's a good £90 worth	Dolby B & C	R	52
Sony TC-W25D £149	Average— Average—	Rather rough and ready but a nonetheless honest and tolerably transparent sounding deck. Acceptable sound at the price	Dual deck, Dolby B & C		57
Sony TC-R303 £179	Good Good	Bright, detailed but not especially refined sound quality, makes excellent Dolby recordings, but has slightly suspect pitch stability	Auto reverse, Dolby B & C, remote control		57
Sony (WMD6C) ProWalkman £249	Good+ Excellent	"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	52
Sony TC-R503ES £299	Good Good+	High grade auto-reverse cassette deck with a very clean, articulate sound. What might it have been like with a more stable transport?	Real-time counter, auto reverse, track search, Dolby B, C, HX Pro, bias adjust, remote control	R	57

TO ORDER BACK ISSUES OF HI-FI CHOICE SEE PAGE 50

DIRECTORY

CASSETTE DECKS

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Sony TC-K444ESII £349	Good Average	Even the best this deck has to offer is not truly commensurate with the price	Real-time counter, Dolby B & C, bias adjust, remote control		52
Sony TC-K70DES £499	Excellent Excellent	Firmly in the esoteric league, this is easy both to operate and to listen to. Best points: first class imagery, focus and stability	Auto reverse, track search, Dolby B & C, tape alignment adjust	R	52
Tandberg 3014A £1650	Good Very Good	Very exactly engineered but excessively complex to use. Test sample had poor response for prerecorded tapes, but recordings were unusually stable and clean	Real-time counter, track search, Dolby B & C, bias adjust, remote control, 3 Head		57
Teac V-200 £80	Average— Average+	At this price you don't get fireworks, but it offers real value for money and sounds open and honest	Dolby B	R	52
Teac V-210C £99	Poor Poor	It could have been our sample but we found inadequate speed stability and a 'messy' sound	Dolby B & C, bias adjust		52
Teac W300 £115	Poor Average—	Sonically a mixed blessing, it does well with pre-recorded tapes but home-made recordings sound a little rough	Dolby B		52
Teac W-310C £129	Average— Average—	Dubbing performance is poor, especially using the high speed mode but normal record and replay performance standards are not too bad	Real-time counter, Dolby B, C, Hx Pro, bias adjust		52
Teac R-515 £299	Average+ Average+	Expensive, this deck is basically a competent but pedestrian performer which will not fully satisfy the critical user	Real-time counter, auto reverse, Dolby B & C, bias adjust		57
Teac V-970X £499	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
Technics RS-B305 £140	Good+ Excellent	Well built and offering excellent sound quality at the price, working well with metal tapes if not so hot on pre-recorded material	Dolby B & C	R	52
Technics RS-T22 £150	Excellent Average	Good value for a twin deck machine, and fairly simple to use, but sonically no competition for single transport machines	Dual deck, auto reverse, Dolby B & C		52
Technics RS-B505 £160	Average+ Average+	Neatly made recorder with Dolby HX Pro that sounds precise and stable, though sometimes a little processed and grainy too	Track search, Dolby B/C/HX Pro		57
Technics RS-B605 £180	Good Average+	Mixed but generally good sound. Weakest points are dbx and prerecorded sound, best are Type IV (metal) recordings which sound sharp and precise	Track search, Dolby B/C/HX Pro & dbx	R	57
Technics RS-B705 £250	Average Average—	3 heads for the price of two, but not the sound quality to go with them	Track search, Dolby B, C, HX Pro, bias adjust, 3 Head		52
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
Technics RS-T80R £400	Poor Poor	Flexible and pleasant to use but poor transports led to poor sound on our latest sample	Dual deck, auto reverse, track search, Dolby B, C, dbx		52
Yamaha KX-200 £140	Good— Good	Cheap, well-equipped and workmanlike with the sound quality less obviously processed than most – the whole is more than the sum of the parts	Track search, Dolby B & C, remote control	BB	52
Yamaha KX-300 £150	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-400 £200	Good Good+	A highly commercial package with every widget under the sun. Happily it sounds good too	Auto reverse, track search, Dolby B, C, HX Pro, remote control	R	52
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-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 control, track search, Dolby B, C, dbx, HX Pro, bias adjust, remote control		52

CD PLAYERS

This all-digital music source seems set fair to becoming properly 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 CD's sound less involving

than top quality vinyl replay. Introduced five years ago at around £500, CD players now average 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 pre-amp, there are no problems connecting a player to a normal amplifier.

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Acoustic Research CD-04 £290	Good Fair	Stylish but basic player, based on Philips 14-bit 4 x oversampling with respectable sound and remote control	Remote Control, headphones		51
ADC CD-250X £230	Good+ Fair	Well made and engineered, and average soundwise; trumpets could sound 'thin' though violins were liked so it may prefer Stephan Grappelli to Miles Davis	Skip and search, manual, repeat and 16-track programming		This
Arcam Delta 70 £500	Good Very Good	This solidly built British player has attractively understated presentation with straightforward, simple ergonomics. The very good sound quality shows a steady improvement over earlier samples	Simple remote, headphones etc.		This
Aiwa CD-001 £350	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.		This
Akai CD93 £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.		This
Cambridge Audio CD2 £600	Fair Very Good	The finest midrange in digital audio is sufficient grounds for Recommendation, though there remains a tinge of disappointment that the CD2 didn't get closer to big brother elsewhere, notably in the bass.	16x oversampling, remote control	R	This

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

DIRECTORY

CD PLAYERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Cambridge Audio CDI £1500	Good + Excellent	Advanced design and circuitry give this top class two-box machine exceptional performance, so the intrinsic qualities of CD, (eg. silent surfaces), make themselves felt	No headphones, seven audio filters, skip R and scan		Coll
dbx DX5 £640	Good Poor	Sound quality proved a signal 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.		This
Denon DCD 300 £210	Average + Fair	Unspectacular all round competence with remote control can't be bad at the price	Skip, remote control, headphones	R	51
Denon DCD-800 £300	Good Good	A generally good subjective and objective performance, a comprehensive range of remote controllable facilities, plus Denon's good reputation for build quality and field reliability.	Track entry remote, menu display etc.	R	This
Denon DCD-1500II £500	Very Good Very Good	The extra build quality over cheaper Denons is justified in terms of sound quality and lab performance, while the feature list is comprehensive and quite nicely presented	Track entry/volume remote, menu display etc.	R	This
Denon DCD 1700 £650	Good + Very Good	The overall sound was strong and coherent approaching reference standards. Fine build quality and facilities make this a firm contender	Remote, skip, scan, headphones, programmable	R	This
Denon DCD-3300 £1200	Good + + Very Good	Sounding tight and coherent though not significantly better than the cheaper 1700. Very well built and comprehensively equipped	Remote control, with volume, keypad programme, scan, search, headphones		51
Goodmans GCD-500S £150	Average - Poor	User-friendly but flimsy build quality and second class sonics make this poor value even at the price	Audible scan and track skip, programming		51/45
Harman Kardon HD100 £399	Average Poor	With a mixed subjective performance this well built player failed to make the grade in its price class	Skip and scan, programmable		51
Hitachi DA-7000 £180	Good Fair	Generally competent, especially considering the price, this was well built and styled if lacking in some facilities - a good budget starter	Memory and repeat, plus the basics	R	This
Hitachi DA7200 £220	Good Fair	Distinctly more competitive than the '009, the '7200 remains undistinguished in the current state of compact disc technology and sound quality	Simple remote etc.		This
Hitachi DA007 £300	Average Fair	Unusually fitted with wooden end cheeks and comprehensively kitted out, but only average in sound quality	Full remote control, adjustable headphone output keypad programming		51
Hitachi 009 £300	Good Fair	Despite a pretty clean bill of technical health and an extensive range of facilities, the 009 failed to inspire the subjective enthusiasm needed for recommendation at its £300 price level	Random, 'roulette' play, menu display, complex remote		This
JVC XL-V1100 £659	Average + Fair	A substantial and very well built flagship model with 16 bit 4 x oversampling, though sound quality was disappointing at the price	Full remote, headphones, scan, skip, intro-scan		51
Kenwood DP990D £299	Average + Fair	A good all-round package, but comparable sound quality can be found more cheaply elsewhere	Headphones, remote control, (manual override)		51
Kenwood CDP990SG £400	Very Good Good	Falling just short of the required subjective standard for Recommendation at this price level, this is a doughty player nonetheless, with a build quality and technical performance that arguably justifies its premium price	Track entry remote, menu display, sprung feet etc.		This
Luxman D-90 £300	Fair Good	Despite technical ingredients that do not seem particularly inspiring, this is a nicely judged package that is ergonomically neater than most, with decent sound quality for the price and distinctive finish and presentation	Track entry remote, programming etc.	R	This
Luxman D-100 £399	Average Poor	Sparsely equipped with a slightly old fashioned sonic character, offering little but physical weight for a quite high price	Remote control, skip, scan, headphones (variable)		51
Marantz CD273 £199	Good Good	An ambitious machine at the price, offering pretty good sound quality but a slightly below average build standard	Skip, scan, programmable	BB	51
Marantz CD873 £240	Good Very Good	Putting many 'audiophile CDs' to shame in terms of sound quality this proved another winner, though there was slight criticism of control accessibility at times	No remote control, but the usual skip, scan etc	BB	53
Marantz CD-273SE £240	Good + Very Good	The Euro-tweaked version of the standard 273, this model fulfils pretentions to audiophile standards at a budget price	Manual control, skip and scan (audible), 20 track programming, repeat	BB	51
Marantz CD873LE £250	Good Excellent	This is the outstanding sound quality bargain in the latest review project, with discreet if plasticky presentation and rather lightweight build	Manual repeat, skip, scan, programming	BB	This
Marantz CD94 £800	Good + + Very Good	Clearly the best Marantz CD player, with high build quality and good objective and subjective performance	10 digit keypad, headphones, favourite track selection, remote	R	This
Mission PCM7000 £400	Good Very Good	Stylish with a large informative LCD display this deserves recommendation on the basis of sound quality alone	Remote volume control, digital filtering	R	51/Coll
Nakamichi OMS-1E £400	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.		This
Nakamichi OMS-3E £995	Good Good	Superbly built and presented this expensive machine was a bit of a "stuffed shirt" when it came to sound quality	Remote control, skip and scan, headphones		51
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, headphones		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
NEC CD610 £250	Good Very Good	Although NEC's CD players may take a bit of hunting down, the sound/price/build equation comes down firmly in favour of the '610 despite unspectacular lab performance	Track entry remote, menu display etc.	BB	This
NEC CD810 £400	Very Good Very Good	While the lab performance might have been better still, sound quality, ergonomics and build quality all point towards Recommendation for this rare but attractive example of the CD player maker's art.	Track entry remote, menu display etc.	R	This
Nikko CD200R £250	Fair Fair	This player delivers fair overall performance at what is presumably a fair price, but is insufficiently distinguished to warrant Recommendation.	Simple remote, skip, scan, programming etc.		This
Philips CD371 £180	Fair Good	Though the build and presentation may not be to every taste, this is a fundamentally honest basic player that delivers more than enough of the sonic goods to merit a Best Buy rating.	Skip, scan, programming	BB	This
Philips CD472 £200	Fair Good	Once again one cannot argue with the fine sound quality Philips make available at a modest price - with remote control and extensive facilities besides.	Simple remote, programming etc.	BB	This
Philips CD473 £250	Good Good	In the forefront as regards sound quality, this is one of the best sounding Philips players yet; we were unable to catch it out on classical through Jazz program	Favourite track selection, remote control with volume, headphones etc	BB	This
Philips CD800 £500	Very Good Very Good	The '800 is an impressive blend of luxury build quality and features at a far from extravagant price, and also delivers the subjective goods	Volume remote, FTS, menu display etc.	R	This
Philips CD960 £700	Good + + Very Good	Simple to use with exemplary lab performance, this showed no sign of weakness while sound quality improvements over mainstream models more or less justify the price	Full remote control, favourite track selection etc	R	51/Coll
Pioneer PD5050 £200	Good Fair	Though this is neither our favourite budget CD player nor our favourite Pioneer, the 5050 delivers a well judged combination of good build, plentiful features and decent sound	Track entry remote, skip scan etc.	R	This
Pioneer PD-6050 £230	Good Fair	Much liked on Jazz and rock program this was highly rated in terms of value for money. The midrange sounded a little forward and thin though	Everything but a digital out socket and remote volume control	R	This

TO ORDER BACK ISSUES OF HI-FI CHOICE SEE PAGE 50

CD PLAYERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Pioneer PD-M50 £280	Fair Fair	This machine would justify its price on features, sound and build quality even disregarding the autochange system	6-disc autochanger, disc/track entry remote etc.	R	This
Pioneer PD7050 £280	Good Good	This mid-priced Pioneer offered significant sonic and lab performance advances over the cheaper models in the range, more than sufficient to justify the extra cost	Track entry/volume/fade remote, menu display etc.	BB	This
Pioneer PD-M70 £399	Average Fair	A remarkable catalogue of features justify the price. Soundwise it rated just about average overall	Remote control, 6-disc autochanger, 8 programme memory, headphones etc.		51
Revox B226 £756.70	Good+ Good	The traditional Revox house style is combined with the fine Philips 16-bit chip set, but this player doesn't really offer sound quality to match the price	Infra-red remote control, full search, scan, programming		51/Coil
Rotel RCD820BX2 £300	Good Very Good	Start with a good base and then make it sound better, the '820BX2' CD player maintains the reputation established by its namesakes, and comfortably deserves Recommendation	Direct track entry remote etc.	R	This
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.		This
Sanyo CP17 £200	Average— Poor	A no-frills mid-sized package, this was not up to the usual Sanyo sonic or technical standards but it was well built	Skip, search, repeat, 16-track memory programmable		53
Sanyo CP27 £220	Fair Fair	System remote apart, the CP27 offers no improvement over the cheaper CP17, and neither of these systems-oriented players really are the subjective musical	LCD display, skip, scan, programming		This
Sharp DX-R700H £225	Average— Poor	A workmanlike player that does not offer exemplary lab or sound quality but which is well-built with good facilities and should perform well in use	Remote control, track selection keypad, skip, scan repeat programming		53
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/Coil
Sony CDP-M35 £170	Fair Fair	There is no disguising the lightweight plastic construction of this player, but the technical performance, sound quality, aesthetics and ergonomics all deliver more than one has the right to expect for £170	Skip, scan, programming etc.	R	This
Sony CDP-M20 £179	Average+ Fair	Keeping pace with improvements in the marketplace, it combines decent performance with good build and is competitively priced	20 track programme, skip and scan, repeat and random play	R	51
Sony CDP-M55 £190	Fair Fair	£20 buys a remote control handset to operate your M35. Sony call it an M55 (see CDP-M35 review)	Simple remote, skip, scan, programming etc.	R	This
Sony D30 £230	Average— Poor	At 50p per hour to run, the sound quality is poor compared to mains machines although reasonably competent overall for a Discman	LCD display, skip, shuffle, and repeat, "in-ear" headphones		51
Sony CDP-M75 £230	Good Good	This mid-version of the '750 saves £20 on the price (see CDP-750 review)	Track entry remote, menu display etc.	BB	This
Sony CDP-310 £250	Average+ + Fair	Fine build, facilities and healthy enough sound quality – recommended, but look around the range	Remote control (+ usual)		51
Sony CDP-750 £250	Good Good	A seductive blend of fine presentation and solid performance, all at a very realistic price that should ensure its success	Track entry remote, menu display etc.		- This
Sony D100 £300	Average Poor	The best all round portable tested, but also the most expensive, and still no substitute for a conventional player	Skip, repeat, 21 track programming, headphones, LCD display		51
Sony CDP-222ES £449	Good Fair	Exceptional build quality and presentation plus respectably good sound quality but some of its kin were preferred	Remote control, 20 digit keypad, track access, programming		51
Sony CDP-333ESD £600	Excellent Excellent	Sony's new '333 represents a triumph for their development department, effectively bringing down the entry level price to 'high end' compact disc replay	Track entry remote, menu display etc.	R	This
Sony CDP 555es £1000	Very Good Very Good	Extravagant build quality, sophisticated features and near state-of-the-art performance, it competes effectively with more expensive models	Remote control, 20 digit keypad, track access, programming	R	51
Tanberg 3015A £1250	Good Fair	Very classy presentation is not enough to compensate for subjectively and objectively faring no better than standard and modified Philips packages that cost a fraction of its price	Simple remote, skip, scan, programming etc.		This
Teac PD135 £180	Fair Fair	Particularly easy to use, this lags a little behind the pack when it comes to sound quality, but it still represents a valid alternative for those who find the presentation attractive	Skip, scan, programming, repeat		This
Technics SL-P111 £179	Good Fair	An average sound quality at a well below average price, but this is only most things to most men	Skip, audible scan, programme repeat, preset edit play	R	This
Technics SL-P220 £229	Average+ + Fair	Sound quality keeps this out of the top ranks but the facilities (wow) and fine technical performance will make it hard to resist for some	Everything except a digital out socket, which is no great loss to most	R	This
Technics SL-XP5 £250	Average— Poor	A contender for the "World's smallest" title, this beautifully crafted miniature falls short in terms of sound quality	Headphones, "high cut" filter, skip, search		51
Technics SL-P520 £350	Good+ Fair	With features and facilities to satisfy the most eager button pusher, this also produced decent sound quality	High/Low scan ratios, headphones, memory programming and more	R	51
Technics SLP 720 £400	Good+ + Good	More buttons for sonic pilots – this was the most sonically super of the top Technics models	Search dial cueing, high scan speed optics, disc menu, programming	R	51
Technics SL-P990 £450	Excellent Good	An obvious technical tour de force, with ample engineering and build quality to justify the price, but some subjective reservations nonetheless	Track entry remote, menu display, search dial etc.		This
Technics SL-P1200 £800	Good+ + Good	Looking more like a desk workstation than a stackable component, this will appeal to the creative recordist and semi pro user. Sounded quietly good	Headphones, remote control, search dial cueing etc.		51
Yamaha CD-X5 £180	Average+ Fair	Good build quality, respectable lab performance, and decent enough sound delivery for your money	Skip, scan, manual only, etc.		This
Yamaha CDX-900 £450	Good Fair	A real button bristler with extensive facilities, well built, but sound quality might suggest a lower price	Programme calendar, remote control, 26 key direct track entry		51
Yamaha CDX-1100 £700	Good+ Fair	A pearly king might like the button overkill here... yet despite exceptional lab performance, listeners were not unduly impressed. It's worth considering	Volume handset, random play, space insert, 26 direct track entry keys		51

To Advertise in
this space ring Susie Triffitt
on 01-631 1433

DIRECTORY

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 usually 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.

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
A&R Arcam Alpha £149	Good Average+ +	Attractively classic British analogue tuner with sound quality comfortably better than most	FM/AM Analogue	BB	50
A&R Arcam Delta £270	Very Good Very Good	Hi-fi sound on FM, good on AM, a dependable British all-rounder	6AM, 6FM presets. FM/MW LW display manual tune	BB	55
Creek CAS3140 £150	Very Good Good +	A true front-rank tuner, excellent ergonomics and audiophile sound quality albeit with the minor handicap of having FM only	FM only	BB	50
Denon TU 450L £130	Average + Average +	Poor AM sound quality may be a deterrent but the FM performance fully merits recommendation	FM/AM Digital	R	50
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 TU915 £325	Good Good	This gave good FM performance but was thought "wretched" on AM. (Psst ... you don't necessarily buy a tuner for the AM)	FM/AM 16 presets auto seek		50
Hitachi FT-MD 5500 £230	Excellent Good + +	A powerful, good sounding tuner with versatile facilities	16 presets, FM, AM, MW auto scan digital, signal meter	BB	55
Hitachi FT5500 II £230	Very Good Good +	Soundwise highly rated on FM, and on AM basically satisfactory - a versatile all-rounder	Auto and manual tuning. 16 presets	R	44
JVC FX-1100 £355	Good + Average +	A sophisticated model with 40 (!) AM/FM presets although the sound was unexceptional at this price level	Multi function computer, signal meter, digital auto tune		55
Marantz ST35L £160	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 £495	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
Mission Cyrus £180	Average Good +	Best Buy material on sound quality but radio frequency performance let it down	FM/AM auto seek tuning	R	50
Musical Fidelity TI £300	Good + Very Good	Top class FM stereo sound on good signal strengths from this audiophile model. Watch out for local CBI	FM only, analogue box dial, manual tune, signal meter	R	55
NAD 4020B £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
Nikko NT-540 £154	Good Average	Lab report was promising but the sound was rather dated	8 presets, AM/FM, digital auto scan		55
Onix B.W.D.1 £520	Good + + Good	Unexceptional sound despite the costly power supply option	FM only, manual digital, variable bandwidth		55
Pioneer F551L £100	Good + Good +	High value budget tuner, very little to argue about (includes long wave)	12 FM, 12 AM presets, auto scan, digital and signal strength meter	BB	55
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 B261 £1174	Excellent Good +	A sophisticated and well-executed example of modern broadcast design, could be the logical choice for the deep-pocketed radio enthusiast	FM only, twin headphones 20 presets	R	50
Rotel RT-830L £110	Good + Good	Fine sounding budget audiophile material, no frills, no fuss	Manual dial analogue, FM, MW, LW	BB	55
Rotel RT-850L £150	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
Sansui TU-D99XL £249	Very Good Good +	This slimline compact model gave good FM sound quality and strong RF performance. But the AM sounded unpleasant	FM/AM, 16 presets	R	50
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	50
Tandberg 3001 £1295	Excellent - Good	An enthusiast dx model, versatile performance and generally good sound, excellent build	8 presets, FM only, analogue, manual dial, var bandwidth, signal meter		55
Technics ST-500L £100	Average + Average +	Fine RF performance and fair FM sound at bargain price = Recommended tag. Alias the AM sounded as if it was coming "down a long furry tunnel"	FM/AM 16 station presets, scan	R	50
Technics STG45AL £140	Good + Good	Good sound on FM, weak AM but clever facilities and a good lab test	16 FM presets or 8 FM/8 MW-LW, digital auto scan, auto memory	R	55
Technics ST-G7 £400	Very Good Good +	Muffled AM, but fine stereo FM quality and well built	16 presets, digital	R	50
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

TO ORDER BACK ISSUES OF HI-FI CHOICE SEE PAGE 50

DIRECTORY

CD MIDI SYSTEMS

So you want a hi-fi, but you don't want to make a fuss about it. A pre-packaged system with everything matching up and no aggravation may not rank with carefully chosen separates on **sound quality**, but there's no denying the attractiveness or popularity of this approach – the market for pre-packaged component hi-fi systems is 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 V-990DX £750	Good Good	Refined up-market system with most modern features. Sound quality is good all round – even the speakers are acceptable	Remote, timer, auto source select	R	54
Aiwa V1500DX £999	Good Good	Remarkable features level even includes independent record feeds to each cassette. High class build, satisfying sound, but best without loudspeakers	Separates system, twin auto-reverse cassette, full remote, timer	R	54
Akai 990 £1400	Average Average+	A gadget oriented expensive system with good compact disc player and remarkable loudspeakers. Let down by the tuner and turntable and not helped by obscure ergonomics	Twin deck cassette, Auto rev., Remote Control, Auto source selection		Systems
Binatone Laser CD System 2000 £270	Bad Bad	A bit of a disaster even at the price. Built to extremely low standard with an appalling turntable. CD and loudspeakers OK, but let down by amp	Twin cassette		Systems
Ferguson HF03 £400	Average+ Good	An all round success with British built speakers and all sources achieving a reasonable standard. Compact disc was weak compared to other units	Twin cassette	BB	Systems
Fidelity MS202 £340	Bad Bad—	Very cheap and poorly finished. Thin, raw sound to match appearance and build	Twin cassette, one-piece system		54
Fisher Midi System M46CD £500	Average Average	Somewhat overpriced, the M46 is let down by a poor amplifier and worse speakers. Other elements perform reasonably, CD being its strongest point	Twin transport		Systems
Fisher Midi System M56CD £580	Average Average	Fitted with a pretty good amp, but dire loudspeakers; otherwise a competent combination including a pretty fair cassette deck	Twin cassette, 5-band graphic equaliser		Systems
Fisher 2400 £600	Average Average	An ambitious and competent package with a strong amplifier and CD player. Given its new lower price it would have merited recommendation if the loudspeakers hadn't let it down	Twin deck, Graphic eq, 5-band		Systems
Goodmans 5100 £350	Poor— Bad	A combined electronics package, with performance standards only too typical of the breed. Speakers good for type but don't compensate	Twin cassette, one-piece system		54
Goodmans 5200 £459	Average+ Average+	Offering possibly the best speakers around in this midi system market, the Goodmans wins on a fair standard for the price, though the turntable was not too hot	12 Band Graphic Eq, Twin deck	BB	Systems
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
Hitachi MD280 £430	Average— Average—	Although the CD player tried to change our mind this system was felt too poor a contender for anything but thumbs down	Remote unit TT, twin cassette, no spare inputs		54
Marantz Studio System £449	Average+ Good	More a hi-fi system than a true midi package, it's good if uninspired. A stronger amplifier could help	Only amp, CD, & speakers – rest optional	R	54
Marantz Concert System £649	Good+ Good+	Well matched and achieved high fidelity standards. Strong characterisation with some treble loss – this wasn't quite neutral, but a pleasure to listen to	Only amp, CD & speakers – rest optional	BB	54
Marantz MX673CD System £999	Average+ Average	Tremendously flexible audio/visual system. Sound quality is satisfactory at best and ergonomics a mess	Various A/V inputs, remote, speakers optional	R	54
Mitsubishi CD51 £429	Average Average—	In some ways a well balanced system, in that the amp and speakers smooth the rougher edges of some sources, but not very satisfactory on the whole	Remote, twin deck		Systems
Mitsubishi E602CD £500	Poor— Poor—	Totem-pole aesthetics match the mixed constructional quality. Sound quality is already poor, but featured synthesised bass can make matters worse still	Spare in/output set, twin cassette		54
Mitsubishi 100R £650	Average Average+	A pretty good package, flawed by 'tinny' loudspeakers, but having a fair turntable – a rarity in this category of equipment	Remote, Multidisc CD, Twin	R	Systems
Philips FCD 565 £370	Poor Poor	An unimpressive system. While the compact disc player and tuner were OK, its main tonal characteristic on all sources was a coarse top end	Double deck, 5 band graphic eq		Systems
Pioneer S-7000 £478	Average+ Average+	Excellent beer-budget system that really works, with the exception of wobbly sounding cassette	One piece + (optional) CD and speakers	R	54
Pioneer System 10 £678	Average Average—	Loudspeakers sound cluttered, and cassette unstable and thin, but tuner and CD are fine	All separates, twin cassette		54
Pioneer System 30 £978	Average+ Average+	Odd remote system means two handsets. CD and radio work well, but turntable and cassette weak. Expensive	Remote, separates, twin auto reverse, multi-disc CD	R	54
Sanyo W40CD £380	Average Average	Low cost, no options package with attractive displays, cassette had high wow and flutter, but the rest worked OK	Semi auto T/T, auto record start, twin cassette	R	54
Sharp SA-CD800H £700	Average Average—	A superficially high grade, high spec system, the SA-CD800H actually sounds clean but a little 'synthetic'	One-piece, 6-disc CD, no T/T		54
Sony Compact 310 £450	Average+ Average+	Low cost but well built and finished and better sounding than most at the price	Remote, auto T/T, twin cassette	BB	54
Sony Compact 510 £599	Average+ Average+	Very good control layout. Shabby loudspeakers not up to otherwise uniformly good system	Remote, twin cassette	R	54
Sony Compact 610 £700	Average Average—	Inconsistent. Same turntable used in much cheaper Sonys gave 'fifty' record reproduction. Cassette likewise	Remote, 'shuffle' play CD, twin cassette		54
Sony FH1215CD £800	Average Average+	Probably the ultimate miniature system. The CD player is particularly good. Best to chuck the speakers away though	Miniature, transportable (AC only). Single auto-reverse cassette	R	54
Sony Compact 710 £999	Good Good	Typically well built and presented but complicated to use except via remote. Record deck poor but remainder good, including speakers	Full remote, auto T/T, twin auto reverse cassette	R	54
Sony Compact Series 90 £1500	Good Good+	The best of a not too wonderful bunch, the excellent compact disc player and pretty good speakers make for reasonable sound quality, though the tuner wasn't of quite the same standard	Twin deck, auto reverse, timer, extra tape socket	BB	Systems
Technics X800CD £400	Average+ Good	Very unstable sounding cassette lets system down badly. Tuner a bit dull, but remainder OK	No T/T, twin cassette		54
Technics X820 £580	Average Average	Tuner and CD player work well but the speakers sound ragged	Remote, auto record starts		54
Technics X840 £730	Good Good	Expensive, but well made, good sounding system. Turntable, tuner & CD player similar to X820	Full remote separates system	R	54
Technics X880 £900	Average+ Average+	Complex, high spec unit with good performance except for the indifferent speakers, which are completely out of keeping	Remote, auto source selection, programmable T/T		54
Toshiba V17CD £399	Average Average+	Loudspeakers are the weak link, with cassette and turntable also indifferent. Tuner and CD worked well though, so reasonable value for money	Twin cassette, semi-auto T/T	R	54

DIRECTORY

HEADPHONES

There are a variety of different approaches to headphone design, and examples of each turn up in this group. Amongst the more expensive esoteric models, electrostatic drivers are used in square open-backed phones such as the Jecklin and Stax models. The majority of these come with some form of transformer which takes the signal initially from the speaker terminals on the amplifier. The actual speaker cables then travel from this unit 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	SOUND COMFORT	COMMENTS	TYPE	VALUE	BACK ISSUE FULL REVIEW
Audio Technica ATH 909 £54.95	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 £64.95	Good Average	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
Beyer DT330 Mk II £45	Poor Good	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 DT990 £130	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
Jecklin Float Model One £75	Very Good Good	Whilst very unusual in appearance the Floats give remarkable sound quality and openness at a reasonable price	Circumaural-ish, open-back, dynamic	BB	55
Jecklin Float Electrostat £375	Excellent Good	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
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 PMB 65 £69.90	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
Sennheiser HD30 £12.99	Poor Good	Built specifically for the personal stereo market these small and light Sennheisers have a slightly synthetic sound, but are an upgrade on the average Walkphones	Supra-aural, semi-open back, dynamic		55
Sennheiser HD410SL £26	Good Good	The 410s have a tight clear presentation underlined by a slightly forward top end, and can be a bit raw with less than adequate sources	Supra-aural, open-back, dynamic	BB	55
Sennheiser HD420SL £45.50	Good Good	The 420s gave a full and tangible quality to instruments and voices, whilst not the most revealing headphones around they would suit slightly brash sources	Supra-aural, open-back, dynamic		55
Sennheiser HD540 Ref Gold £150	Very Good 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 MDR-E272EX £30	Average Poor	These in-ear 'fontopid' type phones are intended for upmarket personal stereos, and sound reasonably good for their size, but are plagued by hiss	Intra-aural, 'open-air', dynamic		55
Sony MDR-A60 £40	Poor Poor	Unusual lightweight intra-aural types, the A60s are pretty stylish but failed to deliver the goods sonically	Intra-aural, 'open-air', dynamic		55
Sony MDR V4 £50	Fair Good	These folding closed-back phones are nicely made but didn't sound too great, the tonal balance being on the 'cold' side	Supra-aural, closed-back, dynamic		55
Sony MDR V6 £70	Good Very Good	A lot more civilised and dynamic than the V4s, these were pretty good for their type and fold up to boot	Circumaural, closed-back, dynamic	R	55
Stax SR34 £140	Very Good Fair	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 SR Gamma £199.85 (SRD-6 Adaptor: £100)	Very Good Very Good	The next model down the Stax range from the Lambda, the Gamma is an excellent headphone with little to criticise but the price	Circumaural, open-back, electrostatic	R	55
Stax SR Lambda Pro £360 (SRD-7SB Mk 2 Adaptor: £185)	Excellent 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

PERSONAL STEREO

Whilst not exactly hi-fi components, personal stereos probably play more music to more ears than CDs and LPs combined and as such should not be ignored. Since the introduction of the Sony Walkman in the early eighties, more and more people have adopted these diminutive machines and consequently the market has become saturated with a vast assortment of players. This is obviously good for competitive pricing but bewildering if one is trying to select a reasonable machine. Prices start incredibly low (around £10) and wind themselves up

to close on £300, although the sub-£50 sector is the most popular.

There seems to be almost no end to the features that appear on personals, some of them have specifications like a midi system! Graphic equalisers are very popular, for what they're worth, and Dolby is fairly common on the £40 plus models, though the quality of noise reduction systems seems to be pretty poor. You can expect more useful features such as autoreverse and ferric/chrome-metal tape type compatibility on many machines and

some even record, but usually only from a microphone or built in radio where it exists.

The sound quality available tends, not surprisingly, to increase with the price of the machines but even quite expensive players are prone to wow with critical material, so if classical piano music is your bag then steer clear of the cheaper (sub £50) players.

Note that our value judgements relate to the personals group as a whole, and are not comparable with separate hi-fi ratings.

MODEL NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Aiwa HS-G35 MkII £35	Poor Fair	A reasonable player for the price but not well suited to classical material and let down by the headphones	Autoreverse, graphic EQ, types I & II		56
Aiwa HS-J36 £89	Good— Average	Comprehensive facilities and reasonable sound are no mean feat for the price	Dolby, autoreverse, types I, II & IV, AM/FM, recorder	R	56
Aiwa HS-PX101 £149	Average— Good	A very slick little number with soft touch controls and remote control headphones	Dolby B, C, autoreverse, types I, II & IV	R	56
Aiwa HS-J101 £170	Poor Good—	Let down by cheap headphones, this is otherwise a quite nice machine with radio presets and electronic transport controls	Dolby, autoreverse, graphic EQ, tape types I, II & IV, AM/FM, recorder		56
Ferguson 3T46 £35	Very Poor Poor	Not particularly subtle but having reasonable speed constancy, it's OK with most material but can get painful	Autoreverse, AM/FM		56
JVC CX-7 £111	Poor Average+	Quite attractive and unusual in appearance, the CX-7 sounded pretty good and came close to recommendation	Dolby, autoreverse, types I, II & IV, rechargeable		56
JVC CX-R7K £188.77	Poor Good	Maximum feature count from this expensive JVC, including soft touch record and stereo microphone. Sound quality, however, could be better for the price.	Dolby, autoreverse, types I, II & IV, AM/FM, record, rechargeable		56

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

DIRECTORY

PERSONAL STEREO

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Panasonic RX-SA78 £100	Very Poor Fair	Not particularly good value with poor speed stability and irritating hiss levels, the latter can be improved with better headphones.	Autoreverse, graphic EQ, AM/FM		56
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
Sanyo MGR-77 £35	Very Poor Very Poor	Rather a basic machine with a raw edgy sound, not helped by poor speed stability.	Graphic EQ, AM/FM		56
Sanyo MGR-87 £50	Very Poor Fair	The 87 came up with a slightly fast but rhythmic sound. Although lacking in finesse, it worked OK with pop material.	Autoreverse, graphic EQ, AM/FM		56
Sanyo MGP 600D £50	Average+ Average-	With styling aimed at the fairer sex the 600D sounded a little better than the similarly priced MGR-87. Lacking in clarity, it was still quite durable.	Dolby, autoreverse, graphic EQ, types I, II & IV		56
Sanyo JJ-P4 £100	Poor Good	Claimed by its makers to be the world's smallest personal stereo the JJ-P4 is a tasty looking object that's capable of good sounds to boot.	Dolby, autoreverse, tape types I, II & IV, rechargeable		56
Sony WM-34 £40	Poor Average	This straightforward no frills Walkman makes pretty plausible sounds at a reasonable price and apart from the Walkman Pro was the only model to earn a Best Buy rating.	Dolby, types I, II & IV	BB	56
Sony WM-F38 £70	Average- Average	A quite stylish player, the F38 delivered good performance for the price and also had reasonable headphones.	Dolby, types I, II & IV, AM/FM	R	56
Sony WM-F63 £100	Average- Average-	This attractive Sports Walkman is nicely built but sonically flawed by rather hissy intra-aural headphones.	Dolby, autoreverse, types I, II & IV		56
Sony Walkman Pro £249-£289	Good+ Excellent	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-4027 £35	Very Poor Very Poor	Not a very wonderful machine, the 4027 sounded pretty appalling with all but the most unobtrusive music.	Graphic EQ, AM/FM		56
Toshiba KT-4047 £60	Average Average	This model proved capable of making the most of better recordings, and sounds reasonably tuneful.	Dolby, autoreverse, graphic EQ, types I, & II, AM/FM	R	56

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
Ferguson RCDD2 £300	Poor	A large, slightly tinny midi system-esque unit with removable speakers and a slightly brash sounding CD player.	Twin cassette, graphic equaliser, spare input (DIN)		53
Fisher PH-D473F £300	Average	The Fisher is quite a neat and compact player which is nice to use but doesn't offer particularly great sound quality.	Autoreverse, AFC		53
Hitachi CX-W800 £300	Average+	This meaty Hitachi lives up to Blaster expectations, its super woofer bass speaker giving maximum street credibility.	Twin cassette, graphic equaliser, phono input	R	53
Memorex CD-3300 £280	Average	A little bit tacky, the Memorex put in a plausible if unenthalling performance, and will work with external speakers.	Spare input		53
Panasonic RX-FD80L £300	Average-	Shiny in a glitzy way, this Panasonic features a reasonable cassette deck but a below par CD player with tiny transport controls.	Autoreverse, spare input		53
Sharp WQ-CD15 £250	Good	A reasonably compact machine with a quite impressive CD player and a novel twin cassette mechanism.	Twin cassette, graphic equaliser, spare input	R	53
Sony CFD-66L £350	Good	A very attractive player in the true yuppie mould of white plastic with silver details, it even sounds OK.	Spare input, shuffle play, AMS (tape search system)	R	53
Toshiba RT-7096 £250	Poor	Quite a large box for the money, the Toshiba isn't too special when it comes to sound quality but does have partly wooden detachable speakers.	Twin cassette, graphic equaliser, spare input		53

To Advertise in
this space ring Susie Triffitt
on 01-631 1433



GLOSSARY

The Hi-Fi Choice dictionary of audio terminology, explaining all the weird and wonderful adjectives used by our reviewers, as well as technical abbreviations.

AM: Amplitude modulated; see 'Medium Wave'.

ACOUSTIC BREAKTHROUGH: Sound that gets into the turntable and hence the cartridge from the air and thereby creates a risk of acoustic feedback.

ACOUSTIC FEEDBACK: If any sound in the room can find its way through the body of the record deck to the cartridge stylus, then that sound will be reproduced from the loudspeakers, along with the wanted programme material. If too much of this sound from the loudspeakers is picked up by the cartridge in this way then a vicious circle of acoustic feedback will be created.

ACTIVE: Speaker systems which contain electronic crossovers and where the drive units are connected directly to power amplifiers.

ALIGNMENT PROTRACTOR: A device used to minimise the lateral tracking error of a cartridge/arm combination.

AMPLITUDE: Size or magnitude; hence the amplitude/frequency response, known normally simply as the frequency response, which describes the relative loudness of the system at different frequencies with a constant input voltage.

ANECHOIC: Without echo; a special room or 'chamber' with thick sound absorbing materials on all surfaces to prevent reflections.

ARM MASS: More accurately called *effective* arm mass, because it is *not* the weight of the arm on a pair of scales. It is the mass of the arm and cartridge combination that appears to be concentrated at, and thus felt by, the stylus tip which is tracking a record groove. There is nothing inherently good or bad about arms with light or heavy effective mass; what matters is the manner and choice of their combination with cartridges of different compliance and the low frequency resonance produced by such combination.

AZIMUTH: With reference to tape and cassette recorders, the alignment of head gap to tape path.

BALANCE: 1) The overall relative loudness perceived at different frequencies (eg bass, treble); 2) the accuracy of the match between the two channels of a stereo transducer (eg cartridge or pair of loudspeakers).

BANDWIDTH: A range of frequencies with presumed defined upper and lower limits.

BASS: Lower part of the frequency spectrum.

BELT DRIVE: The motor has its rotational speed geared down to the required platter speed (33 $\frac{1}{3}$ rpm for LP discs) by a rubber or similar resilient belt which runs round a small pulley on the motor shaft and a large pulley attached to or part of the platter.

BEXTRENE: A plastics material frequently used for bass and mid-range cones.

BIAS: (*turntable/arms*) Because the cartridge on a pivotal arm is being drawn across the record surface by the stylus tracking at an angle offset from the pivots, groove friction produces an imbalance of lateral force. Bias is the application of a compensatory lateral force acting in the opposite direction.

BIAS: (*tape*) This refers to a high frequency current passing through the record head which allows the audio current also passing through the head to produce reasonably linear magnetisation of the tape at all levels permitted by the combination of each machine with the tape. The lowest level of bias is

required for ferric cassettes, a slightly higher one for ferrichrome, an even higher one for chrome or pseudochrome, and the highest for metal.

BOTTOMING: The stylus scraping on the distorted rounded bottom of the groove due to incorrect stylus geometry.

CANTILEVER: The thin rod or tube that connects the stylus to the armature and hence the cartridge body.

CAPACITANCE: An element of electrical impedance that is particularly important when matching pickup cartridge, arm leads and amplifier input characteristics to achieve a flat frequency response from discs.

CLIPPING: This is reached when a circuit is overloaded and overdriven, resulting in bad waveform distortion and audibly unpleasant effects.

COLORATION: A general term used to describe the audible effects of distortions, particularly in loudspeakers and record players. These are usually caused by frequency response irregularities and/or resonances.

COMPATIBILITY: The selection of interdependent components to achieve optimum system performance; notably arm/cartridge mass/compliance matching, cartridge electrical loading, or loudspeaker compatibility with amplifiers.

COMPLIANCE: A measure of the springiness of the cantilever/armature seen from the stylus, expressed in compliance units (cu), where 1 cu = 10⁻⁶ cm/dyne.

CROSSOVER: An electrical circuit which uses combinations of inductors, capacitors and resistors to divide the signal from the power amp into the required frequency bands and with any necessary equalisation for feeding to the individual drive-units of the speaker system.

CROSSTALK: The leakage from one channel to the other in a two channel stereo system.

CUTTER: Mechanism used to cut recorded signal onto lacquer master; consists of turntable, lathe, cutting head, cutting and servo amps.

DIN: German standards body, responsible amongst other things for a popular range of standard plugs and socket specifications.

DAMPING: A means of controlling resonances by means of a resistive medium (electrical, mechanical, or acoustic depending on situation).

DECIBEL (dB): A logarithmic unit that is convenient for expressing ratios that span a wide range on a linear scale. For simplicity it can be regarded as a measure of relative loudness.

DISTORTION: Literally this can mean any deviation from the original, but usually refers to harmonic rather than intermodulation distortions when not specified.

DOLBY: Covers various signal processing/deprocessing systems, but normally refers to the B & C noise reduction systems used in cassette record/replay, and the B system used for music cassette replay.

DOPING: A technique involving the application of damping to a loudspeaker driver cone in order to assist in controlling resonances.

DOWNFORCE: The weight, measured at the stylus, which holds it down in the groove.

DRIVE UNIT (DRIVER): The term used to distin-

guish the loudspeaker unit itself, be it bass, mid-range, treble or fullrange in application, from the complete loudspeaker system which combines drive units, cabinet and crossover into a total design.

DROPOUTS: Momentary reductions of programme level due to inadequate head/tape contact caused by oxide particles shedding off the tape onto the head gap, or inadequacies in tape transport or tape.

DYNAMIC RANGE: The ratio in dBs between the quietest sound that can be successfully recorded and the loudest which can be accepted without serious distortion on an average programme.

EFFECTIVE MASS: The inertia, or mass-controlled resistance to movement, of a device, particularly important with regard to tonearms.

EFFICIENCY: The amount of acoustic power delivered for a given electrical input power.

ELECTROSTATIC: A principle employed in some loudspeaker transducers using static electricity effects to set up a polarising field within which the modulated transducer medium moves.

ELLIPTICAL STYLUS: A specially shaped stylus profile that makes the 'plan view' radius along the length of the groove smaller than the 'elevation view' contact radius viewed from the front.

EQUALISATION: (*general*) The deliberate modification of frequency response, usually in response to some engineering limitation or deficiency.

EQUALISATION: (*tape*) This refers to the necessary change in frequency response required of an amplifier so that overall flat frequency response is obtained from a tape medium. Equalisation is required both on record and replay. Any tape recorded on a good cassette recorder should have the same inherent response when played back on another correctly set up machine, since all playback equalisations should have been standardised. These standards are normally specified by the time constants of the circuits involved, eg 70 μ s or 120 μ s (see 'Microseconds').

FARAD: Measure of capacitance.

FM: Frequency modulated; often used to describe radio transmissions of high fidelity potential on the VHF band.

FARAD: Measure of capacitance.

FERRITE ROD: A short rod type aerial used for AM reception; may be fitted internally or externally to tuner or receiver.

FERRO-FLUID: A magnetic fluid which is introduced into the voice-coil gap to provide damping and/or improved cooling.

FILTER: A circuit (normally) used to restrict the bandwidth of a system; may be fixed or switchable.

FREQUENCY RANGE OF SPECTRUM: Can refer to any particular group of frequencies, but commonly applied to the audible band from 20 to 20,000 cycles per second (Hz), extending from the deepest bass to the highest audible harmonics.

FREQUENCY RESPONSE: The variation in output over a frequency range, particularly of a transducer; can be expressed as a range with decibel limits, or depicted graphically.

Hz (HERTZ): 1 Hz = 1 cycle per second and is a measure of frequency which corresponds to musical pitch (the higher the frequency the higher the pitch).

HF: High frequency.

HARMONIC: Harmonics are the whole number multiples of a base frequency called the *fundamental*.

HARMONIC DISTORTION: The addition of unwanted harmonics to a signal.

HUM: A low frequency interfering sound produced by break-through or interference from mains wiring or circuitry.

IHF: American Institute of High Fidelity, an important standards body.

IEC: An international standards body.

IMPEDANCE: Measure of resistance (and reactance) in alternating (ie audio) signals; this is of some importance in the compatibility of both cartridges and headphones with amplifiers. For convenience sake is measured in ohms.

INTEGRATION: Used to describe the success with which the output from two drive units combine to give smooth output through the crossover region.

INTERMODULATION (IM): A form of distortion arising from two or more signals producing non-harmonic signals that correspond to the sum or difference of the two frequencies.

KILO (k): prefix meaning one thousand.

LED: Light Emitting Diode; an indicator light.

LF: Low frequency.

LATERAL FRICTION: The resistance to movement of an arm and cartridge combination in the horizontal plane (ie across a record), caused by friction in its bearings.

LINEAR: A transducer that produces an output that exactly portrays its input over the required operating range is described as linear, and is hence distortion free. Hence also nonlinearities (distortions).

LINE-CONTACT: A special stylus profile that extends the ellipse, increasing contact length up and down the sides of the groove.

LOAD OR LOADING: The impedance (including resistive and reactive components, ie ohms, mH, pF) seen by one component looking back to its interconnected component; of importance in compatibility of cartridge/amp, and amp/headphone.

'LOUDNESS': An equalisation circuit frequency switchable on amplifiers which is designed to compensate for presumed hearing characteristics at low listening levels by boosting bass and treble.

MOL: Maximum operating level of tape normally referring to 5% distortion of 315Hz or 3.15kHz.

MEDIUM WAVE: An AM transmission band incapable of high fidelity signals.

MICRO- (μ): Prefix for units meaning one millionth of.

MICROSECONDS (μ s): The time constant of a resistor capacitor combination involving a frequency response change (equalisation).

MIDRANGE, MIDBAND: The central part of the audible frequency range where the ear is most sensitive.

MILLI- (m): Prefix for units meaning one thousandth of.

MODULATION: The audio signal is 'stored' by means of modulations within a medium, eg the 'wiggles' in the groove of a plastic disc, or the magnetic coding on a tape.

MODULATION NOISE: An additional noise added

to tape noise, which increases with the degree of modulation of the tape, caused by the properties of the magnetic coating. This noise has most of its energy near the modulation frequency (causatory tone).

MOVING-COIL: A transducer (eg cartridge or headphone) where the signal is generated by the movement of a coil within a magnetic field.

MOVING-MAGNET: The most common form of cartridge transduction, where the magnet moves while the coils are held relatively stationary.

MULTIPLEX FILTER (MPX): A circuit which introduces severe attenuation at supersonic frequencies to decrease interference encountered with the output from some stereo FM tuners.

NANO (n): Prefix meaning a thousandth of a millionth of.

NOISE: Random unwanted low level signals.

NOISE MODULATION: An unwelcome breathing effect that can be heard on some programme material, produced by poor noise reduction systems, or circuits.

OCTAVE: Two-to-one ratio of pitch or frequency.

OFFSET ANGLE: The angle measured between the centre line of the pickup cartridge and the line which joins stylus and arm pivot point.

OHM: Unit of electrical impedance (including reactance) or resistance; also kohm, where 1 kohm = 1,000 ohms.

OVERHANG: The extent to which the cartridge stylus extends beyond the centre of the platter is critical, and controlled by fore and aft adjustment of the cartridge on the arm.

PASSIVE: The most common type of system, where drivers and crossover are driven from a single power amplifier.

PEAK RECORDING LEVEL: A level above which distortion becomes apparent. This distortion is introduced when the oxide particles almost reach magnetic saturation, and thus will accept no more level.

PHONO: The most commonly used plug/socket combination in audio components.

PICO (p): Prefix meaning one millionth of a millionth of.

PORT: An opening in a cabinet which is tuned to characteristics of the bass driver and the enclosure volume to provide reflex type bass-loading.

POWERAMPLIFIER: The part of an amplifier that provides power to drive the loudspeakers: usually integrated, it is sometimes a separate component.

PRE-AMPLIFIER: The part of an amplifier that accepts the input signals, sorts them, applies any necessary equalisation, and then passes the signal to the (normally integral) power amplifiers.

PRESENCE: A quality of forwardness or immediacy in a sound balance, generally related to an upper-middle frequency response boost.

PRINT-THROUGH: A pre- or post-echo of a loud signal created by magnetisation occurring from one layer to an adjacent layer after the tape has spooled or been recorded.

Q: A measure of the magnitude and shape of a resonance; the higher the Q, the sharper and more severe in amplitude the resonance.

REFLEX: A system of bass loading (using port or ABR) which offers improved efficiency and bass

power handling at the expense of subsonic control compared to a sealed box.

RUMBLE: The low or medium frequency sound produced mechanically by any moving parts in a turntable, mainly the motor and platter bearings.

SENSITIVITY: The volume of sound output for a specific electrical voltage input.

SEPARATION: As between the two channels of a stereo pickup; see *crossstalk*.

SHIBATA: A special stylus extending the elliptical to a 'line contact' type of profile.

SIDE-THRUST: A force acting on cartridges in pivoted (ie not parallel tracking) arms, due to the stylus/vinyl 'friction' acting along the line of the offset angle; hence bias or side-thrust compensation.

SIGNAL-TO-NOISE, SIGNAL/NOISE, S/N: The difference in total output when an applied signal is removed.

STYLUS: The specially shaped piece of diamond in contact with the groove and connected to the cantilever.

SUBSONIC: Below the audible range, ie below 20Hz.

SQUARE WAVE: A signal which consists of a fundamental plus a (theoretically infinite) series of odd (3rd, 5th etc) harmonics in a precise phase and amplitude relationship. It is useful for examining transient performance, symmetry, resonance control and 'ringing'.

THD: Total harmonic distortion.

TRACING: The following of the groove modulations by the stylus: hence for example tracing distortion, caused by the inability of a spherical stylus to trace the high frequency inner grooves on a disc.

TRACKABILITY: The ability of the cartridge to cope with large amplitude modulations (or of the arm and cartridge to follow the groove itself properly).

TRACKING ERROR: The discrepancy between the truly tangential angle at which a record is cut and the slightly off-tangential angle at which it is tracked by a stylus on a pivoted arm during some parts of the arm's travel.

TRANSIENT: Signal of very short duration.

TREBLE: Upper part of frequency spectrum, typically above about 3kHz.

TWEETER: A small drive unit designed to operate over the high frequency range.

ULTRASONIC: Frequencies above audibility, ie greater than 20kHz; also *supersonic*.

VERTICAL TRACKING ANGLE (VTA): The angle at which the plane of motion of the stylus is set with respect to the vertical when viewed from a side elevation of the cartridge. Should match the 20° cutter standard.

WEIGHTING: A factor or function that is applied to a measurement to increase its relevance and usefulness.

WOOFER: A drive unit that operates over the bass portion of the audio range.

WOW AND FLUTTER: Low and high frequency pitch variations (from poor tape transport of turntable platters with speed drift).

DEALER GUIDE

All Hi-Fi Bought!

We buy or exchange ALL 2nd hand Audio & Video equipment.

Everything accepted in ANY condition — absolutely NOTHING refused!

MUSIC & VIDEO EXCHANGE
 56 Notting Hill Gate, London W11
 Open 7 days 10am-8pm
 Tel: 01-727 0424

Westwood & Mason (Oxford) Ltd

HI-FI SPECIALISTS

SELECTED PRODUCTS FROM: A&R CASTLE CREEK DEAN DENON DUAL HEYBROOK KEF LINN SONDEK MISSION MONITOR AUDIO MORDAUNT-SHORT INCA TECH NAIM QUAD REGA ROTEL SPENDOR AUDIO TECHNICA TANNOY WHARFEDALE YAMAHA. BEYER FOUNDATION AND TARGET STANDS NAGAOKA QED ORTOFON HARBETH SENNHEISER MARANTZ LOGIC EPOS

Demonstrations strictly by appointment

46 GEORGE STREET, OXFORD
 Tel. Oxford (0865) 247783 Closed Thursday



PHASE 3 HI-FI
 HI-FI SALES, DEMONSTRATIONS, INSTALLATIONS & SERVICE
 HITACHI
 SPENDOR, KEF, TANNOY, MORDAUNT-SHORT, HEYBROOK, JBL, MARANTZ, HARMAN-KARDON, KENWOOD, ONKYO, GOODMAN'S, CELESTION, DUAL, DENON, ROTEL, NAD, YAMAHA, AIWA, TEAC, PROTON, THORENS, QED, ETC.
WORTHING 206820
 53 BRIGHTON ROAD WORTHING, W. SUSSEX

Philip March

audio systems

Demonstrations by Appointment • Closed Mondays

103a. Beverley Road. Hull.
TEL. 0482 227867

A Selection of BETTER BRITISH HI-FI

THE AUDIO SHOP

HI-FI SPECIALISTS

Appointed stockist of:-

Tannoy • Mordaunt Short • Castle • Royd • Infinity • B&W Goodmans • Dual • Mantra • QED • Revolver • Ion Systems (Nytech) • Nagaoka • Audio Technica • Goldring • Rata Ortofon • PhilipsCD • Target • BLQ • Goodmans Foundation

(Demonstration Room)

Coffee Tavern Court,
 37a High Street, Rushden.
 Tel: (0933) 56651

DOWNLANDS AUDIO

HI - FI SPECIALIST
 (0825) 61263



- DUAL ■ NAKAMICHI ■ QED ■ A&R CAMBRIDGE
- SENNHEISER ■ B&W ■ BEYER ■ MUSICAL FIDELITY
- DENON ■ THORENS ■ TANNOY ■ PROTON
- SYSTEMDEK ■ ONKYO ■ RUARK ■ HEYBROOK ■ QUAD
- ROGERS ■ MARANTZ ■ MYST ■ ACOUSTIC RESEARCH

FULL DELIVERY & INSTALLATION SERVICE. 2 DEM ROOMS
 OPEN: MON-SAT 10-5.30 p.m. (CLOSED WEDNESDAYS)

79 HIGH ST., UCKFIELD, EAST SUSSEX TN22 1AS

— PREMIER HI-FIDELITY —

Audioscene

Tel: 0246 204005

Selected products from: Musical Fidelity, D.N.M., Inca-Tech, Cambridge Audio, S.M.E., Pink Triangle, Revolver, Alphason, Denon, Trio Kenwood, Mission, N.A.D., Rotel, Nakamichi, Celestion, Epos Acoustics, BLQ, Gale, Cliff Stone, Teac, Marantz, Philips CD, Thorens

132 CHATSWORTH ROAD, BRAMPTON, CHESTERFIELD, DERBYSHIRE

Hastings Hi-Fi

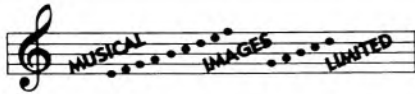
CONSULTANTS

32 WESTERN ROAD, ST. LEONARDS. (0424) 442975

Selected Hi-fi from — EXPOSURE, MUSICAL FIDELITY, QUAD, NAKAMICHI, HARMAN KARDON, MONITOR AUDIO, ROGERS, TANNOY, CYRUS, NAD, REVOLVER, MANTICORE, GALE, MARANTZ, AUDIOPHILE, ELITE, THORENS, CELESTION, HEYBROOK, & Many more.

- OPEN MON-SAT 9.00-6.00.
- FULL DEMONSTRATIONS — IN STORE & IN HOME

DEALER GUIDE



AKG, AR, AIWA, A&R, AVANCE, ARISTON, ALPHASON, B&W, BOSE, BEYER, CASTLE, CELESTION, CAMBRIDGE, DENON, DUAL, dbx, ELITE ROCK, HARMON KARDON, HEYBROOK, INCA TECH, INFINITY, KEF, KENWOOD, LUXMAN, MARANTZ, MONITOR AUDIO, MICHELL, MORDAUNT-SHORT, MUSICAL FIDELITY, MYST, NAD, NAKAMICHI, NAGAOKA, PMB, ONKYO, PIONEER, PHILIPS (CD), QED, QUAD, REVOLVER, ROTEL, SPENDOR, SANSUI, STAX, SENNHEISER, TANNOY, TARGET, THORENS, VdH, WHARFEDALE, YAMAHA.

- LATE NIGHT THURSDAY ● INSTANT CREDIT UP TO £1,000
- MAIL AND TELEPHONE ORDERS WELCOME
- ACCESS, BARCLAYCARD, AMEX, DINERS CLUB.

45 HIGH STREET, HOUNSLOW, MIDDLESEX
TEL: 01-570 7512

SHROPSHIRE'S HI-FI CENTRE!

NAD
 Quad
 B&W
 Kenwood
 JVC
 Celestion
 Onkyo
 A&R
 Nakamichi
 Dual
 Beyer Dynamic

AVON HI-FI LTD

12 Barker Street, Shrewsbury (0743) 55166



Hi-Fi Specialists

- A&R
- B&O
- Castle
- Dual
- Mission
- Aiwa
- B&W
- Denon
- Marantz
- Monitor Audio

- Mordaunt-Short
- Musical Fidelity
- Nakamichi
- Pioneer
- Philips CD
- Quad
- Rogers
- Rotel
- Revox
- Sony
- Spendor
- Tanhoy
- Technics
- Thorens
- Trio
- Yamaha etc.

Two-year guarantee
 Private listening room
 Excellent comparator demonstrations

54 Chapel St., Chorley, Lancs.

Telephone (02572) 71935

THE AUDIO CENTRE

Hi-Fi Specialists in Northern Ireland

Stockists of:

AR, AIWA, DUAL, DENON, NEC, HITACHI, MARANTZ, QED, GOODMAN'S, WHARFEDALE, ROTEL, SANSUI

OPEN: 9-6pm (excluding Thursday)

**84 Bridge Street, Portadown,
 Northern Ireland**
Telephone: 0762 358059



ROTEL



DENON



Norman H. Field

Hi-Fi

Technics

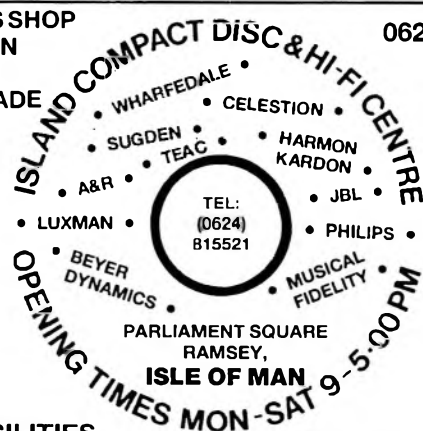
ALBANY HOUSE,
 HURST STREET,
 BIRMINGHAM B5 4BJ
 Telephone: 021-622 2323

YAMAHA

HI-FI MARKETS
 The place where people care about hi-fi.

DOUGLAS SHOP
 NOW OPEN
 ON LOCH
 PROMENADE

0624-815521



DEM FACILITIES

MANDERS HI-FI LTD

For Nakamichi, Quad, Dual, Hafler, Luxman, Denon, Revox, Sansui, Harman-Kardon, A+R, Thorens, Sondek, QED, Spendor, Monitor Audio, Rotel, Ariston, Revolver, Technics etc.

**2 Edward St, Grimsby,
 Humberside**
0472-51391

SOUND DECISION LTD



Retailers of fine quality Audio equipment

Stockists of

- Audio Innovations • A&R Cambridge • DNM Design
- Denon • Dual • Townshend International • Gale • Heybrook • KEF • Marantz • Mission • Ariston • Rogers • Goldring • Audio Technica • RATA • Revolver • Rotel • Ruark • Snell • Musical Fidelity

106 Harley Road, Sale, Cheshire M33 1FP
Telephone: 061 969 1074

Demonstrations by appointment please, Mon-Sat 9.30-6.00

REVIEW PRODUCT INDEX

COMPACT DISC PLAYERS

A&R ARCAM DELTA	39	PHILIPS CD371	
ADC 250X	40	PHILIPS CD472	
AIWA CD001	41	PHILIPS CD473	
AKAI CD93	42	PHILIPS CD880	
CAMBRIDGE CD2	43	PIONEER PD5050	
dbx DX5	45	PIONEER PD6050	
DENON DCD 800	46	PIONEER PDM-50	
DENON DCD 1500II	47	PIONEER PD7050	
DENON DCD 1700	48	ROTEL RCD 820BX2	
HITACHI DA7000	49	SAE D102	
HITACHI D009	51	SANYO CP27	
HITACHI 7200	52	SONY CDP-M35	
KENWOOD CDP990SG	53	SONY CDP-M750	
LUXMAND-90	54	SONY CDP-333ES	
MARANTZ CD873LE	55	TANDBERG 3015A	
MARANTZ CD94	57	TEAC PD135	
NAKAMICHI OMS1E	58	TECHNICS SLP111	
NEC CD610	59	TECHNICS SLP220	
NEC CD810	61	TECHNICS SLP990	
NIKKO CD200R	62	YAMAHA CDX5	

LOUDSPEAKER STANDS

63	APPOLO A820	97
64	APPOLO A10	97
65	FOUNDATION FRED	98
68	FOUNDATION MAGGI	98
69	FOUNDATION PI	99
70	HEYBROOK POINT 5	99
72	HEYBROOK HBS1	102
74	LINN KAN II	102
75	LINN SARA	103
76	MONOTRAK M1	103
77	MONOTRAK M4	105
78	MONOTRAK M4S	105
79	MORDAUNT-SHORT IS1 II	106
81	MORDAUNT-SHORT IS1 I	106
82	ORIGIN LIVE STAND	106
83	PARTINGTON PP4	107
84	PARTINGTON DREADNOUGHT II	107
85	QED TS22 TRISTAND	109
87	RATA TORLYTE	109
89	TARGET HS20	111
	TARGET HJ15/3	111



STOCKISTS OF
LINN PRODUCTS, NVA,
EXPOSURE, ONYX,
BLQ, HEYBROOK,
ROYD, MANTRA,
AUDIO TECHNICA,
REVOLVER, ARISTON,
ROTEL, JPW,
MARANTZ, AND MANY
OTHERS.

MUSICAL APPROACH
137A NEWPORT ROAD,
STAFFORD
TEL: 0785 55154
NEXT DOOR TO RITZY -
ABOVE ROYAL LONDON INSURANCE

Hi-Fi Bargains for cash

New and used equipment

Quad, Sony inc es, Nakamichi, Revox,
Technics, Harmon Kardon, Teac, Lux, Bose,
JBL, Tannoy, AR, T&A (sonab), Mordaunt-
Short, Marantz, Philips.

The Hi-Fi Centre

Green Lane, Wilmslow, Cheshire SK91 1LW
(0625) 524766/522112

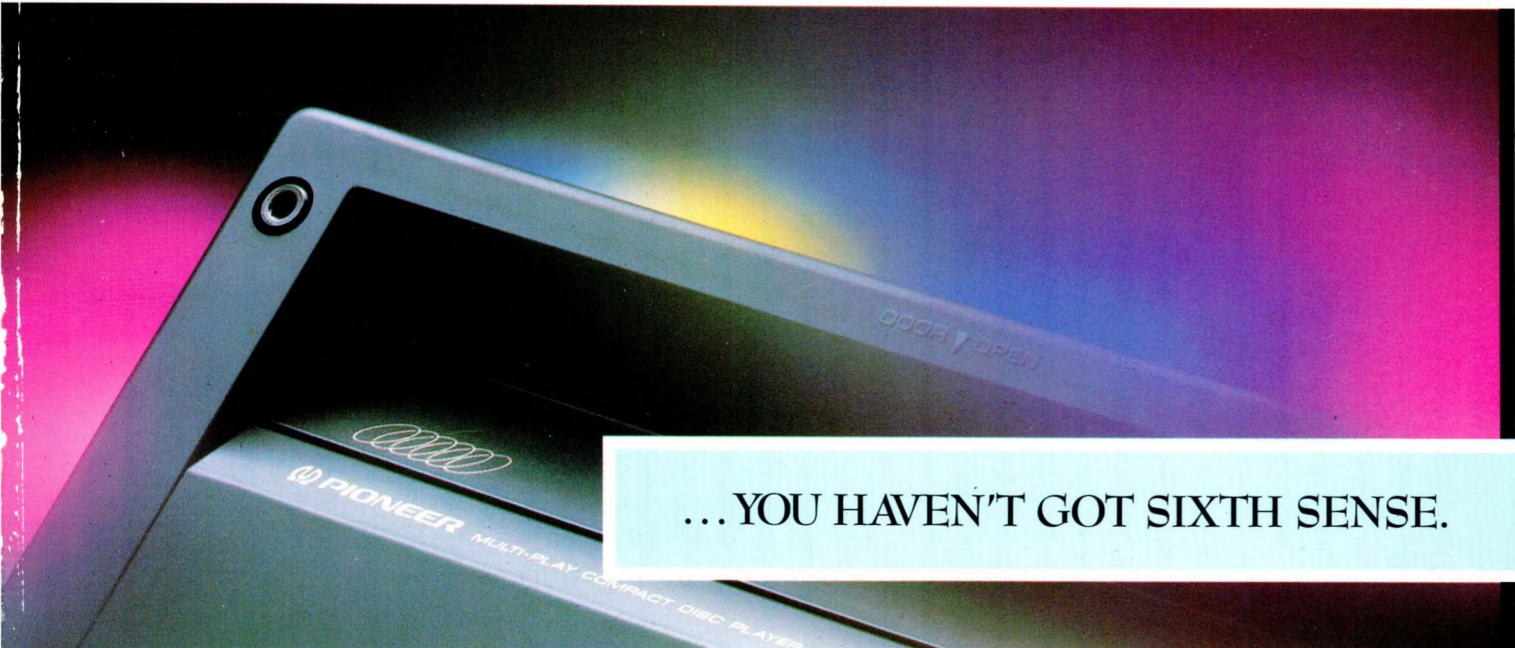
Closed Wednesdays except by appointment

ADVERTISERS INDEX

ACOUSTIC ARTS	95	MAXELL	1
AKAI	12 & 13	MICHELL ENGINEERING	144
ALTERNATIVE AUDIO	142	MISSION ELECTRONICS	08C
A&R CAMBRIDGE	32	MONITOR SOUND	158 & 159
ARISTON	IFC	MOORGATE ACOUSTICS	146
AT LABS	86	MUSICAL APPROACH	158 & 159
AUDIO CENTRE	158 & 159	MUSICAL IMAGES	158 & 159
AUDIO FILE	144	MUSIC & VIDEO EXCHANGE	158 & 159
AUDIO INSIGHT	144	O'BRIEN HI-FI	88
AUDIO PROJECTS	144	ORELL ELECTRONICS	88
AUDIO SCENE	158 & 159	ORIGIN LIVE	124
AUDIO SHOP	158 & 159	PATH GROUP	73
AUDIO TECHNICA	124	PHASE 3 HI-FI	158 & 159
BANDRIDGE	17	PINWOOD MUSIC CO	14
BEYER DYNAMIC	118	PRECISION AUDIO CONSULTANTS	142
BIB	23	QED	128
DOUG BRADY	104	RADLETT AUDIO	140
BRENTWOOD MUSIC CENTRE	140	RATA	114
THE CORNFLAKE SHOP	34	RAYLEIGH HI-FI	125
COVENT GARDEN RECORDS	90 & 92	READING HI-FI	88
CREEK AUDIO	104	RICHER SOUNDS	30 & 31
DOWNLANDS AUDIO	158 & 159	PAUL ROBERTS	36
NORMAN H. FIELD	158 & 159	ROTEL	136 & 138
HAMPSHIRE AUDIO	80	SEVENOAKS	66 & 67
HASTINGS FI-FI	158 & 159	SOUND DECISION	158 & 159
HAYDEN LABS	26	SOUND GALLERY	142
HEYBROOK HI-FI	60	SOURCE ODYESSY	95
HI-FI CENTRE	158 & 159	SPALDINGS	112
HITACHI (UK LTD)	22 & 23	SWIFTS OF WILMSLOW	23
BILL HUTCHINSON	112	SWISSTONE (ROGERS)	94
HW INTERNATIONAL	56	SUBJECTIVE AUDIO	44
IN HI-FI	146	WEST MIDLANDS AUDIO	140
ISLAND COMPACT DISC	158 & 159	WESTWOOD & MASON	158 & 159
MANDERS HI-FI	158 & 159	WOODSIDE ELECTRONICS	146
PHILIP MARCH HI-FI	158 & 159		



IF YOU CAN'T SEE THE CD...



... YOU HAVEN'T GOT SIXTH SENSE.

At first glance you could be forgiven for thinking that the ultra-remarkable Pioneer KEX-M700 is simply one of the most advanced in-car Tuner/Cassette Decks available.

Take a closer look, and you'll see it's much much more.

You won't just find all the controls you need for total control of an integrated CD Deck. Instead, you'll find all the microprocessor controls you need for the integrated Multiplay CD Deck.

Multiplay means having a 6-disc CD magazine to provide up to seven hours of your favourite music—as it comes, or as you programme it.

And you can also preprogramme up to 15 other 6-disc cassettes, and simply slot them in when you want to play them.

(And all the magazines play just as brilliantly on a Pioneer home Multiplay CD system, too.)

With the CD Control Unit boot-mounted for total security, and with highly effective anti-theft devices built in, you'll find Pioneer's approach to in-car CD to be sound common sense.

But then your sixth sense would have told you that anyway.

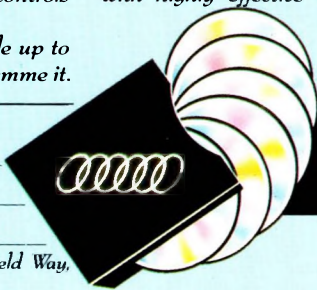
Please send me details and dealer list of Pioneer Multiplay CD Systems.

Name

Address

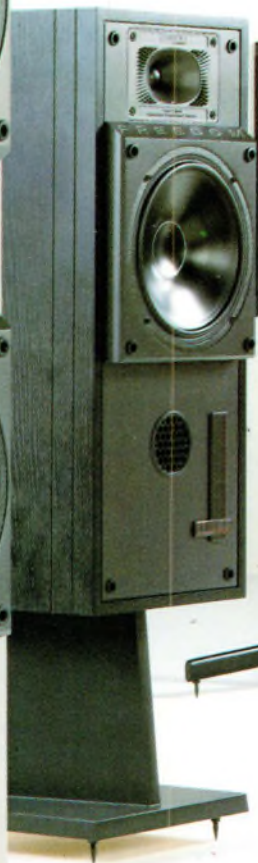
Tel:

To: Marketing Department, Pioneer High Fidelity (GB) Ltd., 1-6 Field Way, Greenford, Middlesex UB0 8UZ



PIONEER
MULTIPLAY CD

IN-HOME/IN-CAR



MISSION
ELECTRONICS

MISSION ELECTRONICS HUNTINGDON PE 1B 6E0 PHONE (0480) 52777 TELEX 32333 FAX 432777