

£2.95

APRIL 1988

HI-FI CHOICE

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

90 LOUDSPEAKERS
- SUMMARISED

124 AMPLIFIERS AND
32 TUNERS - SUMMARISED

52 CD PLAYERS
SUMMARISED

GO FOR GOLD! LAST CHANCE
TO WIN A £3,000 TURNTABLE

10 VALVE AMPLIFIERS
UNDER REVIEW

109 CARTRIDGES
- SUMMARISED

Cassette Head Cassette Deck

37 CD MIDI SYSTEMS
- SUMMARISED

EQUIPMENT SUPPORTS
ON TEST

68 CASSETTE DECKS
- SUMMARISED

47 TURNTABLES AND
26 TONEARMS - SUMMARISED

40 CASSETTE DECKS REVIEWED

TEST SUMMARIES ON OVER 600 HI-FI PRODUCTS - FROM OUR OWN INDEPENDENT LABS

HEAR THE DIFFERENCE Choosing hi-fi is child's play. All you have to do is listen. So forget the jargon, ignore the gimmicks; if one hi-fi sounds better than another – it is better. End of story. Our dealers will be pleased to let you hear Linn equipment and compare the sound with other systems. You'll find it ridiculously easy to hear the difference. For further information contact Linn Products, Floors Road., Eaglesham, Glasgow G76 0EP, Telephone (041) 644 5111.



LINN

HIGH FIDELITY
YOU'VE NEVER HEARD IT
SO GOOD.



MOST HI-FI SYSTEMS



LINN HI-FI SYSTEM



“It’s my tape.”

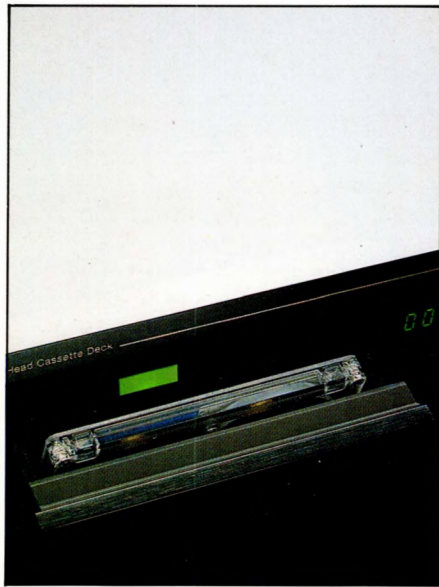
The very special CDXII from Memorex – better than metal performance – gives the highest Magnetic Moment of any cassette currently available – minimises hiss and system noise – records up to + 13dBs without distortion.

CDXII – simply the best tape in the world **MEMOREX**

MEMTEK PRODUCTS LTD · 2 ASCOT ROAD · BEDFONT · FELTHAM · MIDDLESEX TW14 8QH · TELEPHONE (0784) 247241

HI-FI CHOICE

ISSUE NUMBER 57: APRIL 1988



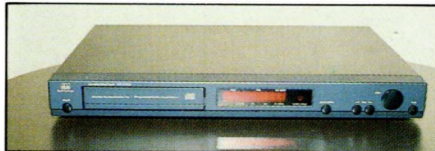
Front Cover: The Recommended Nakamichi CR-4E. See page 57.

7

UPDATE

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

15



AND THE SHOW GOES ON . . .
Paul Messenger visits the Holiday Inn at Bristol to report on the Hi-Fi '88 show.

18

ASPIRATIONS: A HOUSE FULL OF SOUND



Dan Houston visits the home of two high-flying bankers where both eyes and ears get soothing treatment.

23

READERS WRITE/CHOICE ANSWERS

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

26

GO FOR GOLD!

Your last chance to win one of Scotland's most prestigious turntables – the £3,000 gold-plated Source/Odyssey plus the £249 Audio Technica OC-7 cartridge.



28



PERSPECTIVES: PASSIVE PLUS
Paul Crook attempts to unravel the complexities of bi-wiring.

CASSETTE DECKS

33

MARKET RESPONSE

Dan Houston's market survey summarises dealers' opinions on the current state of the cassette deck market.

37

CHOOSING AND USING CASSETTE DECKS

A practical guide to cassette deck selection.

39



CASSETTE DECK REVIEWS

Alvin Gold puts 40 cassette decks through their paces.

87

TECH TALK

The background to the test procedures.

88

CONCLUSIONS, BEST BUYS AND RECOMMENDATIONS

Our regular roundup spotlights the leading performers plus our features comparison chart on over 65 cassette decks.

VALVE AMPLIFIERS

93

CHOOSING AND USING VALVE AMPLIFIERS

A non-technical guide to valve amplifier selection.

95

VALVE AMPLIFIER REVIEWS

Martin Colloms and Chris Bryant test ten valve amplifiers.

107

CONCLUSIONS, BEST BUYS AND RECOMMENDATIONS

The findings from the latest tests plus those recommended in previous reviews.

HI-FI FURNITURE

111

CHOOSING AND USING HI-FI FURNITURE

For the first time *Hi-Fi Choice* looks at equipment supports. Paul Miller reports.

112

HI-FI FURNITURE

Paul Miller reviews a selection of turntable and equipment tables, shelves, platforms and feet.

123

CONCLUSIONS, BEST BUYS AND RECOMMENDATIONS

The leaders from this month's equipment support reviews.

124

SELECTED DEALER DIRECTORY

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

128

SYSTEM BUILDING

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

131

THE CHOICE DIRECTORY

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

154

GLOSSARY

Technical terminology made simple.

MENU

This month's main spotlight is focused upon cassette decks – something of a bastard medium perhaps, but arguably the most universal and practical music source around. The looming threat posed by the launch of a more up to date, digital rival, known as DAT, has been sending shudders through the ranks of hi-fi cassette deck manufacturers for a couple of years, but the evidence so far suggests they needn't have worried – indeed the arrival of four new Nakamichis is a sure gesture of confidence in the old and the faithful.

DAT may yet work commercially. Or it may turn out to have been a mere chimera after all – a myth based on hype and hope, whose only refuge may be alongside reel-to-reel recorders with professional and semi-pro users. For the moment, and at least until DAT has seriously penetrated outdoor and in-car markets, the high quality cassette deck will remain a key element in most hi-fi systems.

Indeed all the signs are that current sales are healthy, particularly amongst the better quality machines, while the UK user is also starting to use premium quality tapes more often. Expectations of both quality and price points appear to have risen, alongside the arrival of CD and the steady improvements in vinyl LP reproduction.

Our second test group is valve amplifiers, which could be regarded as the overflow from last month's big amplifier test. My apologies for placing these in their own ghetto: the rationalisation is that they are innately different, with a narrower appeal to a (very enthusiastic) minority.

Paul Miller's group test on 'hi-fi furniture' (equipment supports) makes fascinating reading, breaking fresh ground in reviewing techniques – as will his examination of loudspeaker stands in the next issue. This comparatively new category of hi-fi components has become successful entirely on the basis of demonstrable sound quality benefits. Miller has developed tests which at least partly – and gratifyingly – help confirm these subjective observations, even though there inevitably remain many avenues still to explore.

Paul Messenger

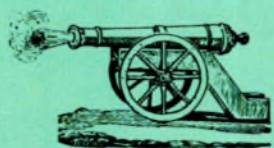
EDITOR: Paul Messenger, ASSISTANT EDITOR: Jane Hadley; STAFF WRITERS: Daniel Houston, Jason Kennedy; CONTRIBUTORS: Martin Colloms, Christ Bryant, Alvin Gold, Paul Miller, Paul Crook; DESIGN CONSULTANT: Paul Carpenter; GROUP ART DIRECTOR: Hazel Bennington; ADVERTISEMENT MANAGER: Susie Triffitt; ASSISTANT 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: Jonathan Lovekin; FINANCE DIRECTOR: Colin Crawford; PUBLISHER: Marianne McNicholas; MANAGING DIRECTOR: Stephen England; CHAIRMAN: Felix Dennis; PUBLISHED by Dennis Publishing Ltd, 14 Rathbone Place, London W1P 1DE. Tel: 01-631 1433/01-580 2684 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.



PUBLICATION

Gunpowder, gelatine
dynamite
with a laser beam



Guaranteed to blow
your mind

Tec

Technics

Technics

Technics
Compact Disc Players.
For Music Lovers.

SL-P1000 model shown features full remote control with digital volume control, 20 selection random access memory, music scan, 2 speed search dial cuing, auto pause, auto space, vibration-isolated optical deck, Class AA output stages, twin D/A converters, gold plated output terminals and multi-function fluorescent display.

TECHNICS, 300-318 BATH ROAD, SLOUGH, BERKS. SL1 6JB. TEL: SLOUGH 34522



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 DM10 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 _____



PRODUCTS

FRESH FROM MARANTZ

Two full size Marantz CD players, the £250 *CD65LX* and £300 *CD75DX* are taking over from the *CD65* and *CD75* respectively. Both models are remote controlled (the '75 has volume control); both are 16-bit 4 times oversampling with three power supplies and Marantz' new *CDM2* plus mechanism; both are programmable with search and repeat facilities with gold output and phono sockets.

NAIM 88/NAIT

Following hot on the heels of Cyrus and Rotel updates, a heavily revised version of Naim Audio's popular 'budget' NAIT integrated amplifier should be in shops by the time this is published. The price has increased significantly, from £258 up to £330, but the package is substantially revised with better quality components and more expensive cosmetics, moving somewhat away from the hair-shirt basis of the original.

Indeed, the front panel is now illuminated by a back-lit display. A rotary switch replaces the pushbuttons for input selection, adding an extra 'aux', and there is now a 'proper' balance control. Conscious of the financial burden of moving up from the integrated NAIT to their separates range, Naim have designed the new model to be convertible to a pre-amp (moving magnet cartridges only, in view of the on-board



Bridging any possible gaps in the market: Marantz' new CD-75DX CD player.

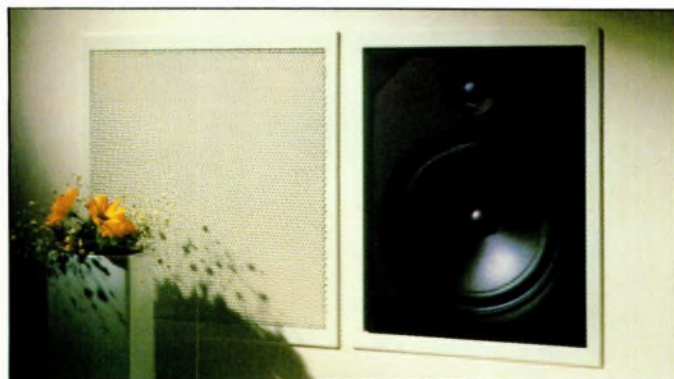


NAIM's NAIT 2: won't sound as cross-eyed as it looks.

power supply) for use with, say, NAP90 or '110 power amplifiers as a first upgrade. The main board itself has been redesigned with the assistance of Naim's powerful CAD system, while the Robin CAM system should ensure good manufacturing consistency.

KEF GOES ON THE WALL

KEF Electronics are responding to the rising demand for hi-fi that blends in with the home by introducing a range of wall mounted speakers.



KeF have cottoned on to the concept of concealment.

Dubbed the *Audiophile Custom-Installation* range, the flush fitting units can be painted any colour to match surrounding decor. The first designs in the range include a *CR200* full-range two-way speaker system, and its *CR250* sub-woofer partner. KEF haven't fixed a price yet, but estimate around £200 for the *CR200*, and £250 for the *CR250* (this figure should include installation fee).

KEF claim that together these comprise a full-bandwidth three-way system with 90dB sensitivity and 150W power handling for around £450, similar in performance and price to a pair of conventional free standing loudspeakers.

The *CR200* incorporates an eight-inch bass driver unit and one-inch soft dome tweeter which are three and a half inches deep.

The *CR250* has a shallow-profile 102 inch driver only three and three quarter inches deep. The two units are the same size externally, and so can be mounted side by side. Cables are taken through the wall to the

back, or bezel as it is called, and connection to the speaker is made when the baffle is installed.

This simple method avoids the problems involved with juggling a heavy loudspeaker in one hand and trying to fix cables with the other. The detachable metal grille (which comes finished in white) can be painted any colour or replaced with a cloth to choice.

STACKS OF PRODUCTS

We can expect new ranges of Stax products sometime soon from the importers Path Plc.

Nigel Crump, erstwhile of Ortofon UK, is now in charge of the Stax and Nagaoka operations for Path, and plans to introduce several of the Japanese-made separates to the UK market. Stax make loudspeakers, amplifiers, tonearms and CD players as well as their headphones which are already imported and known here. Path were also expecting the arrival of the new £399 *7700* Nagaoka CD player to coincide with Nigel's appointment early in March. They describe the *7700* as 'hot stuff' and claim that it was originally scheduled to sell for £799.

REEL TO REEL REVOK

Anyone with £2,490 (plus VAT) and a passion for watching, and listening to, the reels go round, not to mention a penchant for razorblade editing - may invest in the latest offering from Revok, the *C270* being 'suitable for the professional market'.



Musical Fidelity's MA50 – one for the connoisseur?

Among the features that make it suitable are: brushless DC capstan motor to give accurate speed control, high speed AC spooling motors giving optimum tape handling, easy editing with manual movement of the right hand spool activating the left hand so maintaining exact tape tension, large VU meters with LED indicators peaking at +6, +9 and +12dB, full remote control and connection to the system controller, external control of capstan speed and easy access to audio boards allowing alignment without removal from console.

FOR THE FAITHFUL

Musical Fidelity have introduced a new power amplifier – the MA50 Monoblok, selling at £850 a pair.

Designed with a circuit configuration similar to the AI,



Simple ergonomics on display with NAD's Porsche equivalent.

the MA50 is described as having sound quality between the P270 and the A370 but with only 25 per cent of the F270's power. It is aimed at 'discriminating audiophiles who are more interested in fidelity than loudness'. The amplifier is already with some retailers.

VOLUME PUMP

NAD have delivered a beefcake version of their famous 3020E

integrated budget amplifier to the shops.

The 3020FE was on show at Bristol in February for the first time and reaction was said to be good. The PE looks very like the 3020E and is described as similar in nearly every respect. It is rated at 20 watts per channel steady state power, but NAD say it will produce 55 watts per channel on tone-bursts into 8ohms. They add it's like getting a Porsche 944

Turbo instead of the standard model – whatever that means. It is less expensive than a new Porsche though, and will supposedly envelope your room with power for £139.

PERFORMING ON POINTS

Goodmans have introduced metal cones, designed to enhance the bass response of floor standing loudspeakers. Three cones are placed under the cabinet. They can be used points down, or – as recommended by Goodmans – points up. Stability can be achieved with the former method if the cones are fixed onto the speaker base using the screws provided. Although we haven't tried them with heavier speakers, brief audition shows they are a suitable interim solution before getting proper stands for instance. Each pack retails at £6.99.

Goodmans have also launched a full-specification 5100 integrated music system comprising cassette deck, tuner, amplifier, graphic equaliser, CD player turntable and speakers (floor standing of course). The 5100 retails at £349 and is in shops now.

MORE THAN A MIDI

Philips have launched a range of separates to be sold, like Midi systems, only as packages. Three variations are available on the Philips Series 7 range.

The F773 (£699) can be sourced by a 16-bit four times oversampling CD player, semi automatic turntable, twin logic cassette deck (with Dolby B), or a digital tuner. There is also a 5-band graphic equaliser, and 35 Watt per channel amplifier.

For £799 the F775 the next up



The birth of Goodmans full spec 5100 music system.

in the range, includes a more powerful amplifier 7-band graphic equaliser, autoreverse cassette deck and Philips favourite track selection (FTS) on the CD player.

The £849 top of the range F777 comprises all the above features but is still more powerful with a digitally adjustable 7-band graphic equaliser and 'enhanced display and functions on the amplifier'.

All the systems are fully remote controlled and give the buyer the freedom to choose his own loudspeakers. They will also be friendly to Philips coded (RC5) TVs and VCRs and should be available some time in March.

CAMBRIDGE CORRECTION

Our jet-lagged Las Vegas show correspondent inadvertently juxtaposed the technical details of Cambridge Audio's new *CD1 Series 2* CD player. For '16-bit 32x oversampling' read 32-bit 16x oversampling. So now you know. (Glad we weren't the only magazine to trip up over this tongue-twister - Ed!)

TAKING THE HIGH ROAD

The wily Scots at Ariston Acoustics surprised everyone at the Bristol Show and some of us keen bods who braved shameful weather to visit them in London a week earlier.



An old favourite: the Infinity Reference Standard 11B.

Three new products have been invented to give the Ariston name a complete hi-fi range. First the *Icon* turntable with arm stands on the Q Deck's shoulders, providing a natural enough progression for this turntable for the people. More surprising though was the sexy new remote control amplifier which Ariston just produced like a rabbit from a hat (happily it sounded much

better). The *Image* loudspeakers complete the corporate lineup and Ariston plug the separates as being compatible in style and sound quality. You can buy the lot for £580, or separately as follows; *Icon* £220, Amplifier £180, *Image* £180/pair. If that seems a lot, first impressions sonically were that you were getting a lot for it.

BUSINESS/TRADE

INFINITY GOES ON

Rotel Hi-Fi have taken over the distribution of Infinity loudspeakers in Britain. The Milton Keynes firm acquired the contract on February 15 along with existing stock and spare parts from the former distribution company Automation Sciences (still under administration). The company will also take over all the existing guarantees on Infinity products.

Tony Morpeth, Rotel's Managing Director, said he was delighted to win the contract. "It (*Infinity*) deserves to do well, they have the most astonishing product line of anyone in the world," he beamed, "but it has not been competitive in the UK and has not maximised its market opportunities." Mr. Morpeth and Tony Mills, another Rotel senior, are going to the United States in March to see Infinity's set-up in California. They expect to take on several new ranges of Infinity loudspeakers, and hope to start shipping products to be in the marketplace for April 1st. The current price levels would not

necessarily be the same, according to Mr. Morpeth, hinting indirectly they might come down.

WINDY CITY SHOW

The 1988 Chicago CES consumer electronics show, the biggest annual event on the industry's calendar will be held 4th to 7th June.

MORE RICHER

The eponymous and youthful Julian Richer is one of the enfants terrible of consumer electronics retail, having built a powerful and influential chain in a very short period of time despite concentrating on separates rather than midi systems. The early 'pile 'em high and flog 'em cheap' philosophy was an instant success with the vast London Bridge passing trade, thanks to JR's ability to strike cheap bulk deals during the overproductive (pre-CED) early 'eighties, plus extensive advertising.

Now the chain has grown to sixteen, and the three next door neighbours on the London Bridge site are bringing a new maturity - appreciating and appealing to the different needs of different customers. The original Richer Sounds still sells some of the best deals around, 60 per cent of sales being special end-of-line cut-out offers and the like; next door the Music Bar serves would-be musicians, and sells portables, in-car and the like.

But Richer Sounds 2 is the one for those serious about hi-fi. This is a more specialist shop with a broader range of more upmarket brands, with such luxuries as a dem room, coffee and installation services, while offering a two year warranty. Prices tend to be little higher of course, but JR nevertheless promises "special price offers on both current and end-of-line products from top manufacturers" to tempt you in.

TECHNOLOGY

SUPER-VHS LAUNCH

The European (PAL) version of Super VHS will be available this autumn. JVC say the camcorders and decks will be imported for sale in October or November after a debut exhibition at Dusseldorf in August. They will cost an estimated 30 per cent more than standard VHS systems, and will be 'A/V friendly' (depending on the television). Software for the system is expected to cost twice or three times as much as standard tapes.

RARE FIND

An amazing new product has



The Ariston collection: ship shape in Bristol fashion.

LISTENING

i s a g r e a t a r t

Descending into the world of music, discovering the clear, original unadulterated sound requires concentration to hear what others do not, this is an art, the art of a great listener.

Now there is Nikko. With a full line of audio equipment in a class all its own. With pre-amps, power amps, integrated amps, audio/video amps, receivers, tuners, equalizers, cassette decks, turntables and CD players. With state of the art technology and a minimum of control switches and buttons, allowing you more time to concentrate on listening to the sound, not worrying about the technical side

because listening is a great art. Your art.

For this reason Nikko audio products all come with a two year guarantee.

For more informations please call:

01-439 62 88

NIKKO U.K. Office

150 Regent Street · London W1R 5FA



NIKKO AUDIO

just listen



Sun, sand and CD sound for Pioneer racers.

come onto the market aimed at the very dedicated vinyl users among us. Alan McDonald and Martin Swaffer, two students of Audio from Cambridge, sent us the following report on a stylus brush – The Afghanistan Onyx – made by the Weiner Bruchsdorf factory in Geison, Germany. “We were lucky to get a pre-production sample of this beautiful looking product which should be available from April 1st retailing at £348. At first glance it looks like a piece of expensive jewellery with its ornate gold handle and fine brush hairs, tightly packed together to give a ‘solid’ appearance. And it is this ‘business end’ which makes the Onyx so unique (and expensive). The hairs are taken from the animal that gives the brush its name – the Onyx – a rodent from the foothills of the Hindu Kush in Northern Afghanistan. They are plucked from under the animal’s tail which is then released back into the wild. Ali Prolof, a refugee Afghan audio engineer now working at the Weiner Bruchsdorf institute told us that many hundreds of hairs are used in each brush.

The Onyx has a high density of bristles – an incredible 180 per square millimetre, and the two mm long bristles are clamped and bonded to the machined handle giving the brush a very rigid consistency (which is also likely to last a long time). The AO uses no cleaning fluid but nevertheless its fineness and density was proved with the styli we tried giving significant audible improvements showing that the most stubborn groove-collected grime was being removed. We were particularly impressed when a well used Troika stylus which had been sounding brash and insecure behaved as new after some attention with the Onyx.

Verdict: Although it is obvious that only the most dedicated enthusiasts will invest in such an accessory, Recommendation is mandatory.

TRUE GRIT

Pioneer have sent us a (justifiably) chortling press release about their recent exploits in the Western Desert.

Pioneer sponsored the tenth Paris-Dakar rally and had their own particular team – driving a Peugeot 205 – win the 13,000km event. Having lent car stereo combinations (some with CD) to over 250 of the 300 participating cars in a bid to prove how tough the equipment is, Pioneer claim that only two units failed when grit got into cassette player working parts, despite the gruelling heat and conditions that resulted in the deaths of six people.

Pictured are a couple of the Pioneer vehicles tootling over the dunes. We think the music they are playing is a selection from loony tunes.

NEW RADIO SERVICES

Certainly if you live in London, and probably elsewhere by now too, the FM radio dial is a more lively place than it was two or three years ago. Go on, try it! Trawl all the way from 87.5 to 108MHz and see what can be found. New stations are cropping up all the time and you may just have missed an interesting one.

However, these new stations are operating unlawfully since they can’t yet get a licence. And the cheap, often ramshackle equipment they use is likely to be confiscated at any moment in a ‘bust’ by the authorities. Because the normal process of frequency planning has completely broken down, and the technical standards of a lot of the pirates’ transmitting equipment leave much to be desired, numerous complaints have been received of interference from the pirate radio stations. Some have been operating so close to official services that certain London listeners have had difficulty receiving Radio 3, especially at weekends when the jamming of

the airwaves reaches its height. The Government department charged with putting these enterprises out of business is known – somewhat ironically – as the Department for Enterprise and it recently received a \$400,000 bonus from the Government to fortify its anti-pirate activities.

The sound of these pirate stations may be rough due to cheap and often overloaded transmitters, but there’s no mistaking the energy and enthusiasm of these mostly young broadcasters. Who are they, and where have they come from? Essentially they represent the most organised of the minorities whose tastes are squeezed out of the official radio system we have at the moment.

Apart from the BBC networks, which are fundamentally aiming in the same directions as they were when founded in 1967, official local radio generally amounts to little more than downmarket ersatz versions of Radios 1 or 2, and at night you can often get the real Radio 2 on up to a dozen places on the dial, with a little help from the BBC local radio system. There are no specialist local stations at all in this country, unless LBC can be called a news station, which in any event, is unique to London.

The UK must have one of the most tightly regulated broadcast radio systems left in the world. Practically every other European country has seen an upsurge of pirate operation already met by some sort of official recognition of the need for new services. Ireland will be the latest country to open up radio in just a few months’ time; Italy descended long ago into competitive anarchy, France saw a certain Francois Mitterand broadcast over illegal *Radio Libre* stations, duly licensing them after his election in 1981, while the Netherlands, Belgium, Switzerland and Scandinavia have recently all come to terms with a radio renaissance. Germany is a far too stubbornly bureaucratic country to be letting community radio hang loose in its midst yet, but keep watching . . .

Meanwhile, the UK officials lie awake at night worrying about a few temporary stations running fifty milliwatts. You see, the only way a station can be operated outside the vastly expensive and complicated BBC or IBA ways of doing things is to pay \$450 for a temporary licence. This grudgingly allows you to run a transmitter power so weak that it can’t be heard properly more than a kilometre away from the

transmitter, and gives only a fortnight in which to prove yourself. It’s called Special Event Radio. Not much of a radio station compared to the big boys, but it is the only legal option to broadcast unless you’re the BBC or have a cool \$500,000 to start up an ILR station. Even then, more money could be made by paying it into a building society, so strangled is commercial radio by the soon-hopefully-to-be-abolished IBA influence.

However the floodgates are to be opened shortly to the reggae and rapping fans, the soul freaks, the rock stations, the country and jazz formats, Greeks and Asians broadcasting in their own languages, or even the odd classical music station. Everything that can be heard on the pirates will probably be represented and more besides, and it should sound a lot cleaner too. No one can be sure though what form the new radio services will take. A broadcasting Bill is expected later this year setting up a new Radio Authority to issue all non-BBC licences. The first stations operating under these licences will probably be on the air just as the decade turns from the eighties to the nineties.

Home Secretary Douglas Hurd recently announced the outline of his plans in the Commons. Three national commercial networks can be expected, with all BBC networks transferred to FM-only, plus ultimately hundreds of small stations. The task of the Radio Authority will be to draw up a plan and invite applications for licences. He also said that in considering these licences the Authority would “take account of local demand and the extent to which each new service would broaden choice for the listener”.

So get your local demands ready, folks. What would YOU most like to tune into on the radio?

COMPETITION

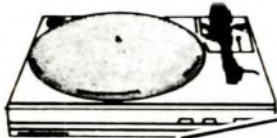
WINNER TAKES ALL

The winner of our £10,000 State of the Art competition is Chris Burrell, a 25-year-old physics tutor who lives in Chiswick, London. Chris wins the Oracle III turntable, Audio Research SP9 valve/FET preamplifier with the AR D115, Magneplanar MG2.5 or Sonus Faber Electa loudspeakers. It’s a case of second time lucky for Chris who won his existing Marantz system in a competition a few years ago!

Absolute Sounds will install the system in Chris’s home and we hope to cover the installation event in a future issue of *Choice*.

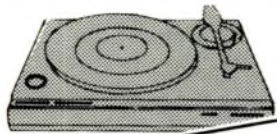
RICHER Sounds

Turntables



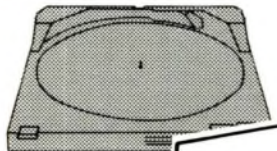
GOODMANS GSP308
 ●Belt drive ●DC motor
 ●static balance tonearm
 ●W&F 0.1% ●Black
 finish ●345 x 92 x 324
 ●Cart £5 extra.

£34⁹⁵



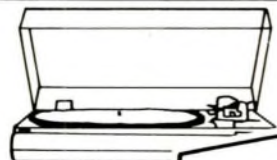
TENSAI TS505 ●Belt
 drive ●straight tonearm
 ●fully auto ●Black finish
 ●350 x 103 x 340 ●Cart
 £5 extra.

£39⁹⁵



MARANTZ TT153
 ●Belt drive ●DC motor
 ●W&F 0.045% ●fully
 auto ●Black finish ●315
 x 79 x 315 ●Cart £5
 extra.

£49⁹⁵



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

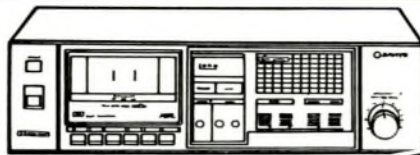
£59⁹⁵

STOP PRESS....

**Just Arrived Dual CS2110
 £74.95 plus cart. £5**

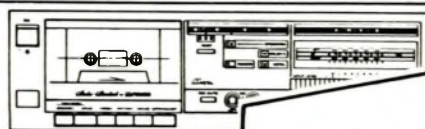
We Welcome Access, Visa, Cheques and Part
 Exchange. Also VAT export (handling charge
 £2.50). All goods brand new in sealed boxes
 unless otherwise stated, inc. VAT. Guaranteed
 1yr. MAIL ORDER Free of Charge for items
 over £50, please phone or write to our
 Stockport branch. E&OE
 Browsers are definitely 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

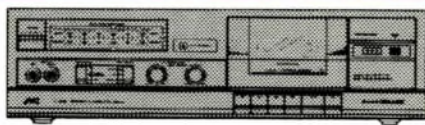
£44⁹⁵



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

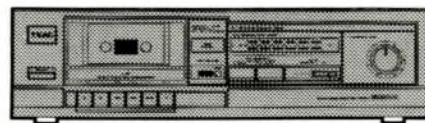
£59⁹⁵

LARGE RANGE OF SPEAKERS IN STOCK!



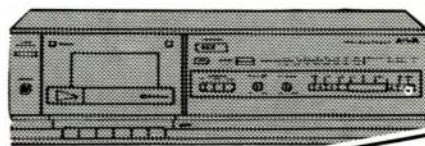
JVC TDX102 ●Dolby B
 NR ●S/N 58dB
 ●Crosstalk (1kHz) 60dB
 ●Freq resp 40Hz-
 15KHz ●Black finish
 ●Metal ●435 x 115 x 237
 (Also TDX202 £89.95)

£69⁹⁵



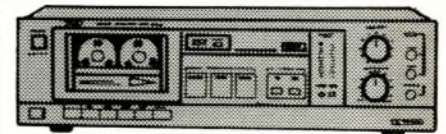
TEAC V200 ●Dolby B
 NR ●S/N 65dB ●W&F
 0.095% ●Freq resp
 30Hz-16KHz ●Black
 finish ●Metal ●435 x 120
 x 215

£69⁹⁵



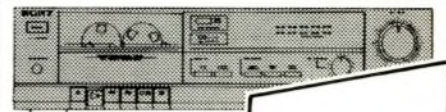
AIWA ADF260 ●Dolby
 B&C NR ●LED meters
 ●W&F 0.09% ●Freq
 resp 20-17,000Hz
 ●Black ●Metal ●S/N
 65/78dB ●softtouch
 ●420 x 116 x 278.
 (Also ADF360 £99.95)

£79⁹⁵



**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 £109.95)

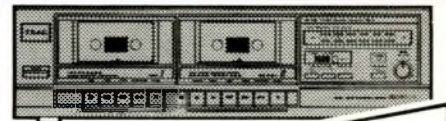
£89⁹⁵



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

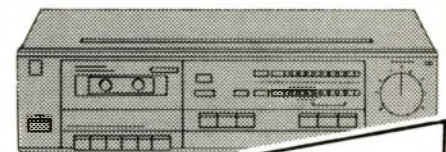
£89⁹⁵

**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 £119.95)

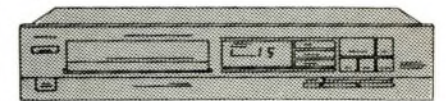
£99⁹⁵



DUAL CC8010 ●Dolby
 B & C NR ●Soft touch
 ●W&F 0.08% ●Freq
 resp 25Hz-15KHz
 ●Black ●440x 117x 245.
 (Also CC8020 £159.95,
 CC8050 £299.95)

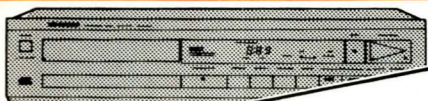
£119⁹⁵

Compact Discs



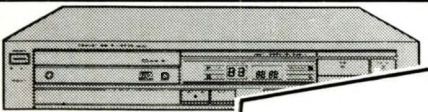
TEAC PD-135 ●Digital
 display ●16 random
 prog memory ●16 bit
 linear ●3 way repeat
 ●Black finish ●435 x 85 x
 290

£139⁹⁵



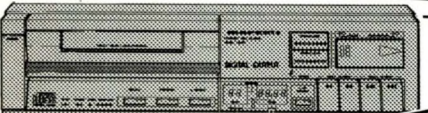
TRIO/KENWOOD DP460 ●Digital ●15-track random memory ●Freq resp 20Hz-20kHz ●THD 0.01% ●Black finish ●420 x 95 x 260. (Also DP310 £149.95)

£149⁹⁵



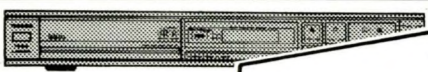
FISHER AD815 ●Infra red remote control ●Digital display ●16 prog memory ●Skip/Pause ●Scan/ repeat ●Black finish ●440 width

£169⁹⁵



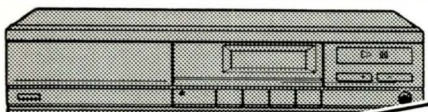
MARANTZ CD273SE ●Digital display ●4 times oversampling ●20 track programming ●THD 0.0015% ●Black finish ●320 x 86 x 312 (Also in stock CD873 £199.95)

£169⁹⁵



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

£179⁹⁵



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

£179⁹⁵

Tuners



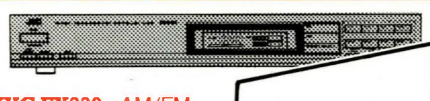
GOODMANS GST5200 ●LW/AM/FM stereo ●Digital ●Presets ●S/N 70dB ●Separation 40dB ●Black finish ●345 x 65 x 278

£49⁹⁵



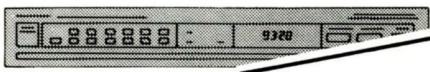
FISHER FMM27 ●LW/MW/ FM stereo ●Digital display ●16 presets ●Separation 45dB ●Sensitivity 1.2uV ●S/N 74dB ●Black finish

£59⁹⁵



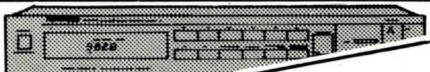
JVC FX330 ●AM/FM ●Digital display ●16 presets ●THD 0.15% ●Separation 40dB ●S/N 73dB ●Black finish ●435 x 61 x 235.

£69⁹⁵



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

£79⁹⁵



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

£89⁹⁵



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

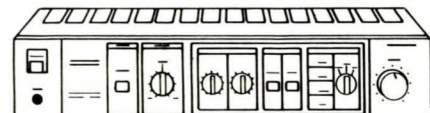
£89⁹⁵



YAMAHA TX300U ●AM/FM ●Digital display ●16 presets ●S/N 76dB ●Black finish ●435 x 72 x 237

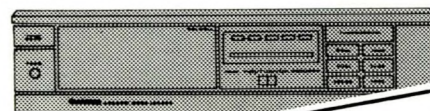
£109⁹⁵

Amplifiers



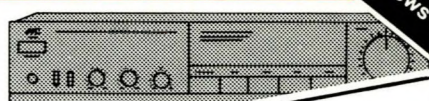
SANYO JA220 ●20 watts per channel ●THD 0.9% ●Freq resp 20Hz-20,000Hz ●Silver/black finish ●420 x 80 x 220

£44⁹⁵



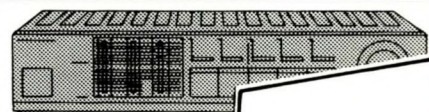
GOODMANS GSA5200 ●35 watts per channel ●High filter button ●Frequency response 10-30kHz ●Black finish ●345 x 83 x 273

£59⁹⁵



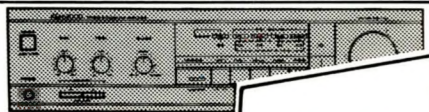
JVC AX220 ●40 watts per channel ●THD 0.003% ●Dynamic Super-A power ●Black finish ●435 x 92 x 252. (Also AX330 £119.95)

£79⁹⁵



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

£89⁹⁵



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

£89⁹⁵

THE RICHER CHARTER

★ **BEWARE OF THE COMPETITION!** We have established our own code of practice over the years giving you, the customer, a fair 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: 031 226 3544 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 Sats)



“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



AND THE SHOW GOES ON . . .

The Holiday Inn in Bristol was the scene of some industrious activity in February when the Hi-Fi industry yoked up for a gruelling 72 hours' exhibition. Paul Messenger sorts it out.

Some sort of coherence is finally growing out of the chaos that has afflicted UK hi-fi shows since the demise of Harrogate six years ago. February's Bristol bash, jointly organised by three increasingly successful specialist dealer chains that cover the whole south west quarter of England, is emerging as second only to September's Penta in importance. Five months behind Penta, four ahead of Chicago, it makes a useful launch platform for British manufacturers and deserves to be regarded as more than just another dealer show.

That said, the view from the bar didn't seem too different from Cunard a decade ago, or Swiss Cottage halfway back in time. The faces were much the same, albeit a little heavier jowled, more wrinkled and less sharply in focus. The travelling, even from Sussex, only added an hour or so to a London venue (Brighton-based Audio Innovations' Peter Quortrup actually commuted the show, so confirming his qualifications for the lunatic fringe.)

Even the hassles were much the same: lift shafts without lifts, hotel catering stretched beyond breaking point as the Holiday Inn cashed in on its windfall bar bonanza at minimum cost. So we grumbled up and down grimy fire regulation staircases in search of lost rooms and passages; thrilled to the sound of smoke detectors triggering the alarm system; attempted to pee accurately between the mattresses and cardboard boxes that filled the loos; had twenty minute conversations with the same absolute strangers as last year while waiting to gulp a Grolsch.

Like the keen enthusiast's hi-fi system, change is perpetual; improvement less easily identified. But besides staying up too late and experiencing *deja vu*, we did find a number of interesting brand new products, saw some recent arrivals for the first time and tried to spot the odd trend.

Hotel-based hi-fi shows are great levelers; sharing similar sized rooms puts one-man-plus-garage operations on much the same footing as the Philips or Matsushitas of this world. Many of the bigger brands were demonstrating their various things, but efficient marketing and PR departments ensure we have already covered the products in *Update*. This report is therefore inevitably, not to say enthusiastically biased towards the grass roots individual taking the opportunity to promote his particular brainwave.



ADC slimline CD player.



The Arcam Black Box CD upgrade.



Maplenoll turntable; coming soon from Acoustic Gold?

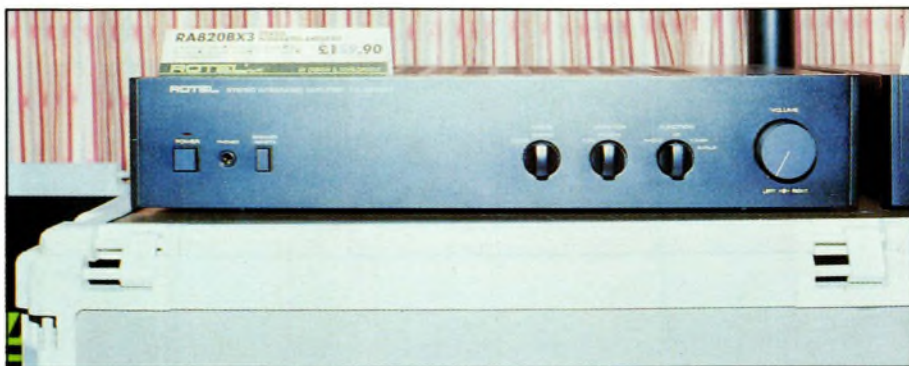
CD technology remains dominated by established companies, and this still establishing medium is fertile ground for new ideas. One of the better ones, albeit about as photogenic as an astronomical black hole, is A&R/Arcam's *Black Box*, due in the shops in April at £250. This completely featureless outboard D/A converter incorporates elaborate power supply arrangements, and should make an easy to use, effective, physically discrete and not too costly upgrade for any decent CD player equipped with a digital output socket.

Mission's new *Cyrus* amplifiers (pre-viewed three months ago) appeared in the die-casting for the first time, looking and feeling suitably chunky and expensive. They are joined by a brand new £800 *PCMII* CD player with remote control that encompasses volume and absolute phase, alongside surprisingly tacky, albeit distinctive and self-explanatory handset graphics. The *PCMII* works normally as a standalone player, but the price also includes an outboard PSx power supply unit whose subjective advantage was apparent even to jaded ears at the end of the second day, and which may also upgrade a *Cyrus* Two amplifier, both sonically and in terms of the overall aesthetic package. The earlier *PCMI* takes a price cut to £400.

Other interesting new CD players include the latest versions of Marantz' longstanding and very successful middle market models. Now *DX*-suffixed, the *CD65DX* sells at £250, the FTS-equipped *75DX* for £300. And if slimline styling is your bag, there can be few if any rivals for the new ADC *CD2000E*. This gorgeous looking £330 package now has the latest 16-bit 4x oversampling chips, and is promised as the first of a new line of ADC separates.

Philips were busy promoting their new hi-fi separates, but were also taking space to keep reminding people that CD Video was just around the corner. We're promised more information on launch dates *etc.* in time for the next issue (he says with incurable optimism). There were two or three DAT players lurking around too (Aiwa, Luxman, Kenwood), but despite the recent summit conference, no-one was saying much about formally launching a format whose future looks increasingly uncertain outside the Pro field.

One manufacturer showing considerable ambition after a recent new blood transfusion is Ariston, turning themselves at a stroke or three into full range manufacturers. Buoyed by the success of the budget *Q-Deck*, they introduced a £200 *Icon* integrated turntable/arm with a heavily *Q*-damped subchassis suspension that is the effective successor to the *RD60*. But they also showed a pair of £175 *Image* loudspeakers, providing a more conventionally priced and sized alternative to the *QLN* miniature. And most exciting of all, there's now a full remote control £180 Ariston *Amplifier* (having wisely decided to



Rotel RA820 BX3 – all new inside.

drop the yukky *Pulsar* name that adorned the prototype and show literature) – moving magnet cartridge compatible, and rated at 40W per channel. This means Ariston analogue record playing systems from below £500.

Rotel are clearly determined to hang onto their handsome share of UK specialist amplifier sales, responding to the *Cyrus* challenge with *BX3*-suffixed versions of the popular *820* and *840* models. All previous variations on a theme that goes back seven or so years have been based on the same original Curtis design configuration; name and apparent identity apart, the *3*s are new from the ground up (albeit again Curtis-penned), and are claimed to represent a substantial sonic step forward, being both smoother yet 'faster' than their predecessors.

Another amplifier surprise was sprung by the hitherto virtually unknown Portsmouth-based company ITL, who made their show debut at Bristol with no less than six models! They currently have seventeen dealers (and will certainly have appointed more in the wake of the show), and have been going a mere eighteen months, yet the standard of professional presentation combined with youthful enthusiasm looks an excellent start. Based on 'budget' and 'standard' chassis sizes, the former consist of the £150 *MA-80* integrated model, the £100 *MA-8* pre-amp and £130 *MA-100* power amplifier; the latter comprise the £330 *MA-120* integrated, £200 *MA-12* pre- and £240 *MA-200* power. Although their sound quality ideology seemed a trifle vague, the apparent value for money of the *MA-80* cannot be denied, the specification rating being 60W/8ohms/both channels, with MOSFET technology throughout plus a moving-coil switchable disc input option. They even showed us the 'Airfix kit' version of an imminent matching digital tuner, targetted at £150.

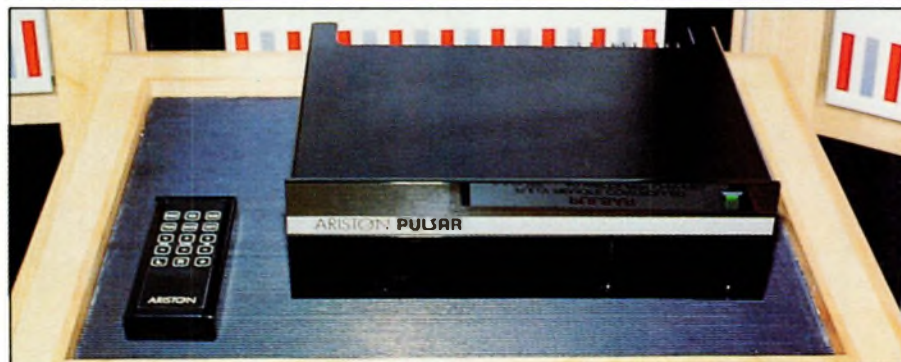
Coming from a confirmed audiophile background, Southampton-based Kelvin Labs are another new company showing for the first time, but in their case with a very neat, high quality *M30* monoblok power amplifier, offering 25W of pure class A at £800 the pair. The designer combines ten years of hi-fi enthusiasm and experimentation with advanced electronics knowhow from the aerospace industry, and plans an unusual £500 FET pre-amp using passive

RIAA equalisation throughout. Sound quality was distinctly promising, given the usual hi-fi show caveats.

Another very promising brand newcomer – technically perhaps the most interesting of all – were the Alexander loudspeakers, designed and presented by a very bright young Bristolian named James Heal. The tiny (c4.5litre) metal box *566s* with SEAS drivers sounded much 'bigger' than they had any right to. The specifications for low frequency extension versus sensitivity (50-25,000Hz ±3dB, 85dB/W) versus box size would appear to challenge currently accepted theories (Thiele-Small *etc.*), which is just what JH arrogantly does; he also uses a 2inch port with a 4inch bass/mid driver... If the specifications can be verified (as the subjective experience renders not unlikely), this £150 loudspeaker with £70 *ILS* stand could become one of the most important new arrivals for years. £90 *514* minis and £350 *Auroras* were also shown.

New speakers were of course legion. Tannoy are rationalising their range with an improved *M20 Gold Mk2*, and a new double bass unit *Jupiter S*. The interesting Pro-influenced Acoustic Energy range has now grown to three models. Ruark have revised the *Broadsword* and launched a £1,600 *Accolade*. And AR have just picked themselves up a complete range of four interesting 'high end' models, priced from £700-£1,500. This *Rouven* series uses dipole driver configurations (facing front and back) to balance mechanical forces, and has been developed from a basis put forward by their Swiss distributor of twenty years standing, based on drive unit technology that goes back to the *LST* and *3a*. Or as it says in the brochure: "... das Konstruktionsprinzip laterale Beschleunigungen auf das Gehäuse nicht auftreten können ..."

The sad decline of Automation Sciences could have left a gaping hole in the distribution of exotic imports, leaving only Presence Audio (who were showing, and to good effect, YBA, Spica *etc.*) to challenge Absolute Sounds (who were not showing, but had lent AR a pair of the legendary French Jadis 2 valve power amplifiers). However, Dennis Wratten's new Acoustic Gold operation (no relation to Alvin) could well step into the breach, particularly in view of DW's immense experience and the



Ariston's new Image speakers, Amplifier (née Pulsar) and Icon turntable.



Kelvin Labs attractive M30 monoblok.



Source-Oddysey bring new elegance to hi-fi furniture, with steel, marble and gold knobs on.

current state of the dollar. The lead product to start with is the Sumo range of 'macho affordable' US transistor pre- and power amplifiers, costing around £600 per item. Then there are the very beautiful, super-macho Danish Primare amplifiers, which cost an arm, a leg and half a torso besides (£8,750 to be precise).

Acoustic Gold have a number of other projects in mind. They are contemplating importing the Maplenoll turntable, which packages an air-bearing tangential tonearm with an air-supported platter bearing at a quite competitive £1,000. AG also have European distribution rights for the extraordinary contact-less laser-reading vinyl turntable from Fial Tech-nology. This has already absorbed \$5m in development and passed a number of deadlines unproven, but if it does work, and is brought to the market this September, it will make plenty of waves despite a £5,000 pricetag (particularly amongst broadcasters and archivists).

The UK high end valve amplifiers seemed as healthy as ever, with most brands represented and a pair of brand new pre-amps from stand specialists Foundation (£600 and £1,000, and looking like 'fifties receivers). Audio Innovations and their budget offshoot Edison Technol-ogy were attracting the crowds, making sweet sounds in several rooms. They also brought out their awesome *Triodes* to indulge in a little after-hours Jadis-bashing, to entertainingly good effect (nothing like a bit of Francophobia . . .).

One of the trends spotted emerging from a tunnel near Bristol is the appear-ance of hi-fi furniture that both looks good enough and should also work well enough to do justice to top quality hi-fi. Thus far we have put up with the rudimentary if cost effective aesthetics of equipment sup-ports for the sake of performance; now the Sound Factory's *Tripod*, and particularly the Source-Oddysey linked Daniel Lamb Collection are breaking this hair shirt mould. And Acoustic Gold have commis-sioned Kenneth Grange's Pentagram design consultancy to come up with another range that is bound to be interest-ing.

Round-the-house systems are another aspect of the domestically acceptable face of upmarket hi-fi. Hitherto B&O have led the way, but Revox were demonstrating the fact that their system can deliver separate programmes at the same time in different rooms, while balanced line operation enables long cable runs to be used. Meridian are the other player in this particular game, and showed a prototype remote sensor while promising full system production availability from June.

Hotel bitching apart, it was good to see both the high level of activity and the healthy attendance, while Absolute Sound & Video, Audio Excellence and Radford Hi-Fi deserve several gold stars for the high standard of their organisation.



ASPIRATIONS

Two American bankers have transformed their London house into a celebration of art and design, where both eyes and ears get soothing treatment after the rigours of the day. Text by Dan Houston, photographs by Ian Dobbie.

House

Full Of

Sound

This month we visit a five-storey London town house where the hi-fi is installed to be heard but not seen. Built in the 1830s, the house was recently bought by two American bankers, who have decorated in modern style while preserving original (listed) qualities such as cornices and skirting boards. The clean lines of modern furniture juxtapose with some homely New England antiques in a bold but successful marriage of ages.

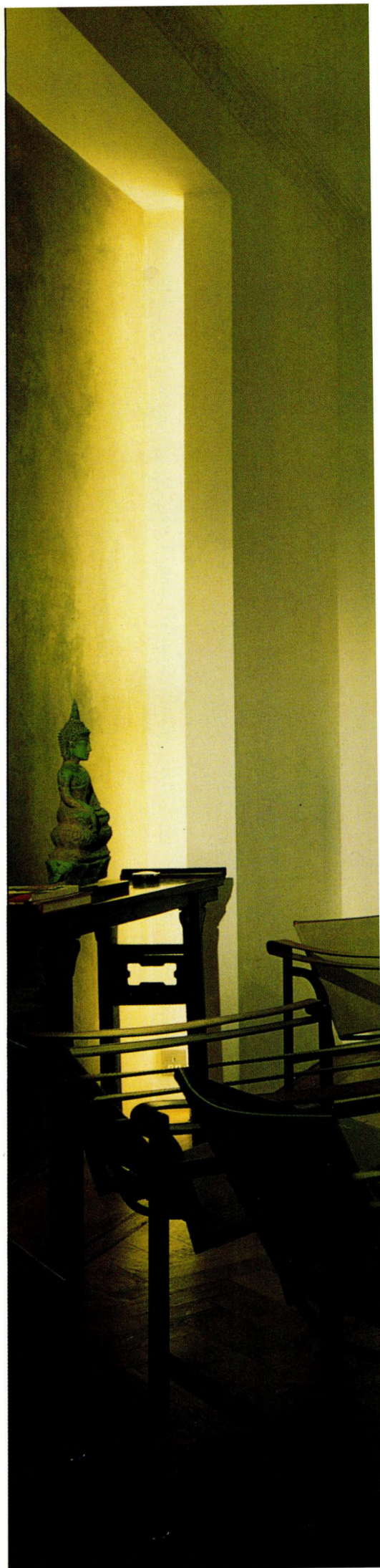
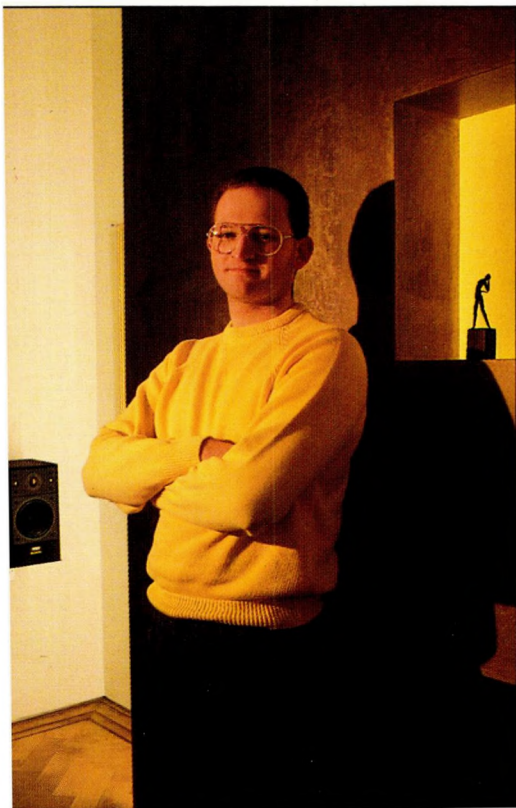
The impressive metamorphosis took about six months, and was carried out by Mark van Oss' Fulham building firm, Moss-cos Ltd and designed by Charles Rutherford of London Architects Rutherford and Stocker. Situated off a quiet leafy square in South Kensington the house has been converted from six bedrooms to two (and three bathrooms), placing the emphasis firmly on creating space.

Throughout, the pervading colour scheme is dark blue and orange, offset with wide expanses of stainless steel and bleached wood. I blanched when told about the bold colours beforehand (as did the owners when the Architects suggested them), but in context they complement the general timbre very well.

Throughout the house, blue radiators designed by Charles Rutherford look more like pieces of sculpture, being made to measure out of pipes, twisted round with cooling fins along their length. Upstairs these radiators run from floor to ceiling, leaving space for furniture along the walls if needed.

The hi-fi is active in four rooms, cour-

Consultant Robert King and cable-less SL 600.





Orange shelves support the system while no wires trail and behind the Revox: the speaker switching unit gives easy control for a house full of music.

tesy of loudspeakers which are controlled individually from a switching unit in the downstairs living room, where the system itself lives.

Installed by audio consultant Robert King, who advised on and supplied most of the equipment, his main job was perfecting the art of concealment. QED 79-strand speaker cable has been run throughout, from the controlling QED six-way speaker switching unit, through the walls to the various outlets. There is no visible wiring in this house.

From the bottom then: the basement offers three room areas where the main eating and preparing of food takes place. Next to the kitchen on a raised wooden platform, the breakfast room is on the South side, well lit by a long window. Breakfasters sit on long rush seats either side of the plain wooden rectangular table. A pair of Wharfedale *Diamond* speakers in fireproof boxes in the sloping ceiling will set the day's tune.

Although the *Diamonds* are ported at the back, and should be sited away from the wall, some performance quality was sacrificed in favour of style and situation, though they do sound a little over-reverberant.

The kitchen, floored with dark mosaic tiles, has a central worktop and stainless steel cupboards, satisfying function but also lending a professional style similar to famous kitchens where nothing detracts from the preparing of food. A second pair of Wharfedale *Diamonds* are again set into the ceiling.

There has been no attempt to cover up the speakers in these two rooms. In fact it was decided to make them a feature, taking off the covers and leaving them black against white backgrounds. Both pairs of speakers are controllable from two volume pots set in the wall, also designed by QED and large enough to cope with the power without getting too hot. These are also styled as a feature, with large rectangular satin steel plates hiding the working parts behind. Full volume is determined by the preamplifier upstairs, but the speakers can also be completely muted.

The back wall of the kitchen is painted a dusty orange, but most of it is taken up by a vast hewn wood swinging door, which is hinged by a solid steel rod about a quarter of the way along its length. The dining room creates a womb-like atmosphere (as if I'd remember!), with another dark orange wall opposite a red lead painting by New York artist Toby Kahn. Two pastels by a Frenchman who goes by the name of Bruno complete the abstract yet comfortable feel of a room which is lit by a row of 12-volt bulbs. Speakers were not needed in



the dining room, but background music from the kitchen is amply and clearly conveyed when the door is open.

The groundfloor living room is the main reception room, and visitors' first stop off after the hallway and its wallsize 'Fall' by Gilbert and George (1983). Wooden parquet floors, steel, white walls and spartan chairs give the room a 'hard' and formal appeal (although the chairs are deceptively comfortable).

The back half of the room is library – shelved from floor to ceiling with beaten steel doors on rollers hiding wide columns of the orange and blue. It is here that the main system is housed, out of sight if necessary.

There are two sources, a Revox B291 automatic turntable (Glanz GMC 10EX cartridge) and Sonograph SD1 CD player. The CD medium is preferred and this is about the first CD player I have heard that lets you get on with listening to the music. These feed a chrome-fronted Burmester 846 line level preamplifier, the Revox using a PS Audio phono stage preamplifier to amplify the analogue signal to line level. The power stage comprises a one-off pair of Dr Thomas (of Musical Fidelity fame) monoblok hybrid power amplifiers which can deliver an impressive 230 watts per channel.

Robert King explained that these amplifiers were ideal for the job of running so many pairs of speakers, because there was ample power to avoid overheating. They are virtually hidden, side by side, just fitting between two shelves, and were still cool when we left. The loudspeakers in the front half of the room are Celestion SL600s, positioned either side of the front window on specially made L-shaped wall brackets. As its decor suggests, the room sounds quite live, though the 600s present a warmth and scale belying their (small) size. A Lucian Freud (*Head of a Boy*, 1941) is casually propped against the left hand 600 (tut tut!), while another Toby Kahn creation, this time in grey, visually takes up much of the adjoining wall.

All the fireplaces in the house are open (even in the bathrooms), and a few logs were burning contentedly in this grate. The surround is part of a freestanding "wall" from floor to ceiling which is finished in copper mottled plaster (the copper is real so the colours are green and blue). A window in this wall serves as mantelpiece if one can draw any parallel.

The main listening room, however, is on the second floor at the front of the house, with views over the rooftops to the Brompton Oratory and the domes of the V & A. Here a pair of SD Acoustics' SD3s are on 18-inch Foundation stands either side of a cast iron stove. The cable outlets set again in stainless steel are left as a visible feature behind the speakers, and there is room to pull the SD3s out into the room for serious listening. The volume controls, again set on steel plates, are in a wall



recess behind the speakers.

Wooden floors bleached by emulsion and mud help provide reflected light. A huge handmade tapestry of wild flowers on a beige background at one end of the room, and a (nearly antique) kilim bought in Istanbul's Kappeli Karsi (covered market) damp any possible echoes around the walls. Music therefore sounds very clear. This is also the only living room with curtains – wooden shutters were preferred for most of the house.

Two sofas at right angles to the axis of the speakers allow listening while reclining, and the Revox' automatic cut-off facility is appreciated when the record ends in the middle of a conversation. The only problem is missing the first few bars of a favourite track while climbing the two flights of stairs up from the ground floor. (But that's an incentive to keep fit!)

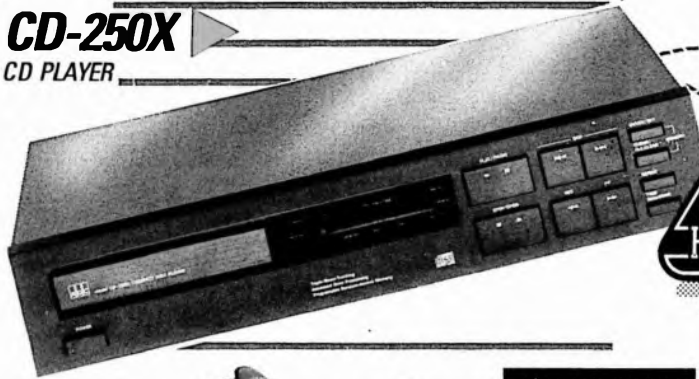
This is a house where the system is subservient to visual and user friendly ideals.

Above the SD3s realise the potential of the system in this room, and below the ceiling set Wharfedale Diamonds sound surprisingly clear in the dining room, beyond the door.

But you don't notice that the Revox is not the most wonderful thing you've ever heard, because the rooms offer more than enough distraction for the eyes, and the house has such a superb atmosphere. How many people can say that looking at a radiator is interesting? Well in this house it is, and that's just the start.

LOOK WHERE THE GOOD SOUNDS ARE COMING FROM!

ADC **CD-250X**
CD PLAYER



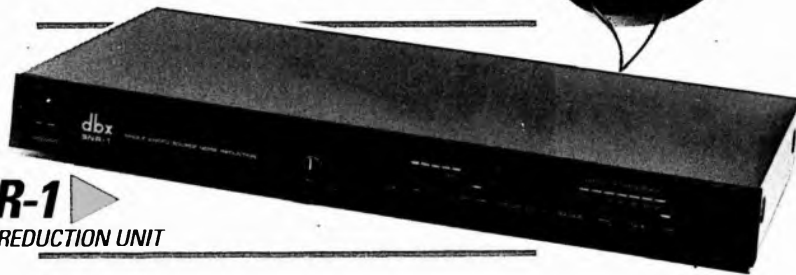
MB QUART **PMB65**
HEADPHONES



MB QUART **PMB25**
HEADPHONES

"AT THE ASKING
PRICE THE SNR-1 IS
ONE PIECE OF
GEAR GUARANTEED
TO EARN IT'S KEEP!"
"HOME & STUDIO
RECORDING" 1988

dbx **SNR-1**
NOISE-REDUCTION UNIT



SOUNDTEC
MARKETING

**MAKING GOOD...
SOUND BETTER!**
TALK TO YOUR
DEALER SOON



READERS WRITE CHOICE ANSWERS

AN UNUSUAL PAIR

I read with interest about the concept of using a Celestion 6000 bass driver unit with a Quad ESL 63 speaker unit. I would be most grateful if you could give me an idea as to how these two speaker units might be coupled in tandem. Specifically, would it be necessary to have a separate output from, for instance, a CD player, driving a separate amplifier which would drive the Celestion 6000 speakers, or could a simple crossover network be used to allow the Quads and the Celestion to be driven from the same amplifier.

ANDREW HEATON,
NORFOLK, V.A.

The SL6000s come complete with their own active crossover which is used to split up the signal from your amplifier and feed bass signal to the SL6000 and the rest of the frequency range to the Quads. But you will need an extra power amp for the Celestions.

The top plate on the SL6000 is designed for their SL600 speakers, which are fairly small boxes compared to the Quads, and a larger top plate may be required if you wish to stack the two speakers. However, a separate stand for the electrostatic unit might be sonically preferable, as driving a lot of low frequency energy under the Quads could be detrimental to their performance.

ON DISC

I enjoy reading *Hi-Fi Choice* as it helps to cut through the confusion in the audio market and gives one an opportunity to make reasonable decisions and avoid costly mistakes.

Last year I exchanged a pair of Goodmans Goodwood loudspeakers and a Quad 331/405 amplifier (which I had for over ten years) for a pair of Sony APM 22ES loudspeakers and a Sony TA-F222ES amplifier.

Unfortunately, I cannot agree with your reviewer regarding the Sony loudspeakers, as I found them to be very much inferior to the Goodmans. The bass is 'muddy' and overall the music lacked the 'warmth' of the Goodmans. Sony say that the speaker was designed with the

'British ear' in mind, but my opinion is that nobody can make loudspeakers as well as the British. I intend to change as soon as funds allow.

I am still worried about the 222ES amplifier. Maybe this is not as good as Sony make it out to be. I would be interested to know if *Hi-Fi Choice* reviewed this amplifier in a past issue, and would be obliged if you would kindly give me the reference number so that I may order it. C A O'CONNOR,
CORK, EIRE

We are sorry to hear of your dissatisfaction with your Sony equipment, but perhaps you are being a little hasty in blaming these components. The problems that you are getting may be due to the source that you are using.

The aim of upgrading the amplifier and loudspeakers in a system should at least partly be to turn more of the source signal into music. Better ancillaries may well show up limitations that previous equipment had either covered up or been in sympathy with.

We have not reviewed the Sony amplifier you mention. Our reactions to their current ES amplifiers have not been all that enthusiastic, but we still doubt it would account for the 'muddy' bass you mention. Nevertheless, very few contemporary amps and speakers will create the warmth of a Quad/Goodmans set up from ten years back, unless a deliberate quest is made in that direction.

Perhaps it's fashion, but it could also be the search for greater clarity which has led hi-fi equipment to sound a lot more 'stark' than it once did. The term 'warmth' is one which most of us understand but one which can't be quantified in musical terms, and it is debatable whether it is all that relevant to absolute fidelity.

But if what you want is more clarity in the bass and more warmth, the former is most logically achieved by upgrading your source, the latter by using an inexpensive thick stranded cable such as QED 79 strand. It would also be worth experimenting with speaker positioning - try angling the speakers in so that the axes cross

in front of the normal listening position. These would broaden the stereo sweetspot and cut down on the amount of treble information getting to your ears. If all this fails to give the sound you want, a sideways step to contemporary Quad gear could do the trick.

A MATTER OF SPACE

My stepfather has requested my assistance in putting together a very basic hi-fi system. I have so far dissuaded him from buying a midi system believing, rightly or wrongly, that even a basic system composed of separates would make far better sounds. The limiting factors are cost (around £400 if this is not asking the impossible) and space. The equipment, excluding speakers, has to fit into an area 16in. wide x 14½in. deep between a chimney breast and a display cabinet. This space is not adjustable although stacking is possible.

My stepfather's music collection comprises only cassettes. He does not use either LPs or CDs. He does, however, listen to radio programmes. My own thoughts on the matter are that he might consider buying two budget priced cassette decks (he would like to record from cassette to cassette on occasion). I suggested two separate decks rather than one twin deck machine, since reproduction quality would probably be better and also the question of space crops up. Something like the Sony TC-FX150B might do. The speakers need to be small since they are going to be wall-mounted on swivel brackets (there is a solid supporting beam which can be used for this purpose). I have read some good reports on the Goodmans Maxim 2 speakers which would be OK as far as size goes.

Thus far and I have no further ideas regarding the rest of the system. I suppose that it would be necessary to buy a separate amp and tuner. I had thought that a receiver might be possible but, again, any receiver considered would most probably be too long to fit into the space available. The amplifier would, obviously, need to have input facilities for two cassette decks and a tuner.

Could you kindly advise me on the above and also give your

recommendations concerning an outdoor aerial and any other necessary items such as cable which you think will improve the system. Is it advisable to separate decks/amp/tuner with some form of vibration proofing?
BOB WATKINS,
OXFORD.

You are quite correct in believing that separate components can give you better sound quality for your money than a midi system. However, £400 is a pretty tight budget and we are unable to recommend two cassette decks, a tuner, amplifier and speakers that come within that price constraint. But this isn't all you're up against, as the space you want to put the equipment in is too small for the standard separate component width (usually around 43cm). There are a few high quality tuners and amps around that are small enough but they're too expensive.

Under the circumstances it looks like a midi system would be the most practical approach. Our reviews of these systems have so far concentrated on stacks that incorporate CD players, which being the most expensive part limits the quality of other components such as the inevitable twin cassette deck. Even non CD midi systems will incorporate a turntable of sorts and the cheaper ones rarely have good quality cassette decks. Hitachi have some good midi separates, including the £200 D-003 twin cassette deck reviewed in this issue. Unfortunately their fine MD5500 tuner costs £230 and already busts your budget!

It looks like you will have to compromise either sound quality or domestic convenience, and depending on your priorities one or the other will be appropriate.

If you should opt for sound quality, a suitable equipment line-up would be NAD 3020E amplifier (£110), Rotel RT830AL tuner (£110), Sony TC-FX150 cassette deck (£90) as you suggest; the Goodmans Maxim IIs (£80) are good small speakers at a competitive price. With two cassette decks these components will take you £80 over budget but give far better sound quality than a similarly priced system.

As far as aerials are concerned, we haven't as yet investigated them so can't recommend any particular brand. It would probably be best to consult a dealer who is familiar with reception in the area and can suggest something suitable. Lastly, it is not really necessary or cost effective to separate such components with vibration proofing. However, the amp will produce some waste heat and needs a little ventilation.

BUILD IT IN

I will soon start building a new house and intend to install speaker cables in wall conduiting in order to avoid loose runs of cable. I wondered if you could advise me on a suitable cable type, bearing in mind that lengths of between 7 and 12 metres will be required. It also needs to be as sonically neutral as possible given that I use a variety of amplifiers and speakers including; Audiolab 8000A, Luxman LV103 and 105, Quad ESL63, Kef 105.2, 104.2 etc and I anticipate trying other equipment in future. The third prerequisite is that it should not oxidise easily.

In Belgium the only wall outlets are of the DIN variety and I wondered if there are any other types available in the UK.

On a different track, do you think an infra-red remote system such as those available from Bang & Olufsen and Sony would be a valid alternative both economically and soundwise?
N. VAN ASSCHE,
WEMMEL, BELGIUM.

We will be printing an extensive speaker-cable review by Paul Miller in a future issue of Choice, and in order to get a definitive run-down on the sonic merits of various cables you would be best advised to wait for that. But if you are in a hurry then it would be worth checking something suitably priced from the Van den Hul range, which I should imagine is available in Belgium. As far as wall outlets are concerned, there aren't any generally available here but The Cornflake Shop, Windmill Street, London said that they could make some up as a special order using conventional 4mm plug sockets in suitable wall mountings. Alternatively you could adopt and adopt mains plugs/sockets of various sizes and types.

The remote systems you mention would probably offer superior user friendliness and be domestically less intrusive, with

the singular advantage of allowing you to keep all your discs etc in one place. But they are expensive and unlikely to improve on the equipment that you already have on sonic grounds.

RADIOGRAM V MIDI SYSTEM

My wife and I wanted to replace our ageing 'radiogram' (remember that term?) with a small new system which would include a compact disc player. £500 or so seemed quite enough to pay, but we then found ourselves unable to choose between the various midi systems on offer at that price. A helpful dealer suggested your magazine, so we bought and read the January 1988 issue from cover to cover.

It seemed very helpful at first. We learned which manufacturers were highly thought of, and your reviews warned us that even in one system costing £900 'the loudspeakers must be ditched' and that in others costing £1,000 'the record and cassette decks aren't good enough' or 'the music making is lacklustre or worse'. But there were some good buys at our price, nevertheless.

On returning to our local dealers we found that most of your recommendations were not stocked for us to see and hear, but instead there were the Kenwood M30/31, Aiwa V770, Technics X800 and other systems noted in your Market Response article as among the top sellers. What a pity that your Christmas issue could not have carried reviews of these instead of some of the more specialised systems of less seasonal interest. Perhaps you could bear this in mind for next Christmas.

A 'system personalised to our own requirements' offered by one specialist dealer sounded promising, but only turned out to be Denon or Marantz components which he couldn't wire up to work together. So in the end we were left to ourselves and, having (like most ordinary purchasers) rejected the most garish and 'hi tech' models, bought a Kenwood M31 system together with a graphic equaliser and stands for the speakers.

After listening to it in our own home we are reasonably pleased, in that it sounds much the same as the 20-year-old equipment we have just discarded. But we had expected something better – particularly a better refined sound with more clarity and depth, especially in the bass. Since a common theme both from dealers and your magazine is that great improvements in sound

quality can be possible with better speakers, we wondered if these might also be the 'weakest link' in our M31 system. If so, could you recommend replacements which would go some way towards introducing us to the real world of hi fi. Our living-room is 18 x 12ft. and carpeted, but not plushly furnished.
D BUSS,
FLEET, HANTS.

We are sorry to hear about the unimpressive standard of sound quality achieved by your new Kenwood system; perhaps radiograms aren't such bad things after all! The reason that there weren't any reports on Kenwood systems in our last midi systems review is that their range was being changed at the time we began reviews, and no samples were available to us.

Whether a better pair of speakers would have a dramatic effect on the sound you are getting from the M31 is hard to say as we have never tested this particular system, so under the circumstances your best bet would be to borrow a pair of speakers from your dealer and try them out at home. A few budget priced speakers worth checking out are Sony's APM10ES (£99), Goodmans Maxim 2 (£80) or the Mordaunt Short MS10 II (£90). Any of these models will reveal more of what your system has to offer and will most probably do so in a more neutral and controlled manner. But if the system itself is the limitation (which is not that unlikely), new speakers alone will not transform the sound quality.

BACK IN THE USSR

Having read your glowing reviews of the Denon DR-M 44HX cassette deck, I am interested in purchasing one but would like to know the expected lifetime of the replay head. I am in the country for some months but will be returning to the USSR where it would be impossible to get a replacement.

I would be grateful therefore if you could tell me the approximate lifetime (in hours) of the SF head before noticeable distortion creeps in.
DR V SHALIMOV,
LEEDS, YORKSHIRE.

We contacted Denon on this point. They weren't able to give us a lifetime in hours, but reckon that with average use (whatever that is) heads should function for three to five years.

This ties in well with our latest

Market Response findings in this issue, while the good field reliability reported for Denon should provide further peace of mind.

Denon did say that it would be possible to order new heads by post if necessary, but possibly currency might prove a problem; alternatively you could take a spare head back with you (though frankly we wouldn't bother)

TIME FOR A CHANGE

I am seriously thinking of upgrading my present equipment which consists of a Thorens TD150 II turntable and Shure N95EJ cartridge, Leak Delta 70 amplifier and Wharfedale Dovedale speakers as well as a Sony CDP35 compact disc player. Most of these are about 15 years old. I have about £350 to spend on improving my system, and use records more than CD.

Should I spend my entire budget on a new turntable such as the Linn Axis, or change the amp as well, and how do you rate the Leak? I hear Cyrus are supposed to be doing some work on their models. If need be I could wait and save some more funds, if the extra outlay would bring commensurate sound quality improvements. If I change loudspeakers I would prefer something smaller than my present Dovedales.
R SPENCER,
BIRMINGHAM.

It does look as though your system could do with a complete upgrade to more contemporary components, but that would be an expensive move and it may be possible to drug the TD 150 into the eighties by putting a Rega RB250 arm (£65) and Nugaoka MP11 Boron cartridge (£38) onto it. Not, admittedly a conventional set up but one that has the potential! For good sound nonetheless. A bit of suspension fine tuning and a belt change would also be worthwhile. Of course a new deck such as the Axis or Manticore Mantra would sound better but the extra cost would mean almost doubling your budget.

The amplifier is perhaps the weakest element of the system and something like a NAD 3020e or Rotel RA820AII would be worth listening to. This would leave you with about £100 for new speakers if you thought they were necessary. A couple worth auditioning are the JPW AP2s and Royd Coniston Rs, but there are many alternatives you could also consider from our Directory.

CASSETTE - DECK - KX200

Yamaha cassette decks have always enjoyed a reputation for excellent performance, fine sound quality and advanced technology. The KX-200 is another brilliant example of Yamaha Hi-Fi 'know-how' at work. The KX-200 re-defines the meaning of 'value-for-money', combining as it does professional recording and playback quality with stylish ergonomics at a price you'll find hard to beat. That's why the Hi-Fi Choice panel wasted no time in giving the KX-200 its 'best buy' status. The KX-200 boasts all the superior characteristics of the Yamaha cassette deck technology:— 2-motor transport and full logic control for smooth tape operation; *Dolby B & C capability for maximum quality and minimum noise levels; Easy-to-read peak level meters for precise performance monitoring; Automatic tape

RS

quality with stylish ergonomics at a price you'll find hard to beat. That's why the Hi-Fi Choice panel wasted no time in giving the KX-200 its 'best buy' status. The KX-200 boasts all the superior characteristics of the Yamaha cassette deck technology:— 2-motor transport and full logic control for smooth tape operation; *Dolby B & C capability for maximum quality and minimum noise levels; Easy-to-read peak level meters for precise performance monitoring; Automatic tape



selection that takes the bind out of bias, the effort out of equalisation. All this plus Armchair Control capability with the optional Remote Control Unit. And the Yamaha KX-200 is 'RS' compatible which means you can employ its considerable talents in a fully Integrated Remote Control System that gives total fingertip command of a Yamaha Hi-Fi system – from the comfort of your listening position.

KX-200 – there's no cassette deck to touch it, because it's music – naturally. For your nearest Yamaha Hi-Fi dealer, contact us at the address below.



100 YAMAHA HI-FI
YAMAHA 1887-1987

A Hundred Years of Musical Experience

Yamaha Electronics (UK) Limited, Yamaha House, 200 Rickmansworth Road, Watford, Herts WD1 7JS. Tel. Watford (0923) 33166.

MUSIC - NATURALLY

*Dolby is a trademark of Dolby Laboratory Licensing Corporation





GO FOR GOLD!

PART TWO

ENTER OUR TWO-PART COMPETITION TO WIN THE SOURCE ODYSSEY SIGNATURE 100 – A £3,000 LIMITED EDITION FRONT END SYSTEM WITH GOLD PLATED ARM AND PLATTER

Chances are that if you had £3,000 to spend you wouldn't use it all on a state of the art record player. Well here's the opportunity to change that; the opportunity to win one of the most beautiful deck/arm combinations around – Source Odyssey's Signature 100. *Hi-Fi Choice* and Source Odyssey are giving away the first of only 100 Signatures being made, serial number 001. It comprises: The Source turntable with an exclusive black lacquer plinth and lavish application of 24 carat gold plating to many of its precision parts including the massive phosphor bronze platter; the Third Dimension power supply unit; handmade Odyssey *Signature* tonearm in gold plated

brass alloy. To complete the prize Audio Technica have supplied their £239 *ATOC7* moving-coil cartridge, *Choice* Recommended and described by Source as "the perfect match". The total retail price of this system is £3,239 and the lucky winner will receive an engraved plaque confirming ownership, as well as having the turntable installed by a Source Odyssey consultant.

To enter this competition all you have to do is answer the five questions (below) in this and last month's edition of *Hi-Fi Choice* and send the completed forms together to us. The first correct set of answers pulled out of the hat will win.

This month's questions are:

1. How many FM presets does the A&R Arcam Delta tuner have?

2. When did R&D start on Quad's current electrostatic speaker?

3. Which is the most expensive preamplifier reviewed by *Choice*?

4. Approximately what arm mass is the *ATOC7* cartridge best suited to?

5. Who manufactures a highly acclaimed range of amplifiers that all share the same distinctive casing?

NAME _____

ADDRESS _____

COMPETITION RULES

- 1) All entries must be on the entry forms provided. Photocopies will not be accepted and only one entry per reader will be considered. Entrants must submit completed entry forms in a single envelope. Incomplete entries will not be considered.
- 2) There is no cash or other alternative to the prize.
- 3) Employees of Dennis Publishing Ltd and associated companies, or their agents, or of the manufacturers and suppliers of the prize system components or their relatives are not eligible to enter the competition.
- 4) The competition is not open to readers living outside the United Kingdom.
- 5) The main prize will be awarded for the first set of correct answers opened. The Editor's decision shall be final and binding. No correspondence whatsoever will be entered into regarding the competition.
- 6) All entries must be received by Friday, April 29th 1988. The winner will be notified by post and the results will be announced in the July 1988 issue.

NB Please send this completed entry form along with Part One (March issue) to:
HI-FI CHOICE COMPETITION, 39 GOODGE STREET, LONDON W1P 1FD.

1963
Galle
Mansel
Academy

PERSPECTIVES

There are now a number of alternatives to the simple 2-wire connection of conventional loudspeakers. Paul Crook describes his experiences with the latest (and cheapest) of these – bi-wiring.

Passive Plus



Above: Rear panel terminal of Celestion SL700 shows bi-wire/bi-amp options. Below: Celestion's new flagship SL700 was designed expressly to take advantage of bi-wiring.

Put simply, the typical hi-fi loudspeaker consists of a wooden box with a pair of terminals on the rear. Connect it to an amplifier and squirt electrical music signals at it and out comes the acoustic facsimile that justifies its existence. Start dismantling the box, however, and you will find it contains at least two drive units connected to some fairly basic electrical circuitry known as the crossover. The crossover divides the signal into the right frequency bands for the respective drivers to handle, all linked to the terminals with wiring. This is the passive loudspeaker.

The opposite extreme is the active loudspeaker, where each drive unit is fed directly from its own power amplifier without the inevitable distortions introduced by the crossover, however well designed. Although there are several advantages, this is inevitably an expensive approach, particularly when used with large multi-unit loudspeaker systems. Instead of the passive crossover built into the loudspeaker box, the signal is divided up between the pre- and power amplifiers, using an 'active filter' – normally a fairly expensive box of electronics.

Over the past ten years there have been a number of successful UK active systems, notably from Naim, Linn and Meridian, but the substantial price premium needed to 'go active' has proved a singular disincentive. So first let's do some brief sums. A passive Linn/Naim 250/Isobarik system, with record player, amplifiers and loudspeakers will provide little change from \$5,000; the active equivalent will require a \$2,500 plus upgrade – a hefty sum by any standards.

The American 'high end' hi-fi industry, where companies are smaller and more specialist, with more limited resources and opportunities for co-operation, has tended (and this is a generalisation) to adopt a slightly 'lower tech' approach, known as bi- (or tri-)amping. This avoids the cost, complexities (and certain advantages) of using an 'active' (pre-power amplifier) crossover by retaining passive crossovers within the loudspeaker, but nevertheless giving each drive unit its own

unique terminals. The user can then employ one or more power amplifiers according to funds, linking (or better, bi-wiring) drivers that will be driven from the same power amplifier.

A third means of connecting loudspeakers to amplifier that provides widely claimed subjective improvements over the conventional passive two-wire approach has surfaced quite recently. Known as bi-wiring, it is further down the hierarchy in terms of performance gains, but is particularly cost effective, needing only the purchase of an extra set of loudspeaker cables.

Bi-wiring simply requires that the crossover of a two-way loudspeaker is designed with separate 'arms', feeding each drive unit from two pairs of terminals. The user may connect a single wire pair plus bridging straps for conventional passive operation, or alternatively opt for the subjective improvements offered with bi-wiring, running separate cables from the amplifier to each set of terminals.

The origins of bi-wiring remain somewhat obscure, though certainly some responsibility must be laid at the door of one Alan Harris, uncrowned Archtweak of the '70s and sometime Audio T demonstrator, and his unparalleled efforts to null and void any manufacturer's guarantee on a pair of long suffering but sonically remarkable (*née*) Spendor BC1s, something like ten years ago. More recently, Martin Collops and his then assistant Paul Crook carried out exhaustive subjective comparisons, resulting in a seminal article in the hi-fi press, and a gradual awakening of interest amongst such UK loudspeaker manufacturers as Harbeth, Rogers, Marantz and Musical Fidelity.

The reasons why bi-wiring actually works, and any measurement methodology to prove its case remains somewhat obscure at present. Nevertheless the subjective evidence of experienced listeners under controlled blind conditions (including the carefully orchestrated *Hi-Fi Choice* loudspeaker sessions) is incontrovertible, and certain possible theories have been put forward. In the following article Paul Crook outlines his subjective and practical experiences and speculates on some of the mechanisms that may be involved. Make no mistake, bi-wiring may well be the most important and cost-effective hi-fi development since spiked stands and supports.

Paul Messenger

BI-WIRING (AND BI-AMPING)

Besides the UK loudspeaker designs that are specifically configured to facilitate bi-wire connection, clearly any speaker designed for bi-amping could also claim to have been designed with bi-wiring in mind. However, as far as I know, none of them carry the recommendation that they be connected to a single stereo amplifier with separate cabling. The fact that the two pairs of terminals are invariably supplied with shorting tags for normal use is sufficient evidence. And indeed, such is the innate conservatism of manufacturers that speakers designed with bi-wiring in mind still come with shorting tags, despite the fact that this encourages the purchaser to use them in an inferior way.

It is also likely to encourage laziness amongst dealers, as was indicated when someone asked recently for guidance on what loudspeakers to buy for his system. Following my positive experience with the Musical Fidelity MC-4s, I recommended he go to his local dealer to hear them. At first



he found them good but not as impressive as I had led him to expect. After realising the dealer hadn't bi-wired them he insisted he do so with the result that he heard the sound he wanted and immediately bought them.

The above anecdote illustrates a general lack of understanding of the effect and benefits of bi-wiring, and the potential gains to be made in the performance of most loudspeakers. And clearly there is a considerable need for more education.

HOW IT WORKS

As yet, the mechanisms that favour bi-wiring are somewhat obscure and hypothetical. I have to admit to an only rudimentary knowledge of electrical circuit and wave theory, and can only pass on the view that has been formed by those of us deeply involved in the subjective appraisal of its

effects with a number of different loudspeaker designs and the cables used to connect them to the amplifier.

The first principle that may apply is borrowed from the theory of wave propagation down a transmission line. This theory states that the load at the end of a transmission line determines the behaviour of the signal passing down that line. Thus the load will determine the frequency bandwidth of the signal passing down the transmission line.

If this is applied to a loudspeaker (the load) connected to an amplifier (the signal source) by means of a loudspeaker cable (the transmission line), then it follows that the loudspeaker will determine the frequency bandwidth of the signals being carried by the loudspeaker cable. Given that bi-wiring a loudspeaker electrically divides it into two separate loads according to the crossover frequency, then the cable connecting the bass part of the speaker will only carry the low frequency signals, and the treble part cable the high frequency signals. This in turn means that

explains why connecting several cables in parallel to a 'normal' loudspeaker never seemed to make any significant difference (eg connecting a thick, high current cable and a thin, increased skin area cable for the bass and treble respectively).

The second possible principle at play in bi-wiring is an extension of the 'star earthing' concept that has recently come to prominence in amplifier design, as applied in many good sounding products including the Naim Audio and DNM ranges. If one considers the two separate ground conductors used in a bi-wired configuration, the point where the bass and treble section grounds meet is moved very much closer to the amplifier grounding point. Combined with the aforementioned load separation of the bass signals from the treble signals, this probably helps reduce any intermodulation effects between the two halves of the crossover network.

There is clearly still a lot of scope for proper scientific investigation of bi-wiring. Hopefully the larger loudspeaker manufacturers whose technical designers have the theoretical knowledge and research resources to confirm or refute the above speculations will become involved. Suffice it to say the ear can detect the result, although the inability of measurements to account for obvious subjective differences between amplifiers and cables makes it likely enough that any measured effects associated with bi-wiring will prove similarly elusive.

WHAT DIFFERENCE DOES IT MAKE?

I have personally bi-wired the following loudspeakers for individual clients: Celestion SL-600s, Sendor SPTs, Rogers and Sendor LS3/5As and Monitor Audio MA4s, and have always asked the owners to report their findings back to me. The results have been surprisingly consistent in terms of certain regularly repeated comments, from people using a wide range of equipment and cables in different environments and with different types of music.

Probably the most consistent theme is the significant improvement in stereo soundstage resolution when playing a well recorded orchestra, or similar, fundamentally acoustic recording. However, even rock music listeners report improved stereo resolution of artificial ambience and like studio artifacts.

Specific comments describe a more open and explicit soundstage with improved depth and width resolution and more clearly focused individual instruments or sounds. Opera fans say they can more easily identify the chorus as a body of separate voices rather than an acoustic wash of singing. The tighter focusing seems to offer more solidity to the source of the sound within the stereo sound picture, providing stronger contrast with the silent space between different sounds. This effect seems particularly noticeable with the Celestion SL-600, which is already one of the best speakers on the market in



Left: Sendor BCs. Alan Harris' elaborately modified pair probably represented the first instance of bi-wiring in the UK. Above: Marantz loudspeakers use a 'bi-ground' variation which needs only 3-wire connections, shown here with shorting link attached. Below: Mordaunt-Short MS442 is a 3-way design, equipped for tri-wire connections (if your amplifier terminals can handle it).

each cable is working less hard than a single cable would, and could therefore sound better (or transmit the signal more easily).

One of the first effects of bi-wiring is therefore probably to improve the performance of your connecting cables. It also

its ability to resolve stereo information

Another oft-repeated benefit of bi-wiring a conventional speaker is an improvement in the apparent power and solidity of the bass, especially with small loudspeakers. Such was this perceived enhancement in one case that the owner of a pair of *SL600s* subsequently cancelled his order for a pair of *System 6000* subwoofers! I have also found improved bass quality with my own Spendor *SP1s*, which are a reflex design and thus not quite as solid or stable at very low frequencies as a sealed box system. Related to the stereo image improvements and the better bass definition, some clients reported a more 'solid foundation' to the soundstage, similar to the effect of changing to a better turntable.

At the other end of the audio spectrum, the effect on the high frequency performance is of equal magnitude. The treble becomes purer and clearer and any grainy or fizzy effects are often reduced. This again contributes to the quality of the stereo focus, with a consequent loss of any glare and smearing of individual sounds.

These improvements to the frequency extremes seem to indicate that the behaviour of the drive units and their associated crossover network components becomes more linear with the reduced intermodulation between the two halves of the crossover, and with the closer coupling of loudspeaker and amplifier. This would account for what is for me the most important change with bi-wiring: the improvement in the absolute transparency and resolution of a loudspeaker, which seems to allow through more information than when wired in the conventional way. More low level detail and ambient information enhances the effect on the stereo focus and depth, resulting in a more communicative and therefore more alive and musical loudspeaker.

DOES IT WORK FOR ALL SPEAKERS?

Having bi-wired a large number of loudspeakers since first offering my services as a consultant in this field, I have not yet encountered a result that was not satisfyingly superior to the original. I have found, however, that some clients immediately heard more clearly what the rest of their system was doing, the removal of another veil revealing problems that had been previously masked – an effect many purchasers of ribbon-based loudspeakers will recognise. Eventually they adjusted to the increase in information, soon reporting back that they could not return to conventional wiring.

It is clear that bi-wiring could have a detrimental effect if greater clarity reveals fundamental weaknesses in the drive units or crossover that were masked by the occlusion resulting from 'normal' operation. One could only assess to what extent the benefits of bi-wiring would outweigh the increased awareness of a particular problem area in a design on an individual

basis, and even then this will be influenced by the listener's sensitivity to particular defects. I personally, for example, can tolerate some loss of bass attack in return for a clearer midrange. Others differ. Ironically, bi-wiring seems to improve the crispness and clarity of bass transients as a result of the closer link with the amplifier in the same way that an active Linn *Isobarik* can make its passive brother sound almost flaccid.

The risk of revealing unpleasant, hidden defects will obviously be less with well made loudspeakers that use top quality drive units and crossover components selected for good sound rather than low price. In other words, bi-wiring will always work better when the parts you are separating are good.

Alternatively one could take the view that bi-wiring is worthwhile to reveal any weaknesses more clearly, and then try to solve these problems. This would not be possible if the defects lay within the drive units without effectively re-designing the speaker, but there is some potential for improvement if it becomes clear that the crossover is the offender. When bi-wiring Celestion *SL600s*, for example, I have found it worthwhile to upgrade the tweeter capacitor from the standard electrolytic to a high precision polypropylene (carefully matched to the original value).



Supplied bi-amp ready, the Apogee Scintilla came with US recommendations for single amplifier bi-wire working.

A word of caution, however, to DIY enthusiasts who might try to modify carefully calibrated crossovers; without the proper laboratory equipment and expertise it is possible to degrade the precise matching techniques that are undertaken by the better manufacturers. Note that identified commercial component values are only within a certain tolerance range; this factor may be a tripwire for the DIY individual but is actually manipulated to advantage by the more advanced manufacturers. Tampering with crossovers would also obviously invalidate any guarantee, apart from the danger of missing the crossover PCB and puncturing a plastic cone with a hot soldering iron!

What about tri-wiring three-way designs and so on? It is inevitable that anyone with three-way speakers and contemplating rewiring would consider tri-wiring with three pairs of terminals and conductors per channel. Experience with the Mordaunt-Short *442s* confirms that tri-wiring does subtly improve on bi-wiring, but by a much smaller degree than the significant jump offered by the latter over conventional passive operation. As there is some enhancement on offer it is therefore worthwhile to consider the practical aspects of tri-wiring and beyond. The major difficulty is likely to be connection to the amplifier, as this involves three (or more) pairs of conductors per channel all of which have to be fixed somehow to an amplifier's (usually single) output terminals. Some amplifier manufacturers are now providing two pairs of terminals per channel connected in parallel to make multi-wiring very much easier; one of these is Musical Fidelity, whose commitment to bi-wiring now extends to marketing special bi-wiring connecting cable.

WHAT ABOUT CABLES?

The question of what cable to use to bi-wire a pair of speakers is complex, since there are twice the options to consider, as well as the possibility of varying the length of one with respect to the other. Here is an opportunity for much experimentation to find the right blend of cables for a particular amplifier and speaker combination. One might consider trying thin cable for the treble and a thick, high current capacity cable for the bass, or running copper conductors for the latter and silver for the former, etc. The only solution is to ring the changes and listen.

Some audiophiles have found it a good idea to run shorter cables to the bass section of a loudspeaker. The backup theory is based on the phase coherence concept expounded by Monster Cable, whose more expensive cables are constructed in such a way that the conductors become increasingly thinner and longer with increasing frequency-carrying-optimisation, the thinnest and longest being the best path for the high frequency signals to follow. Some even claim to have defined the ideal ratio of lengths, although I cannot find any information on what this is supposed to be, or whether it changes according to the crossover frequency of the speaker as might be anticipated. I have not yet found time to carry out any listening tests on this phenomenon, so cannot confirm or deny its existence. I must admit, however, that systems wired this way did sound excellent – which at least indicates that it does no major harm.

As for choosing different cables for treble and bass, I have attempted a few experiments personally and also had some feedback from other bi-wiring users. My general impression is that it's better to choose just one good cable type which has both good bass and treble performance for

connecting both sections of the loudspeaker. This seems to give a coherence to the sound that I have not yet managed to achieve using different cables, especially with the single strand conductors which I generally prefer. I have also tried using a 4-conductor cable intended for conventional wiring which has all four conductors twisted together – with not very happy results, as the loss of transparency associated with intermodulation effects seemed to be reintroduced. This is not surprising when you consider that the bass and treble waveguides (if I may call the + and – conductors that) are twisted together. The new Musical Fidelity cable physically separates the two pairs of twisted conductors by an H shaped outer insulator.

WHERE CAN I GO FROM BI-WIRING?

I said at the beginning that one probable origin of bi-wiring lies in certain loudspeaker manufacturers designing their speakers to be bi-amped, and supplying them with shorting links for optional use by the customer with a single stereo amplifier. History comes full circle, in that the next step in upgrading a system that has been bi-wired is to buy a second stereo power amplifier and bi-amp the speakers. I recently reviewed the Musical Fidelity P140 power amplifier that is designed to facilitate this by means of a switch on the front panel to mono the input signal and feed it to both channels, thus avoiding the need for an extra pre- to power amp interconnecting cable. The improvements gained by bi-amping seem very similar and of a similar order of magnitude to those achieved by bi-wiring. An additional benefit is an increase in the apparent power handling capabilities of the loudspeaker, with a consequent gain in the maximum levels available from the system beyond that expected on the basis of doubling the amplifier capacity.

Comparisons between a system using a single, large stereo power amplifier and the same speakers using two very much smaller amplifiers of slightly lower quality favoured the latter approach. This is what one might expect from extending the concept of a simpler load more directly coupled to the amplifier, bi-amping providing one whole amplifier (well, almost if the power supply is shared) for each drive unit.

There is then the choice whether to dedicate one stereo amplifier to the bass and the other to the treble, or alternatively to use one amplifier for each channel, though this may also be determined by domestic considerations and the layout of the equipment in the room.

Again my listening experience tallied (a rare event in subjective listening) with expectations based on technical considerations. One amplifier used for the treble and bass of one channel gave better stereo imaging and a louder maximum available level. It is reasonable to anticipate better stereo separation in dedicating one ampli-

fier to one channel, rather than both bass drivers sharing the same power supply (or even just the same chassis, if each channel has its own power supply); the same applies for the tweeters. And by sharing the power supply, mains transformer or chassis between bass and treble, it is shared between two amplifiers driving two different loads over different frequency bandwidths, so making differing demands at the same instant in time. Thus when the woofer suddenly demands a large burst of energy from the power supply, it is unlikely that the tweeter will need the same (eg on a loud drum transient), so a shared supply can provide more than half its potential to the woofer. Coincidentally, this arrangement is also domestically more convenient, as the power amplifiers can be sited just behind the loudspeakers!

CONCLUSION

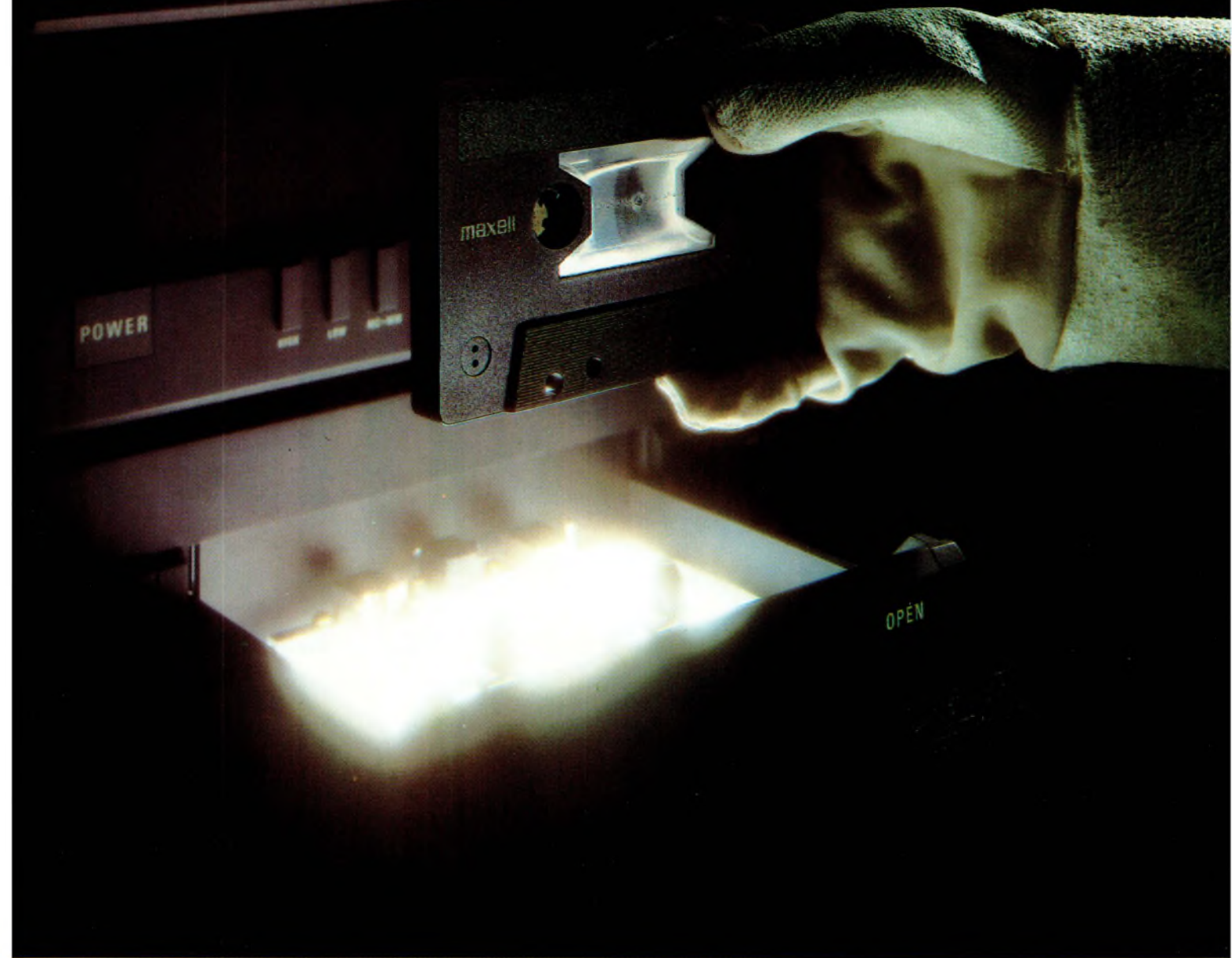
Most of the above thoughts are based on my own personal experience of bi-wiring and bi-amping, supplemented by information gleaned from friends and learned colleagues in the hi-fi business around the

Commercially available bi-wire (or bi-ground) loudspeakers, top: Marantz LD20DMS, left: Harbeth HL Compact, right: Musical Fidelity MC4.

world. I am particularly grateful to Martin Colloms with whom I spent many months experimenting with bi-wiring and bi-amping in our joint pursuit of yet further refinements to his excellent system (fully bi-amped, with one stereo amplifier per channel, of course!). Hopefully they will provoke further debate and investigation, perhaps thereby bringing greater minds to bear on the problem of identifying the mechanisms behind these phenomena. As a final note, I should add that anyone thinking of experimenting with either bi-wiring or bi-amping should seek expert guidance from a good dealer or the manufacturers of their equipment first. My investigations have not been pursued without the occasional mishap!



The acid test for your hi-fi.



How would your hi-fi system measure up to a cassette that overall design gives superior reproduction quality?

Or a cassette that Epitaxial and Metaxial particles are smaller for a much broader, more dynamic range?

Or indeed, a cassette that superior sound quality verges on the pin-point accuracy and quality of a compact disc?

Well, you needn't just wonder how your system will fare, you can try one of Maxell's brand new Black Series for yourself.

And we can guarantee, that although each one of the three new cassettes is designed with the coolest of matt black finishes, they will really make your system shine.



maxell
BLACK
SERIES

MARKET RESPONSE

In this month's dealer survey Dan Houston looks at the cassette deck market bringing you our dealer poll best sellers and comments from the sharp end on matters like reliability.

Cassette decks are *not* the heart of the hi-fi system. Instead they enjoy a kind of dilettante appeal, being rogues to the record industry and a godsend to those of us who love to steal our friends' record collections for a fraction of the asking price.

CD, with its lack of hiss and pops, may have only heightened the appeal of owning a cassette deck which (if well-behaved) will mirror what it hears on to tape. One dealer pointed to a marked increase in the sale of C60 cassettes (to take the hour-length CD) as proof of CD's effect on the cassette deck market.

Neither has the advent or imminence of DAT apparently had much effect on cassette deck sales according to dealers. Some said they told customers that DAT would be mainly for the professional market, and only one claimed: "DAT is going to do to cassette decks what CD has done to record players."

One dealer felt that if anything the market was swamped with too many models to choose from in the same price bracket. There were even too many models by the same manufacturer, he complained. The only thing said to be knocking cassette deck sales was the midi system, which wins on style and aesthetic appeal rather than sound quality.

For this month's market survey we sent around 100 questionnaire forms to a random selection of UK hi-fi dealers. To put some flesh on the bones of the results, we also telephoned to get comments on cassette deck matters such as how to keep the heads clean.

Our *Market Response* feature is based on the same topic as the main reviews in the magazine but deliberately concentrates on different criteria. The *Choice* reviewing methods scrutinise a single sample of a piece of equipment, and cannot address such factors as reliability or consistency, both of which are very important to buyers. We have therefore tried to distil the comments and experience of dealers to give readers advice on these factors. After all it's the dealers who see (and listen to) their range of products day-in and day-out, and who have to cope with the various problems

that arise.

One salient point made by experienced dealers was that cassette decks are now cheap, compared to when the audio tape medium first became generally available. Alan McDonald, of University Audio, Cambridge, told us he had a reel-to-reel Ferrograph which in 1954 cost 100 guineas (£105). One can now get the same sound quality and facilities or better for £105 he claimed (*razor blade editing apart - Ed*). And of course the value of money has decreased by 10.68 times (according to Government Retail Price Index figures) since 1954. So, you get more for your money - principally because firms have paid off expensive research programmes and have developed production lines to bring you their product more efficiently. (Though one can't help wondering how many of today's cassette decks will still be giving service in 2022.)

In a more recent context, dealers praised the component industries who have developed better parts such as motors and transports, so making cassette decks more reliable and less likely to breakdown if properly looked after.

Darbys Hi-Fi told us that the mechanics and component parts of cassette decks were now of such a high standard that manufacturers should have the confidence to introduce full two-year guarantees on their products. Darbys themselves give such guarantees on all their equipment, as do some other dealers we spoke to.

The lack of British cassette decks on the market was a cause of sadness to many retailers. One told us he would like to see A&R Cambridge develop a deck, but another hang-doggedly said: "it's just a pipe dream; the Japanese have got it all wrapped up."

TERRIBLE TWINS?

Just as Tweedledum and Tweedledee went forth to have a battle, so many dealers felt that twin transport cassette decks were a conflict of ideals: the ideal of the customer to get more for his money, and the ideal of the manufacturer to sell him less. "They don't sound as good," we were told, "you're just getting

two cassette decks for the price of one. You get cheaper heads, cheaper transports . . . everything."

Two champions of hi-fi told us they tried to dissuade customers from buying twin decks, but admitted that it was often hard work. "They think it's the vogue, so we sit them down and get them to think what they actually want it for - and how much they're going to use it," our Leicester contact told us.

If you must have a twin deck then the dealers' view was that you should pay twice the price of a reasonable sounding single deck; one dealer quoted a figure of £250.

RELIABILITY (OR WILL IT WORK?)

Doing these market surveys one keeps hoping to discover some grossly unreliable products. However this isn't the case, even with cassette decks; 97.15 per cent of them arrive from the manufacturer in perfect working order according to our survey.

Julian Richer, cherubic proprietor of 12 shops selling bargain price hi-fi, pointed out that all the unreliable brands sank very quickly, and that dealers wouldn't sell them because of the recurring problems involved.

When we asked dealers about turntables (February issue) we heard that most of the faults found on the products' arrival had occurred in transit, but this was not so much the case with cassette decks. Our Isle of Man and Irish correspondents told us that since changing to air rather than sea freight things had improved. It would seem that airport staff are less callous with handling these types of goods than the hook slingers of our ports.

Several dealers said that none of their cassette decks arrived faulty which, if believable, must instill confidence in the buyer, although there are some brands which are more reliable than others after sale.

We asked dealers to list their best and worst and then calculated our results using a points system. Of course if a dealer sells more of a particular brand he is more likely to find

unreliable samples, but some of the best sellers are also predictably amongst the most reliable.

The most reliable cassette decks are made by Nakamichi with 82 points and Denon with 81 points. We kept on hearing that there were just no faults with these decks. The next most reliable were, in order: Yamaha (46 pts), Technics (40 pts), Sony (25 pts) and NAD (25 pts). There were dealers, however, who had had bad experiences with both Technics and Yamaha. There were no complaints against Marantz, Kenwood, Harman Kardon and Teac, although these did not feature as strongly in our survey.

As far as unreliability was concerned over a third of our dealers pointed at Aiwa, which is perhaps to be expected considering their dominance of the budget end of the market. In fact several dealers mentioned that it was only the cheaper models that could be troublesome.

Other cassette decks you might not want to take to a desert island without a screwdriver were given as Akai, JVC and Hitachi. "When someone comes into the shop with a disgruntled look on their face we know it's going to be Hitachi," explained one dealer. Hitachi obviously disagree with this comment since they are just about to put five-year guarantees on all their separates range.

If your cassette deck does fail, then we found that most dealers preferred to carry out repairs themselves, so saving transport time and costs. The average time you will have to leave your deck is seven and a half days according to our calculator, although several dealers promised same-or two-day repairs.

If sent back to the maker/importer, you will lose the machine for an average of 3.2 weeks. Some retailers will lend you a shop model for this period - so it's worth asking. The fastest brands for dealing with faulty decks or sending spares turned out to be Denon and Nakamichi, who take an average two and a half weeks. Technics, Yamaha, Marantz and Kenwood are also quick, while the slowest were stated as JVC, Sony and Aiwa. For



The Cornflake Shop is a small, friendly shop selling hi-fi .
We're just off Tottenham Court Road on Windmill Street.
We sell a carefully selected range of equipment – just what we
think is the best available – and we can install and service
everything that we sell.

We don't rip you off – systems start from £300, and all our
prices are competitive.

So, if you'd like to abandon the nightmare of Tottenham Court
Road, come and have a chat – you'll find us friendly, helpful,
knowledgeable and honest.

the cornflake shop

37 WINDMILL ST LONDON W1P 1HH 01-631 0472

the record, we left out one exasperated comment about Sony, viz: "they had to make a part while the customer waited two and a half years". Such incidents seem about as common as a shark bite in Sainsburys on Saturday, and are mentioned purely for their sensationalist shock horror appeal.

CLEAN HEADS

Now come on – initiates may talk amongst themselves – surely everybody knows about cleaning the heads on a cassette deck? Well we couldn't believe it. On these forms there are a string of comments from dealers who day-in, day-out put up with punters bringing back cassette decks saying: "it doesn't work," or "it's broken." And there are claims such as: "nine times out of ten this is simply because it has never been cleaned." They say: "clean the heads? What do you mean clean the heads?"

Not that dealers mind that much of course. One told us he takes the deck into the back of the shop, swabs the heads, pinch rollers *etc.* with isopropyl alcohol (isopropanol), then gives it back working to a delighted customer in exchange for a fiver.

Many people owning cassette decks apparently rely on them to work forever without cleaning. All the dealers we asked said they pointed out to customers the importance of tape head cleaning at the time of purchase. So either people have very short memories, or don't care, or get their decks cheap off the backs of lorries (know what I mean John?).

We asked dealers to tell us their recommended cleaning method, and of the mechanical head cleaning gadgets available the Allsop 3 (£3.95), marketed in this country by the Path Group, was considered the best by 65 per cent of dealers. This system comes in cassette form which is particularly handy for giving the car player mechanism a once or twice over now and again too. Though recommended as the most user friendly of its type, one claimed that it was merely the best of a bad bunch.

However, 90 per cent of dealers recommended using cotton wool buds and isopropanol or a similar fluid (such as QED) too. Norman Perriam of Norman Audio advised: "it's like

scrubbing the floor, the only way is to get down and look at what you're doing."

As for how often you should clean heads, the consensus was once every three or four weeks and always before recording. But the user will be able to see whether any residue is being left on the cotton buds and can use that as a guide. Isopropanol can be bought from a chemist and is better than meths as it is very pure. Dealers warned against using meths saying it leaves a residue on the tape heads. It was also mentioned that some solvents could be ruinous to cassette decks since the rubber or plastic pinch rollers could be affected by anything too powerful.

OLD HEADS

We wanted to provide some sort of guesstimate on how long tape heads last, and asked dealers for an average average, assuming that the average person uses his deck for an hour or so a day. It was pointed out that the heads on more expensive machines were generally of superior quality and longevity, and that those in a deck priced around £700 can be expected to last seven years.

On a more general level we calculated a mean average of four and half years for normal wear and tear, though it was felt that the heads would often effectively outlast the machine these days.

CHROMED HEADS

If you use chrome or metal tapes will they damage the heads or shorten their life? Not generally, answered the marketplace, although some said that with cheaper decks metal tape could wear heads out more than a normal bias tape. A couple of dealers did point out that using metal tapes on cheap personal stereos had resulted in grief after only 18 months or so for their customers.

CONSISTENCY

Asked which brands were the most consistent in terms of sound quality, we again calculated the answers on a points system. And again Denon and Nakamichi were the most popular for consistent sound, Denon scoring 69 points and Nakamichi 65. Following these were (in order)

Yamaha (39 pts), Technics (29 pts) and then NAD (22 pts).

However, Denon seems to have sparked a love-hate relationship with several dealers because they also ranked second to worst on inconsistency. Bottom of the league here was Aiwa (though two dealers said Aiwa was consistent). Although very reliable, Sony was felt to be inconsistent by four dealers, and NAD, Yamaha and Technics were also criticised a couple of times each. Several dealers claimed there was negligible inconsistency in cassette decks at present and many told us that things were much better than, say, five years ago.

THE BEST SELLERS

These are compiled from dealers' top three selling cassette decks in the three price categories. The results are in points: five for the top seller, four for the second, three for the third and then added up.

In the budget category, up to £120, the best sellers were:

Model	Points
1) Aiwa <i>AD-F360</i>	52
2) Aiwa <i>AD-F260</i>	46
3) Technics <i>RS-B205</i>	39
4) Sony <i>TCF-X150B</i>	30
5) Kenwood <i>KX548</i>	20

We must point out that 14 dealers said they did not stock any cassette decks below this price level but we nevertheless consider it to be a realistic budget figure.

In the mid-price sector, from £121-£300, the best sellers were:

Model	Points
1) Denon <i>DRM 07</i>	114
2) Denon <i>DRM 12HX</i>	52
3) Yamaha <i>KX-200</i>	43
4) Yamaha <i>K340</i>	37
5) Kenwood <i>KX 550HX</i>	33
6) NAD <i>6220</i>	28

In the upper price category, over £301, we found the following:

Model	Points
1) Nakamichi <i>BX125E</i>	75
2) Denon <i>DRM 30HX</i>	64
3) Nakamichi <i>BX300E</i>	46
4) Denon <i>DRM 44HX</i>	43
5) Nakamichi <i>BX 100E</i>	26

Nakamichi have just introduced their new *CR* range of models. The *BX 100E* will be superseded by the *CR-1E*, the *BX 125E* by the *CR-2E* and the *BX 300E* by the *CR-3E* (see main reviews). Dealers who had just started with the new range when

this survey was carried out said they foresaw no problems and imagined the results would read the same for the new models.

The results of this survey are only as representative as the comments from 42 dealers around the country can be. We don't pretend that this is the complete situation, or that our top sellers list is the true representation. The survey is a poll, and only as accurate as the people who contributed.

PARTICIPATING DEALERS:

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

- Active Audio, Derby, Derbyshire.
 - A. Fanthorpe Ltd, Hull, Humberside.
 - Aston Audio Ltd, Alderley Edge, Cheshire.
 - AT Labs, Enfield, Middx.
 - Audio Insight, Stony Stratford, Bucks.
 - Bridge Hi-Fi, Walsall, W. Midlands.
 - Chichester Hi-Fi, W. Sussex.
 - Cloney Audio, Blackrock, Co Dublin.
 - Covent Garden Records, London W1.
 - Darby's Hi-Fi, St. Albans, Herts.
 - Eastwoods, Oadby, Leicester.
 - Hi-Fi Experience, London W1.
 - Framptons, Plymouth, Devon.
 - Gilson Audio Ltd., Middlesbrough, Cleveland.
 - Goldring and Co., Colchester, Essex.
 - Grahams Hi-Fi, London N1.
 - Griffin Audio, Birmingham
 - In Hi-Fi, Edinburgh
 - Island Compact Disc Centre, I.O.M.
 - John Marley Hi Fi, Canterbury, Kent.
 - KJ Leisuresound, London W1.
 - Lafayette, Dublin.
 - Merrow Sound, Guildford, Surrey.
 - Murray Hi-Fi, Stockport, Cheshire.
 - Norman Audio, Preston, Lancs.
 - Paul Green Hi-Fi, Bath, Avon.
 - Peter Russell's Hi-Fi Attic, Plymouth, Devon.
 - Richer Sounds (12 shops in London and UK)
 - Robert Ritchie Hi-Fi, Montrose, Scotland
 - Suttons, Bournemouth, Hants.
 - Swift of Wilmslow, Cheshire.
 - The Audio File, Bishops Stortford, Herts.
 - The Cornflake Shop, Windmill St., London W1.
 - Tru-Fi Ltd., Aldershot, Hants.
 - Truro Hi-Fi, Cornwall.
 - University Audio, Cambridge.
 - Watts Radio, Somerton, Somerset
 - West Midlands Audio, Worcester.
 - Zeus Audio, Belfast & 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.**

BRITAIN'S No.1 HI-FI DEALER

Voted by Hi-Fi News Readers - 1986

ONLY THE BEST HI-FI MAKES STOCKED

From budget to exotic

KNOWLEDGEABLE, FRIENDLY STAFF

To help you decide the system you want

THE BEST IN ANALOGUE & CD

TWO DEMONSTRATION ROOMS

At each store

WE MAKE BUYING HI-FI A REWARDING EXPERIENCE

Fine equipment from:- Acoustic Research - Albarry - Alphason - A & R Cambridge - Audiolab - Celestion - Croft - Dean - Decca - Denon - Dual - Elite - Gale - Grant - Heybrook - KEF - Linn - Marantz - Meridian - Michell - Mission - Nakamichi - Philips - Pink Triangle - ProAc - Quad - Rotel - SME - Systemdek - Target - Van den Hul - Yamaha - Zeta. Also at AUDIO T:- Audio Research - Cambridge Audio - Counterpoint - DNM - Exposure - Infinity - Jecklins - Koetsu - Krell - PS Audio.



AT Labs

159 Chase Side
Enfield
Middlesex EN2 0PW
01-367 3132



Audio T

190 West End Lane
London
NW6 1SQ
01 794 7848



AT Labs

442-444 Cranbrook Rd.
Gants Hill Ilford
Essex IG2 6LL
01-518 0915



CHOOSING AND USING . . . CASSETTE DECKS

Though the Compact Cassette is very much hi-fi's 'bastard' medium, at least on ethical grounds, there is no disputing its success, its convenience, or the high standards of sound quality that can be achieved nowadays – at its best, fully comparable with CD or LP disc. The unique feature of the medium is, of course, the ability to record. But it should also be stressed that musicassettes are a major source of prerecorded music, outselling LP and CD combined. Versatility and compactness are the twin pillars of the cassette's success. All audio systems have begun in the home, but the cassette has done for the music industry what the transistor did for radio, providing 'go anywhere' flexibility in portables, personals and in-car variations.

The most obvious recent trend in domestic mains machines has been towards the double 'dubbing' deck, fitted with two transport mechanisms. *Choice* has tended to steer clear of these, less for moral reasons concerned with copyright theft than because there is no way such a machine can out-perform a single transport machine at a similar price. However, the market share of dubbbers continues to increase, particularly in budget and system/stack sector, so we have included a number of new examples this time around. By and large, they have done little to change our opinions significantly. However, those who do want this extra facility can now decide for themselves whether the price penalty is worthwhile.

REPLAY

Nowadays the best musicassettes can give very respectable quality, so pre-recorded material certainly deserves to be taken seriously, and the replay only performance of a cassette deck must be considered important too. Theoretically, pre-recorded cassettes could be as good as or even better than those made on all but the very best domestic decks, as the equipment for mass duplication ought to be superior mechanically and electronically.

However, in practice quality and quantity often conflict, and the profits are created by the latter. Nevertheless the end result can be good enough to show up limitations in even the very best cassette decks, so the ability to get the best from musicassettes is a valid assessment for a cassette deck.

The task requires a good quality tape transport mechanism and replay head, plus careful alignment of heads and electronics. Although international tape equalisation and noise reduction standards do exist, not all manufacturers are equally good at adhering to them. The result is that many decks perform less well on replay only than they do within the 'closed loop' of record/replay, and our reviews pay attention to this.

RECORD/REPLAY

In some ways record/replay is easier than replay only, insofar as head alignment, Dolby tracking and equalisation errors can cancel out and compensate for each other. However, any inherent transport problems are likely to be exaggerated, and there is now a still greater premium on the quality of the record head, particularly if metal tape is likely to be used. To get a decent quality recording, a deck needs to be accurately aligned electronically for a sensible range of different tape types; some machines offer variable bias for 'fine tuning' to specific tapes – a useful facility for those prepared to take the trouble.

Good quality metering set to the right sensitivity level can be a boon, though in time and with practice a cassette deck owner will probably gradually come to learn the 'right' meter level for getting most signal without compression onto a specific type of tape.

It is worth carrying out a few practice runs to explore the limits of the deck with a particular tape. Try increasing the record level by a specific amount at specific counter intervals during recording, then back off the volume setting at the same time intervals during replay so that the overall sound level

remains reasonably constant. You should then be able to hear the sound balance and/or distortion start to change as either machine or tape reaches overload, and so deduce the right peak meter levels to use for the best balance between background noise and recording quality. It may also be worth trying a similar subjective run through with and without noise reduction circuitry, as some listeners prefer an unprocessed if noisier sound, and noise reduction circuits are not always properly adjusted for different tape sensitivities.

TAPE TYPES

A full comparative analysis of different brands and types of tape will be found in our March issue. Though there are three formal groups of tapes, Types I, II and IV, there are variations within each group which further confuse. In brief, the best advice is to find a tape in each group which suits the set-up of the recorder, and then stick to it. (But note that the tape manufacturers have an annoying habit of re-mixing formulations regularly without changing the brand identity.)

The very cheap ferric tapes are not hi-fi quality, so it is better to go for premium Type I ferric from a reputable brand for general purpose use. A Type II chrome or pseudochrome will give a step-up in quality, while Type IV metals can turn out to be the cat's whiskers on some decks – but may not work too convincingly on others. Perversely, the very best decks can produce stunning results on the better quality Type I ferrics.

FEATURES

No other component fulfills a button pusher's dream like a cassette deck. The bare essentials boil down to tape selection (which can be automatic), and Dolby B noise reduction (necessary for musicassette replay but optional for record/replay).

A host of imaginative inessentials will either enhance the enjoyment or baffle the user, depending upon temperament.

Microphone inputs are fast disappearing, with better quality microphones commonly containing battery pre-amps to provide a line-level signal for normal deck or amplifier connection, but headphone sockets remain. Extra noise reduction may be Dolby C and dbx, with headroom extension from Dolby HX Pro.

Electronic logic control may supervise an almost silent transport system, giving the potential for microprocessor-controlled track search and programming systems; for auto-reverse to extend play or record times; and for automatic tape tuning in the more expensive machinery. Bias 'tweaking' enhances tape matching, while replay EQ may be trimmed for optimum replay response on some machines.

The manufacturer can choose to spend money on a better quality single transport, with a closed-loop double-capstan system perhaps, or slot in a second dubbing transport with all the extra complexity.

Styling is clearly a matter of personal taste, but the whole gamut exists from the garish clash of multicoloured illuminated displays shouting 'buy me' off the shop shelf, through to the deliberately understated or the daringly unconventional. Ergonomics vary from the crass and confusing to the subtle and effective, though take heart from the fact that a purchaser will soon learn to use his own particular deck, as he would learn to drive a new car.

Having weighed up the pros and cons of your own priorities and requirements, and having studied our reviews, it's not a bad idea to audition one or two likely contenders. A comparison with something really good is almost essential to establish a quality yardstick when trying to assess how much you will need to spend to achieve the desired level of performance. The enthusiast may not take the purchase of a cassette deck as seriously as he would the selection of turntable, arm and cartridge, but audible differences between cassette machines are no less obvious.

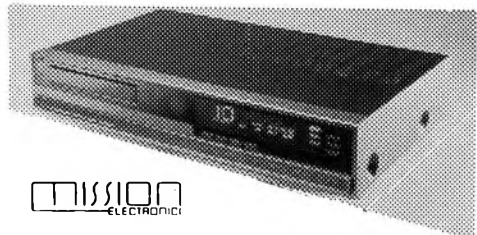
MISSION ELECTRONICS CONTROL CENTRES

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. **



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 70MK II at £99.90 to the awesome 780 at £700 Mission speakers continue to collect Awards and Best Buy recommendations.



AT Labs

442-444 Cranbrook Rd.
Gants Hill Ilford
Essex IG2 6LL
01-518 0915



Compare with all the best speakers from:-
Acoustic Research, Gale, Heybrook, Kef, ProAc

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.



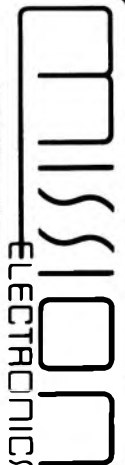
MISSION
ELECTRONICS

CYRUS TWO

Fine amplification from:-

A & R Cambridge, Audiolab, Audio Research *, Cambridge Audio *, Exposure, Quad, Rotel.

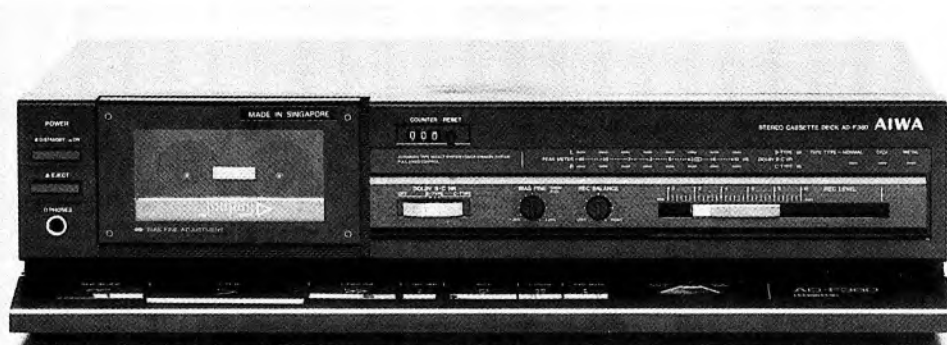
* Product stocked at Audio T.



See the  range at the LONDON CONTROL CENTRES

AIWA AD-F360

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



This low cost model is one rung up from the bottom of the Aiwa ladder. It conforms to the company's usual design style, with the main control panel almost horizontal, an arrangement which provides unusual visual clarity, not thrown away by a clutter of tiny controls as with some of the more expensive Aiwas. At the same time this layout means the deck must be positioned below eye level, and the horizontal section can also become something of a dust trap.

The AD-F360 is well equipped for the price. Tape type selection is automatic, with confirmation telltales. Recording controls include a fine bias adjust knob and the record level meters have a 30dB range over 7 steps, with the LEDs above 0VU picked out in red. The transport section is microprocessor controlled, and includes audible cue and review facilities (a useful feature that is presently found on very few decks).

The machine is well finished, albeit with typically Japanese home market styling that lacks something of the usual European reserve; build is lightweight. The transport, although smooth, produces such an amazing variety of rattling noises as play or fast wind are selected, that I initially half imagined someone had left a bag of screws loose inside!

LAB REPORT

There was marked treble loss with pre-recorded material, but the opposite applied when recording and playing back. The record/replay response shapes are all on the bright side with the fine bias adjust control set as suggested – and at all times when using metal tapes which are recorded with fixed bias. Type I and II tapes generally require a notch or so of extra bias. This is typical of Aiwa decks, and gives a bright immediacy to the sound that helps them stand out from the crowd on first acquaintance, but hardly constitutes accuracy. Dolby integrity on the other hand is acceptable.

This deck is not capable of exploiting the dynamic range potential of Type II or IV tapes – note the high 0VU distortion level with these two tape groups, alongside the quite ordinary signal/noise figures achieved. The IM distortion figure adds further weight

to the story. However, speed stability of the deck is OK. The weighted figures are satisfactory, and the flutter sidebands are well suppressed, despite the higher than expected numbers.

SOUND QUALITY

Monitored *via* the amplifier tape monitor loop, the electronics sound a little warm and 'romantic', a quality that was also noticed with recordings, some of which sounded a little 'sloppy'. There was some mains hum too. When recording with metal (Type IV) tape, the top end acquired a rather 'gravelly' feel (partly a function of tonal quality) and stereo focus was diffuse. Chrome tapes proved the best choice for this recorder, metal tapes evidently stretching the record amplifiers to the point where they started to show audible strain.

Of the noise reduction systems, Dolby B sounded a little sweeter and more natural, but rather lacking in expressiveness, a point that was partly put to rights when listening with the Dolby circuits switched off. However, noise levels are really too high to allow this deck to be used this way, which is a pity since the noise reduction circuits seem subjectively unusually obstructive.

CONCLUSIONS

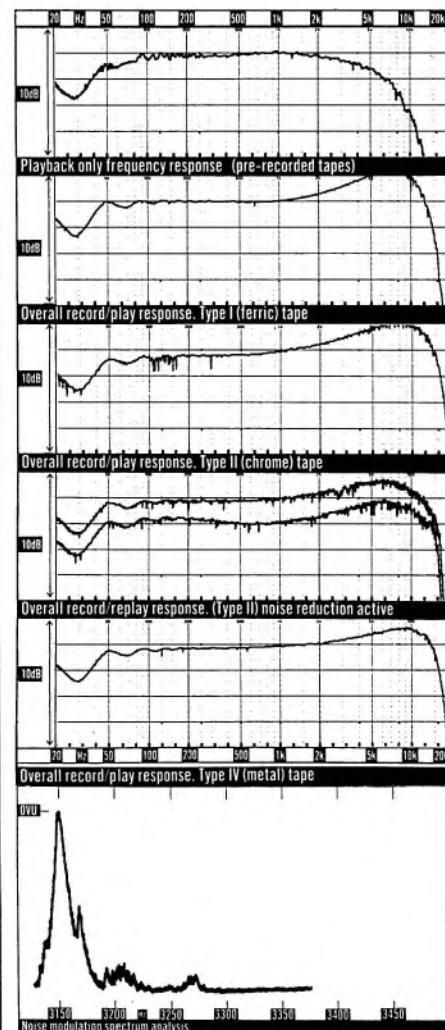
Ultimately an average-ish sounding deck at a comfortably below average price, the Aiwa 360 is well equipped and easy to use but lacks sonic resolution and is rather tackily styled.

TEST RESULTS

Rec/replay response – 3dB ref 1kHz	
IEC Type I	<20Hz – 15kHz
IEC Type II	30Hz – 17kHz
IEC Type IV	<20Hz – 17kHz
Wow & Flutter – Peak DIN wtd/unwtd	
Wow/Flutter Peak DIN wtd	0.10%/0.28%
Speed error	+0.10%
Type I signal/noise CCIR/ARM 315Hz	
distortion 0dB	51dB
	1.0%
Type II signal/noise CCIR/ARM 315Hz	
distortion 0dB	50.5dB
	>3.0%
Type IV signal/noise CCIR/ARM 315Hz	
distortion 0dB	53dB
	>3.0%
Channel separation 0VU/1kHz	48.5dB
Line input sensitivity/overload	79.5mV/>7V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	668mV/29V

IM distortion 1kHz, ref 10kHz/11kHz 0dB
Azimuth check R-L phase at 8kHz
VU indication at IEC 0dB
Dimensions (w x h x d)
Typical Retail Price

3.1%
17 degrees
+30B
42 x 11 x 29.5cms
£109.95



AIWA AD-WX707

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



The AD-WX707 is a brand new model which eschews the split level presentation of older Aiwa decks in favour of a more conventional design, with some subtle sculpting to break up an otherwise monotonously flat front panel. There are two transport mechanisms, one unidirectional for playback only, the other a full auto-reverse mechanism designed to record as well; Aiwa's 'Quick Reverse' mechanism senses the tape/leader join and can change sides in about 0.3 seconds.

The two transports share certain features such as audible cue/review and auto tape type selection, and also have uniform control layout and logic. Like the 360, the 707 sounds as though a herd of bees are deputising for the solenoids - Aiwa describe this interesting feature as 'feather-touch IC logic control'. The transport mechanism remains a little noisy during play.

Noise reduction is as usual by Dolby B and C. Recording aids include a fine bias adjustment for Type I and II tapes, and 30dB, seven step record level meters. The usual dubbing, both in real time (for optimum quality) or at double speed (to hasten things up - but it sounds awful), enables tapes to be duplicated and copyright laws broken with ease. Continuous (sequential) play of two tapes is also available.

LAB REPORT

Bench test performance is modest. The responses are all balanced on the bright side at the recommended bias settings. That this is deliberate is indicated by the fact that Dolby tracking is correct for these bright settings, with none of the expected exaggeration of the resulting curves. It is possible to straighten out high frequencies on Type I and II tapes at some cost to extension, but metals reproduce way over the top, are not amenable to adjustment at all, and are far too bright to be solved simply by changing the tape type. Note also the similar (but milder) rising response trend for playback only, which shows where at least some of the record/playback HF boost comes from.

Weighted wow and flutter levels of the recording transport are fine in the forward direction, but deteriorate significantly in

reverse. The rather high unweighted figures are associated with some discrete low level flutter sidebands. The other numbers are satisfactory.

SOUND QUALITY

Again, results are mixed, but this is not a bad performer in relation to price. (It may be helpful to think of it as a £130 auto-reverse deck combined with a £40 player.) Compared to the rather woolly F360 the WX707 is a little tauter and drier, but some of the energy seems to have been sucked from the sound, whether auditioning the electronics only or off tape. The richly varied strings in the opening of the second movement of Beethoven's *Symphony No. 7* (to pick an example from thin air) has a dried, desiccated quality foreign to the music.

Type II tapes did poorly, especially with Dolby B where clear mistracking was apparent - stilted, wooden transients, the works. There were fewer problems elsewhere, metal tapes extracting the best from this machine, though ferrics sounded OK too. Unusually, Dolby C generally sounded better than Dolby B, and seemed more resistant to mistracking. Prerecorded tapes, which also suffered Dolby mistracking problems, were not a great success.

CONCLUSIONS

Although the electronics offer only modest audio quality, this well packaged deck would undoubtedly have done a lot better if it had been set up even reasonably accurately.

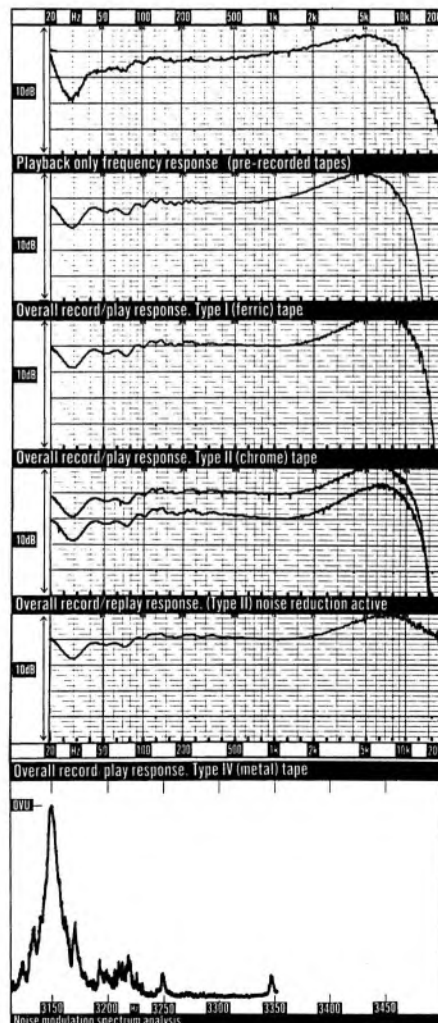
TEST RESULTS

Rec/replay response - 3dB ref 1kHz

IEC Type I	<20Hz - 12kHz
IEC Type II	<20Hz - 14.5kHz
IEC Type IV	<20Hz - 19kHz
Wow & Flutter - Peak DIN wtd/unwtd	0.074%/0.23%
Wow/Flutter Peak DIN wtd	0.064%/0.23%
Speed error	+0.18%
Type I signal/noise CCIR/ARM 315Hz	59dB
distortion 0dB	0.65%
Type II signal/noise CCIR/ARM 315Hz	52dB
distortion 0dB	1.2%
Type IV signal/noise CCIR/ARM 315Hz	52dB
distortion 0dB	1.0%
Channel separation 0VU/1kHz	47dB
Line input sensitivity/overload	104mV/1.17V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	713mV/2.8V

IM distortion 1kHz, ref 10kHz/11kHz 0dB
Azimuth check R-L phase at 8kHz
VU indication at IEC 0dB
Dimensions (w x h x d)
Typical Retail Price

1.8%
5 degrees
+3dB
43 x 13.6 x 31.0cms
£179.95



AIWA AD-WX909

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

BEST BUY



Intriguingly whereas the *AD-WX707* has a unidirectional playback transport and an auto-reverse record one, the *AD-WX909* is exactly the opposite. Apart from losing the ability to make 90 minute near-continuous recordings, this makes a good deal of sense.

The playback transport generally fulfils a less critical role in a twin deck (dubbing tapes is hardly a recipe for hi-fi even when done at normal speed), and the convenience of auto-reverse operation probably outweighs any qualitative compromise. For the record/playback section however, sound quality must be the primary concern, and the limitations inherent in auto-reverse operation are better avoided.

What you have here then is a unidirectional recording mechanism with three heads for full source/tape monitoring (with auto and manual monitor switching – all mod cons!), plus Dolby *HX Pro*. The record deck also features an automatic head demagnetising circuit.

Each transport has Dolby B and C, logic control with track search, cue and review and (unusually) dedicated electronic tape counters. The two transports have their own rear panel connections, and a spare input (labelled CD/DAT) is also provided, but there's no microphone input. This basic mix is leavened with the usual – and some less usual – extras, including standard and high speed dubbing, blank skip, track search, bias adjust (Type I and II), parallel recording and sequential play. It's all very tasty – and well presented too. The auto-reverse playback deck employs a quick acting side change that switches as soon as it detects the tape/leader join.

LAB REPORT

The record/replay frequency responses are a bit messy. To achieve a flat and extended HF response will result in something of a 'hole in the middle' centred on 5kHz. Metal tapes cannot be tweaked at all. Dolby tracking is fair but not exceptional, especially with the more manipulative Dolby C which shows limited amplitude broadband response lifts centred on 200Hz and 5kHz. Bass and treble are well extended, however.

The record transport has excellent pitch

stability – the spectrum analysis is pretty clean – but the playback only transport (results not shown in the table) was predictably less good, being roughly comparable to the record transport of Aiwa's *WX707* (reviewed separately). It's not possible to be too specific since the tests could only cover playback. The various noise and distortion figures were quite good, but notice the significant 0VU intermodulation level.

SOUND QUALITY

The two transports must be discussed separately. The main record/playback one is an excellent performer, fully capable of recordings which retained many of the subtler qualities of the source intact. The deck sounded tonally colourful (in the positive sense) and dynamically (relatively) unfettered. There was some advantage in using metal tapes over chrome and chrome over ferric, but the *HX Pro* circuitry went some way towards levelling the odds. The Dolby processing was also well adjusted to its role, and did little to rob the sound of vitality or believability. Pitch resolution and speed were beyond reproach.

The playback transport was nothing like as good, sounding relatively scrappy and suffering some unevenness and dropout. It sounded cheap, and this was reflected in its dubbing performance.

CONCLUSIONS

Heartily Recommended – Aiwa must be proud of this one. At last a dual cassette deck you don't have to make excuses for.

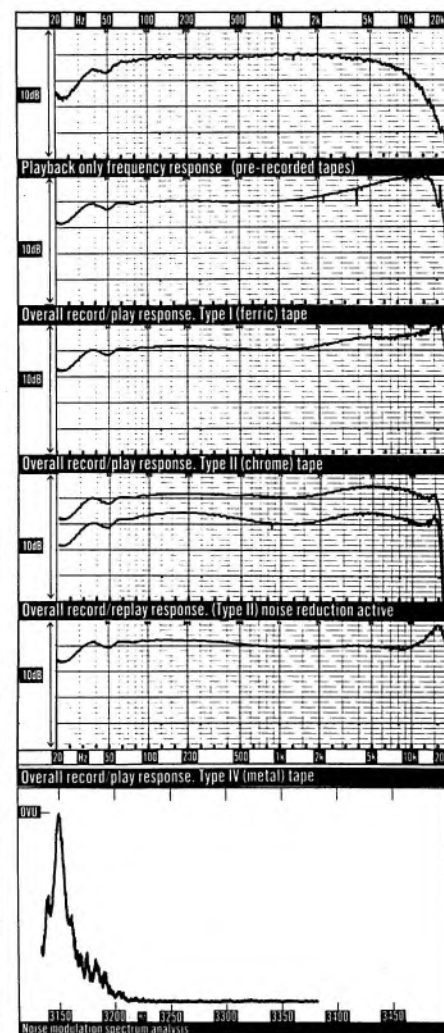
TEST RESULTS

Rec/replay response – 3dB ref 1kHz

IEC Type I	<20Hz – 18.5kHz
IEC Type II	<20Hz – 20kHz
IEC Type IV	<20Hz – 20kHz
Wow & Flutter – Peak DIN wtd/unwtd	0.078%/0.10%
Wow/Flutter Peak DIN wtd	0.068%/0.099%
Speed error	+0.15%
Type I signal/noise CCIR/ARM 315Hz	50dB
distortion 0dB	0.46%
Type II signal/noise CCIR/ARM 315Hz	53.5dB
distortion 0dB	1.0%
Type IV signal/noise CCIR/ARM 315Hz	53dB
distortion 0dB	0.85%
Channel separation DVU/1kHz	48dB
Line input sensitivity/overload	78mV/25V
Mic input sensitivity/overload	n/a

Line output for 0dB/maximum
IM distortion 1kHz, ref 10kHz/11kHz 0dB
Azimuth check R-L phase at 8kHz
VU indication at IEC 0dB
Dimensions (w x h x d)
Typical Retail Price

690mV/2.4V
1.9%
5 degrees
+5dB
43 x 12.6 x 31.7cms
£400



AKAI GX-52

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



The GX-52 is a member of a new range of prestige components called *Grand Excellence (GX)* which features a very small number of products in each category, and which Akai say will concentrate on engineering and audio quality rather than price points.

The £249 average selling price is described as 'tentative', and the original review sample (a second was requested when the first behaved anomalously) was an early 220V one. One measure of the seriousness of this new deck, albeit an indirect and not wholly reliable one, is the high standard of finish and it's also heavier than usual. The deck has an elaborate power supply, with separate regulators for different circuit areas. An optional outboard remote control system (wired or remote) is available.

This two head deck (though as usual with Akai, the record and playback functions are handled by separate gaps on a combination head), has Dolby B, C (with MPX switching), HX Pro and variable bias. It also offers slick tape handling by virtue of a motorised cassette loading door (the well is back-lit), an auto lead-in feature to take up slack - and very quiet transport mode engagement.

Once inserted, the wheels are oiled by a number of thoughtfully designed features, including an excellent status display which includes 33dB high resolution meters (red over 0VU), a real time electronic tape counter, and an A-B memory. A well implemented track search feature will look for tracks up to 16 away from the current position in either direction and this can also be used for selective erasing. Tape type recognition is automatic and visually confirmed in the status area. Finally, the headphone circuit is supported by a level control.

LAB REPORT

The Akai clearly has an excellent transport. Wow and flutter figures are top notch for any sub-£300 cassette deck and the spectrum analysis too shows negligible wow levels and satisfactorily low flutter. The various frequency responses are equally satisfying, with target responses being readily achievable by small adjustments to bias. Dolby integrity is equally accurate. Here's hoping that produc-

tion machinery is this well set up!

The clean bill of health extends through the signal/noise figures. Note the low 0VU THD which suggests useful headroom above this level - borne out by ultra-low 0VU intermodulation. The replay response shape is inherently slightly bright, but lacking extreme top end by virtue of a substantial azimuth error.

SOUND QUALITY

The line amplifiers sit on the sound a little, just perceptibly reducing top end clarity and 'air'. There was also a trace of hum, though its annoyance value was small as it was almost exclusively fundamental 50Hz rather than the higher harmonics noted with some other decks.

This apart, the GX-52 is a surprisingly confident, assured performer which practically never puts a foot wrong. The transport, which measures so well in the lab, lives up to expectations and even exceeds them in the rock solid stability of the sound, and the lack of the usual low level 'muck' and vagueness that is often the main symptom of modulation noise. The Dolby HX Pro circuits also appear to do their job well, pulling the performance standards of lower bias tapes - especially in the area of dynamic ability - up to near that of Type IVs. As usual Dolby noise reduction did conspire to lop a little off the sound, adding more of the same to the losses already imposed by the line amplifiers, but once more the degradation was small.

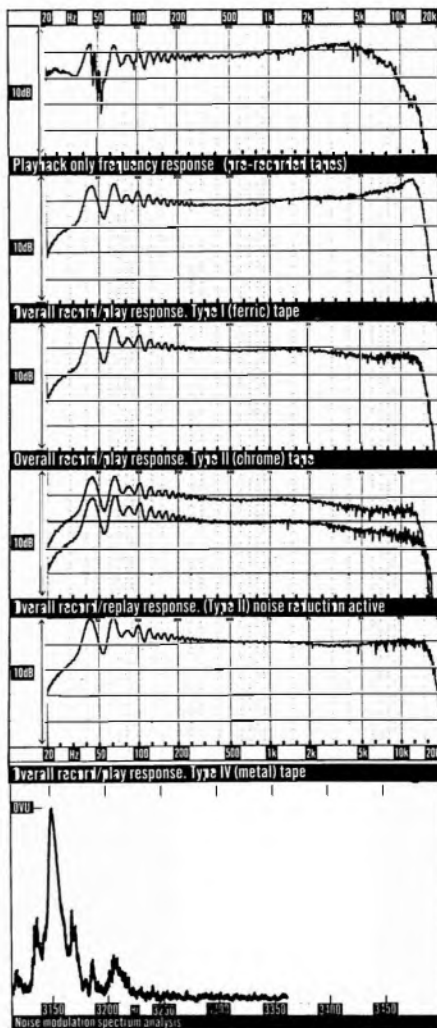
CONCLUSIONS

Clear Best Buy material, with an excellent transport and good electronics, the GX-52 provided a firm, stable and articulate sound on all tape types. In general it was accurately set up - but remember this test is of a preproduction sample.

TEST RESULTS

Rec/replay response - 3dB ref 1kHz	
IEC Type I	36Hz - 16kHz
IEC Type II	37Hz - 15.5kHz
IEC Type IV	36Hz - 17kHz
Wow & Flutter - Peak DIN wtd/unwtd	0.058%/0.13%
Wow/Flutter Peak DIN wtd	0.03%/0.13%
Speed error	+0.15%
Type I signal/noise CCIR/ARM 315Hz	47.5dB

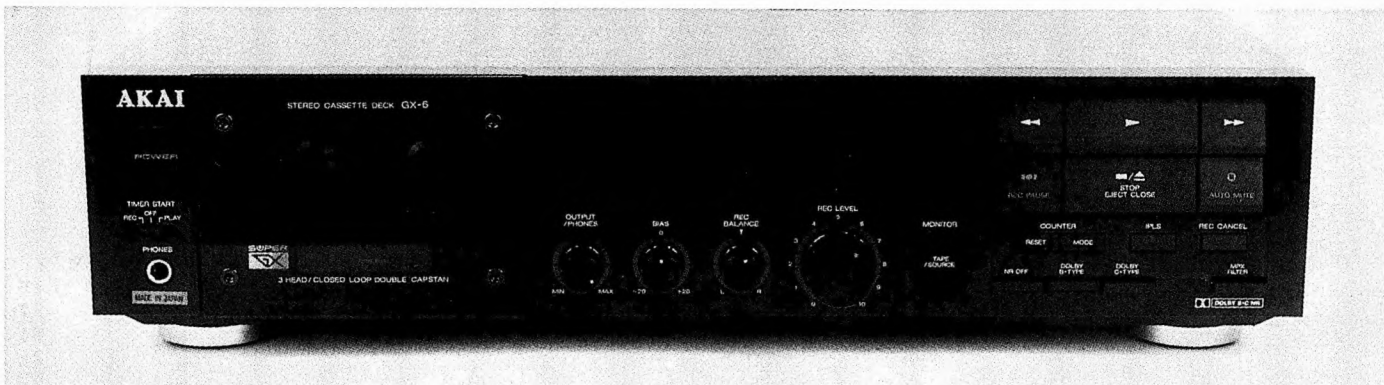
distortion 0dB	0.75%
Type II signal/noise CCIR/ARM 315Hz	52.5dB
distortion 0dB	1.1%
Type IV signal/noise CCIR/ARM 315Hz	52.5dB
distortion 0dB	1.1%
Channel separation 0VU/1kHz	43dB
Line input sensitivity/overload	123mV/>7V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	698mV/3.44V
IM distortion 1kHz, ref 10kHz/11kHz 0dB	0.91%
Azimuth check R-L phase at 8kHz	25 degrees
VU indication at IEC 0dB	+3dB
Dimensions (w x h x d)	42.5 x 11.2 x 35.2cms
Typical Retail Price	£249



AKAI GX-6

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

RECOMMENDED



The Akai GX-6 is a very cleanly styled and quite ambitiously designed deck, costing £330. The fundamentals include Dolby B and C noise reduction (with independent MPX filtering) and three heads, the record and playback heads being mounted in the same housing, and built according to Akai's proprietary GX glass crystal ferrite design. With off-tape monitoring available whilst recording, tape/source mode switching is handled automatically, but with a manual override facility on tap for instant comparisons.

Not only does the deck automatically set record bias and equalisation to suit – there's a fine bias adjust knob as well – the record level meters then proceed to show what they consider a suitable working maximum level. The meters have an operating window of no less than 52dB, with red LEDs above 0VU, peak hold – the biz in fact. Sharing the same display area, an electronic tape counter shows number or time, and is (almost) intelligent enough to work out for itself the length of the tape you've inserted.

The transport section is very quiet in operation and fully logic controlled, with music search, automatically timed mutes, intro scan and 'record cancel', which reinstates the position just before the last recording began.

LAB REPORT

As it happens, the only tape type used on test that was not as recommended was the Type I tape, and this was the only one that gave a dead accurate response shape with the bias knob centred, though a bit of extra bias will pull the Type II and IV responses back a bit. The other frequency plots suggest that Dolby mistracking should not be a problem, and that the replay response is broadly satisfactory, albeit with a degree of premature rolloff due to a 50° azimuth error.

The IM distortion level is low, and as 0VU corresponds to IEC 0dB, the record levels can be allowed to peak a little higher than normal. The transport is a cracker (another of those technical terms, I'm afraid). Absolute (numerical) wow and flutter is very low. The noise modulation plot shows a stable, fine centre frequency, with the first sidebands at $\pm 15\text{Hz}$, -27dB , then $\pm 52\text{Hz}$, -36dB ,

the overall noise level being low. The flutter-gram shows that there are some wow components, but at decently low levels, and that the upper part of this frequency spectrum is very well controlled with low noise.

SOUND QUALITY

The Akai produced a surprising amount of LF rubbish, *ie* music-unrelated spurious – basically just rumbling noises, which stayed regardless of bias setting, tape type, record level or whether Eastenders was on at the time. There was no really obvious reason why this should have been the case, but it was noticeable that head contour effects reached a long way up into the midband.

When music of any volume was being recorded, the bass noises were inaudible, but the problem continued as a bloated quality in the region, with a lack of precision and transient attack. This was a pity since the Akai sounded positively wonderful in all other aspects. The midband and top were not unduly upset by the slightly odd LF behaviour, and in fact lent music a sense of luminosity and transparency.

Best results were had with metal Type IV tapes: Dolby B noise reduction offered better midband transparency but a more metallic sounding top than Dolby C, but the difference was not huge. The Dolby-less sound quality was simply too hiss-bound for proper appraisal with most types of music.

The lower bias tapes had more 'body' than metal, but an imprecise top end by comparison – Type I ferrics especially. Pre-recorded cassette reproduced almost as well.

CONCLUSIONS

When using the GX-6, there is a strong sense that someone had really thought this one through. Had the LF end been properly sorted out, the GX-6 would probably have merited Best Buy status, despite its highish price.

TEST RESULTS

Rec/replay response – 3dB ref 1kHz	
IEC Type I	<20Hz – 14.5kHz
IEC Type II	<20Hz – 16kHz
IEC Type IV	<20Hz – 22kHz
Wow & Flutter – Peak DIN wtd/unwtd	
	0.065%/0.11%
Speed error	
	-0.6%

Type I signal/noise CCIR/ARM 315Hz distortion 0dB	49dB
Type II signal/noise CCIR/ARM 315Hz distortion 0dB	0.65%
Type IV signal/noise CCIR/ARM 315Hz distortion 0dB	51.5dB
Type IV signal/noise CCIR/ARM 315Hz distortion 0dB	0.95%
Channel separation 0VU/1kHz	54dB
Line input sensitivity/overload	1.3%
Mic input sensitivity/overload	44.5dB
Line output for 0dB/maximum	107mV/>7V
IM distortion 1kHz, ref 10kHz/11kHz 0dB	n/a
Azimuth check R-L phase at 8kHz	606mV/4.22V
VU indication at IEC 0dB	0.41%
Dimensions (w x h x d)	50 degrees
Typical Retail Price	0dB
	43 x 11.1 x 35.3cms
	£330

Reprinted from issue No. 52



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	Radford Hi Fi, 52/3 Gloucester Road
CAMBRIDGE	Steve Boxshall Audio, 41 Victoria Road
CHANDLERS FORD	Hampshire Audio, 8/12 Hursley Road
CHELMSFORD	Rayleigh Hi Fi, 216 Moulsham Street (on the Parkway)
CROYDON	Spaldings, 352/4 Lower Addiscombe Road
EDINBURGH	Hi Fi Corner, 1 Haddington Place
	In Hi Fi, 63 George Street
GLASGOW	The Music Room, 221 St Vincent Street
HUDDERSFIELD	Huddersfield Hi Fi, 4 Cross Church Street
LEEDS	Audio Projects, 45 Headingley Lane
LEICESTER	Alpha Electronics, 1 Guildhall Lane
LIVERPOOL	W. A. Brady, 401 Smithdown Road
LONDON W1	Telesonic, 92 Tottenham Court Road
LONDON W1	K.J. Leisuresound, 26 New Cavendish Street
LONDON W2	Thomas Heinitz, 35 Moscow Road
LONDON W5	Ealing TV & Hi Fi, 27 bond Street, Ealing
LONDON WC2	W. A. Brady, 18 Monmouth Street
LONDON WC2	Covent Garden Records, 84 Charing Cross Road
LONDON NW6	Studio 99, Fairfax Road, Swiss Cottage
LONDON SW19	M. O'Brien Hi Fi, 95 High Street, Wimbledon Village
MANCHESTER	The Music Room, 50 Bridge Street
RAYLEIGH	Rayleigh Hi Fi, 44a High Street
READING	Reading Hi Fi Centre, 6 Harris Arcade, Friar Street
ROTHERHAM	Moorgate Acoustics, 2 Westgate
SEVENOAKS	Sevenoaks Hi Fi, 111 London Road
SOLIHULL	Alternative Audio, 95 Hobs Moat Road
WARRINGTON	Doug Brady Hi Fi, Kingsway Studios, Kingsway
WATFORD	Acoustic Arts, 101 St Albans Road

SWISSTONE ELECTRONICS LIMITED

310 COMMONSIDE EAST, MITCHAM, SURREY CR4 1HX. Telephone: 01-640 2172

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



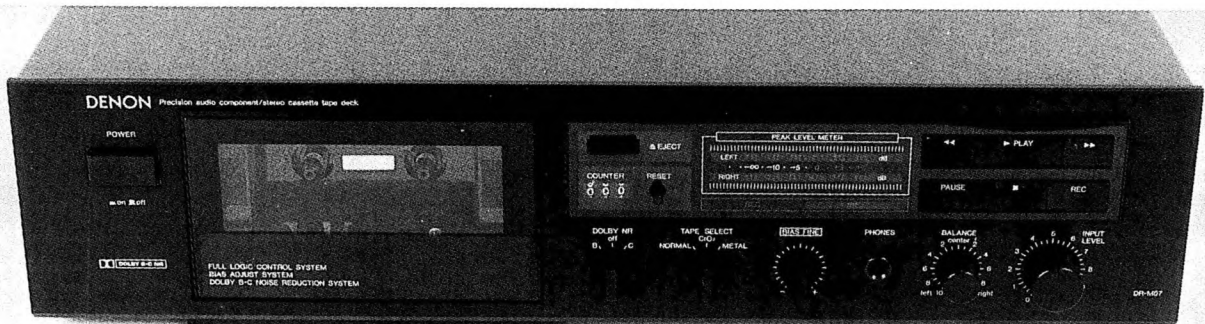
W. A. Brady & Son,
401 Smithdown Road,
Liverpool L15 3JJ
(051) 733 6859
Closed all day Wednesdays

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.

DENON DR-M07

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

RECOMMENDED



Perhaps wisely, the DR-M07 is as close as Denon come to selling a beer budget cassette deck. It is just the kind of product that will appeal to an audiophile of limited means; it's cheap, has the bare minimum of frills, and decent under-the-skin engineering.

In fact using the Denon is by no means a hair shirt experience, since it does at least have fine bias adjustment, which works on all bar metal (type IV) tapes in the time honoured way.

The only feedback provided the user are power on indicators (the bottom 'minus infinity' LED on the record level meters (!)), and a record mode telltale. The logic controlled transport keys work smoothly and the DR-M07 conveys an unmistakable impression of quality. The only slightly tacky touch is the record level meter, which is both plain ugly and has a very limited range (16dB) and coarse resolution (3dB at best).

LAB REPORT

A substantial measured azimuth misalignment led to an early rolloff at high frequencies on pre-recorded tapes – the -3dB point occurs around 6.5kHz. The record/replay responses on the other hand look a good deal healthier. The fine bias control can take care of the ferric response rolloff, but you are left with what you see in the case of metal.

The wow and flutter numbers are impressively low for what is after all a budget price deck, but this is one instance where the real situation isn't revealed by the one figure alone. The flutter spectrum analysis (not shown) is unimpressive due to the quantity and number of wow components and higher frequency noise, at around -42dB between 40Hz – 50Hz. The noise spectrogram is also unimpressive.

Unusually, 0VU on the meters also corresponds to IEC 0dB, and harmonic distortion levels are off the scale of the measuring equipment (>3.3%) at this point, so casting the good signal/noise figures in a less favourable light of course. The practical advice is never to let peaks stray into the red.

SOUND QUALITY

Quite frequently, a high fidelity component

manages to transcend its measured performance. This is just such a case. Pre-recorded material works really well, with fine subtlety and an accurately reproduced soundstage – the space and the limits around that space being explicitly reproduced from suitable recordings. Replay speed stability was a strong point too, again despite the numbers. The only real criticism in relation to price was an occasional 'edgy' treble quality.

Special attention was paid to source material likely to show up any transport problems, but the Denon consistently scored better than expected here. The only really obvious shortcomings occurred elsewhere – for example, in the loss of transparency the two noise reduction systems brought in their wake, and in significant noise 'pumping' when using Dolby C (which can often be heard clearly with headphones, but much less easily with loudspeakers). Overall, the Denon lacked a degree of incisiveness and 'hear through' clarity, and on these grounds was best suited by metal Tape IV, followed closely by chrome bias Type II tapes.

CONCLUSIONS

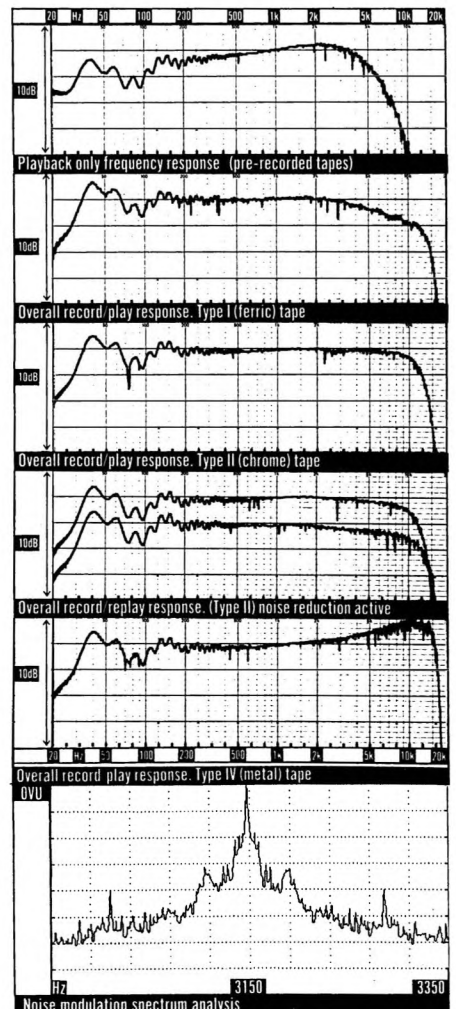
There were a number of objective shortcomings ranging from cheapskate metering to a certain amount of transport 'wobblies' – on paper at least. But in practice the M07 simply sounded marvellous, with good stereo, abundant detail and a welcome lack of artificiality. Recommended.

TEST RESULTS

Rec/replay response –3dB ref 1kHz	
IEC Type I	25Hz – 14kHz
IEC Type II	25Hz – 13.5kHz
IEC Type IV	25Hz – 16.5kHz
Wow & Flutter – Peak DIN wtd/unwtd	0.09%/0.25%
Speed error	+0.2%
Type I signal/noise CCIR/ARM 315Hz	54dB
distortion 0dB	>3.3%
Type II signal/noise CCIR/ARM 315Hz	55.5dB
distortion 0dB	>3.3%
Type IV signal/noise CCIR/ARM 315Hz	57dB
distortion 0dB	>3.3%
Channel separation 0VU/1kHz	43.5dB
Line input sensitivity/overload	110mV/>7V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	575mV/4.27V
IM distortion 1kHz, ref 10kHz/11kHz 0dB	5.43%
Azimuth check R-L phase at 8kHz	28 degrees

VU indication at IEC 0dB
Dimensions (w x h x d)
Typical Retail Price
Reprinted from issue No. 52

0dB
43.4 x 11 x 23.6cms
£140



DENON DR-M12HX

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



The *DR-M12HX* is in many ways a *de luxe* version of the *DR-M10*. Though slightly more sophisticated in hardware terms, it follows the same general pattern in emphasising under-the-skin engineering rather than features.

Facilities are straightforward. Noise reduction is the usual Dolby B and C mix, with separate MPX switching. The transport includes track search and automatic record mute using a control button that obligingly doubles as a record/pause key. Tape type selection is automatic, and record levels are set using impressive fluorescent meters with good range and resolution. The tape counter is electronic and has a memory stop button. Finally, an output level control is wired into both the headphone socket, and also the main amplifier output.

The transport is quite elaborate in design. Power is supplied by no less than three motors, one for the capstan, another for the reel hubs, and the third to operate the cams which replace solenoids in actuating the various transport modes.

Internal features include Dolby *HX Pro*, which reduces the HF compression that afflicts recordings made on low bias tapes in particular, a new head profile that extends and smoothes bass response, and some quite sophisticated amplifier technology.

LAB REPORT

The broad picture is that the Denon does offer low absolute levels of wow and flutter, as you can see from the numbers. But the noise shoulders are fairly prominent on the spectrum analysis, and some wow components are apparent. The fluttergram shows broad flutter noise at 25-30Hz, and several wow components around the -30dB level in the region 4-10Hz. All distortion products are low too, including intermodulation distortion which other Denons didn't cope with as well. The reason for this last observation, it transpires, is that this deck has a new record/replay amp.

Azimuth is quite accurately set, and the playback only frequency response is fairly accurate, allowing for a small amount of engineered-in brightness. The Type I and II

record/replay results shelve up by about a dB above 500Hz-1kHz, but this in itself is not disastrous and Dolby processing does nothing to make matters worse. All bets are off with metal tape, however, whose output rises slowly but considerably with increasing frequency. Naughty, especially as this is the one tape type whose record bias is fixed.

SOUND QUALITY

The combination of Dolby *HX Pro* circuitry with the new record amps that have extra headroom conspire to give this deck a wide working dynamic range, and a more transparent, less obvious kind of sound than usual, especially when the mid to high frequency extremes are stressed.

The net result is that the *DR-M12HX* sounds less like a cassette deck than usual. There is an appealing incisiveness about the sound which can successfully suggest real power combined with a genuine cutting edge, though it can sound rather thin and dry and lacking in ambience. Commercial tapes played on the Denon reproduced broadly along these lines, though even with the best tapes available, the quality of sound was clearly inferior to a good home recording.

Good as it is, it's only fair to note that the review deck suffered from a lack of true pitch constancy, which robbed the music of some of its believability. Sometimes the music could be heard to flutter audibly, and at others it sounded slightly edgy. There was a curious fault too: the channels had been switched internally. It's nice to know that even robots are human!

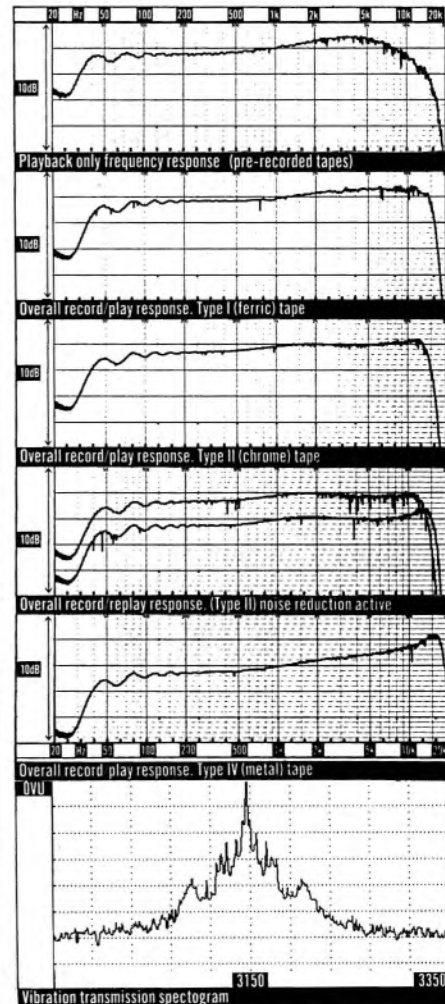
CONCLUSIONS

The *DR-M12HX* is well constructed and unusually pleasant to use. It very nearly sounds superb too; a bit of work on the transport might make that promise a reality.

TEST RESULTS

Rec/replay response -3dB ref 1kHz	
IEC Type I	33Hz - 17kHz
IEC Type II	34Hz - 16kHz
IEC Type IV	34Hz - 20kHz
Wow & Flutter - Peak DIN wtd/unwtd	0.10%/0.23%
Speed error	-0.4%
Type I signal/noise CCIR/ARM 315Hz	50dB

distortion 0dB	0.9%
Type II signal/noise CCIR/ARM 315Hz	51.5dB
distortion 0dB	0.9%
Type IV signal/noise CCIR/ARM 315Hz	53dB
distortion 0dB	1.3%
Channel separation 0VU/1kHz	-47.5dB
Line input sensitivity/overload	80mV/>7V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	632mV/3.8V
IM distortion 1kHz, ref 10kHz/11kHz 0dB	0.58%
Azimuth check R-L phase at 8kHz	8 degrees
VU indication at IEC 0dB	0dB
Dimensions (w x h x d)	43.4 x 11.5 x 28.6cm
Typical Retail Price	£220
Reprinted from issue No. 52	



DENON DR-M24HX

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

BEST BUY



The DR-M24HX is the second cheapest of four currently listed 3-head Denon recorders, the others being the 20, 30HX and 44HX.

As its name suggests, the 24HX is Dolby HX Pro equipped, in addition to Dolby B and C noise reduction. Equally important, the transport employs dual capstans in a closed loop arrangement, Denon being one of a small number of manufacturers using this inherently complicated and expensive technique. Mode engagement (by cams) achieves almost Nakamichi standards of quietness, and operational 'feel' is very good.

Tape type selection is automatic, and a switchable MPX filter is also provided. The record level meters operate over a 28dB dynamic range, and an electronic memory counter is fitted.

The 24HX has front panel provision for bias and level adjustment, the latter set by switching between source and tape (there's no built-in oscillator) so that no difference shows on the meters. Bias is set by ear.

Denon have apparently gone to some lengths to create clean-sounding electronics, citing such measures as the use of high grade capacitors and other components, and separate dedicated power supply feeds for the different circuit areas.

LAB REPORT

The sensitivity adjustment used in combination with the bias trim enables almost any tape to be used, including the recent high energy Type Is and IIs, which are further assisted by the Dolby HX Pro circuitry. With the usual test tapes, and with levels calibrated as suggested, the response shapes were as shown. The common features inherent in the recorder are the loss of output in the lower midrange, and very slight top end brightness (not enough to be particularly damaging). Prerecorded tapes are reproduced with relatively little treble loss.

Wow and flutter levels were numerically moderate, though the spectrum analysis indicates several discrete flutter sidebands, albeit at fairly low levels. The Denon also has an excellent working dynamic range. Note the low Type I and IV 0VU distortion combined with good noise figures; considering

that 0VU corresponds to IEC 0dB, higher distortion levels might have been expected.

SOUND QUALITY

The 24HX strikes an excellent overall subjective compromise. Rarely particularly accurate tonally, the Denon sounded unusually surefooted and was essentially true to the dynamics and detail of the recorded source on all three tape types – which is also a tribute to the Dolby HX Pro processing.

The basic electronics attain a high audio standard too, the source feed monitor sounding comparable to the signal monitored directly from the amplifier. The Dolby installation also appears to be a good one, in the sense that the usual losses of dynamics and openness were very small – indeed often negligible or completely inaudible.

Stereo information was well presented. The impression of a coherent soundstage was very tangible, because the deck suffered much less than most from the cassette medium's disease of terminal vagueness.

CONCLUSIONS

This is a very clean, open and spacious sounding recorder with an attractive range of facilities. The sound is very positively presented, to the point of being larger than life at times. A deck of breeding, and very well built to boot.

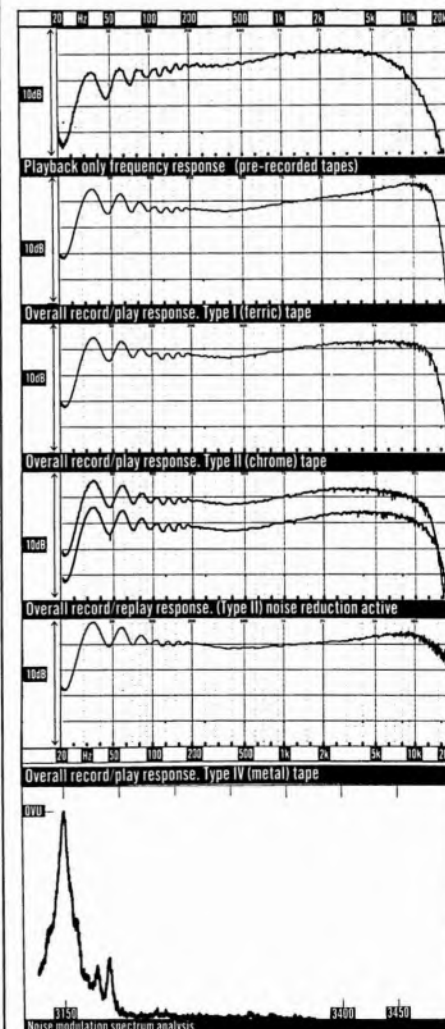
TEST RESULTS

Rec/replay response – 3dB ref 1kHz

IEC Type I	25Hz – 16kHz
IEC Type II	25Hz – 16kHz
IEC Type IV	24Hz – 19kHz
Wow & Flutter – Peak DIN wtd/unwtd	0.13%/0.13%
Wow/Flutter Peak DIN wtd	0.11%/0.12%
Speed error	+0.175%
Type I signal/noise CCIR/ARM 315Hz	50dB
distortion 0dB	0.65%
Type II signal/noise CCIR/ARM 315Hz	53dB
distortion 0dB	1.4%
Type IV signal/noise CCIR/ARM 315Hz	53dB
distortion 0dB	0.8%
Channel separation 0VU/1kHz	45dB
Line input sensitivity/overload	51.5mV/>7V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	91.7mV/4.5V
IM distortion 1kHz, ref 10kHz/11kHz 0dB	2.5%
Azimuth check R-L phase at 8kHz	27 degrees
VU indication at IEC 0dB	0dB

Dimensions (w x h x d)
Typical Retail Price

43.4 x 11.5 x 28.6cms
£289.95



HITACHI D-003

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



Whilst Hitachi are a major source of components used in many manufacturers' hi-fi products (their MOSFET power devices are particularly well known), and are market leaders in portable 'ghetto blasters', they currently have a low profile on the British separates market. Nevertheless they do sell a small range of middle market products, of which the £200 D-003 is typical.

Traditional and not unattractive in presentation, the D-003 has two transports, one record capable and the other for playback only. Whereas the latter is a straight unidirectional transport, the record capable deck has full auto-reverse with changeover effected at the end of the leader, giving about 8 seconds of silence between sides. Facilities include Dolby B (not C), normal and high speed dubbing, continuous (sequential) play and track search, the latter only on the playback mechanism. The controls concerned with the auto-reverse mechanism are extremely unrefined in feel, and interlock in bizarre ways. The whole effect is Heath Robinson both in approach and execution.

By dual transport standards, the D-003 is unusually compact. In standard form it measures just 37cm wide, which qualifies as a midi size component. Width increases to 40cms with the supplied wood veneer sidecheeks, which have a surprisingly humanising effect on appearance.

LAB REPORT

The first point that emerged from the measurements was the very limited low frequency performance, all traces giving the -3dB point at or near 45Hz. Type IV (metal) tapes has other problems, the heavily dished frequency response suggesting severe under-biasing. The other tape groups were handled much more accurately, though treble bandwidth is almost as limited as the bass. Out of purely scientific curiosity, (your honour) a frequency response was run after high speed dubbing. The result looked a bit like a ham-mock on the brink of going terminal.

The transport isn't a high point either. Auto-reverse transports for which excuses are not needed are about as rare as hen's teeth, and the Hitachi doesn't have one, though there are worse around. The various

signal/noise figures were more satisfactory, indicating that the deck has a useful working dynamic range.

SOUND QUALITY

Problems with the sound of this player ranged from a slightly shaky sense of pitch to an overall dry and drab presentation. Typical was the loss of richness and range during the brass fanfare in the introduction to Finzi's *Love's Labours Lost* (Nimbus Classical Preview Single NI1401). Regardless of tape type, and even with the recording levels kept low, the penetrating, brassy quality was lost, and the music sounded wooden and mechanical.

There was little perceptible advantage in using metal (Type IV) tapes; good Type Is and IIs were able to accept nearly all that the Hitachi was able to give.

CONCLUSIONS

The detailed sound quality criticisms are perhaps rather esoteric given that the product is aimed at the convenience market; that it is cheap; and that it makes no real pretence of being a full blown high fidelity component.

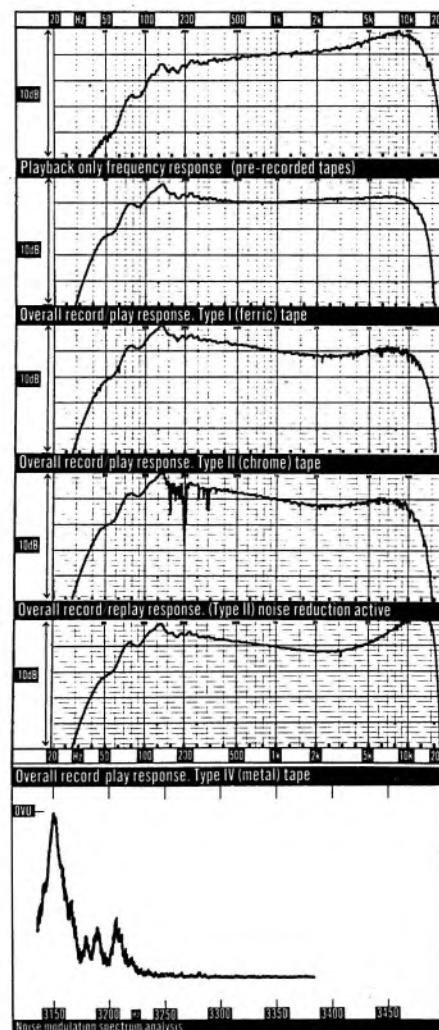
On balance it does what it sets out to do well enough; just don't be fooled into believing that decks of this kind can do what they patently can not. I only wish Hitachi would re-engineer the manual direction change switch so that it worked properly.

TEST RESULTS

Rec/replay response -3dB ref 1kHz	
IEC Type I	45Hz - 14kHz
IEC Type II	43Hz - 14kHz
IEC Type IV	43Hz - 17kHz
Wow & Flutter - Peak DIN wtd/unwtd	
	F = 0.17%/0.39%*
	R = 0.22%/0.39%*
Wow/Flutter Peak DIN wtd	
	F = 0.19%/0.32%*
	R = 0.14%/0.36%*
Speed error	
Type I signal/noise CCIR/ARM 315Hz	F = +0.15%; R = 0.20%
distortion 0dB	50.5dB
Type II signal/noise CCIR/ARM 315Hz	55dB
distortion 0dB	1.4%
Type IV signal/noise CCIR/ARM 315Hz	53dB
distortion 0dB	1.1%
Channel separation 0VU/1kHz	
Line input sensitivity/overload	48.5dB
Mic input sensitivity/overload	85mV/>7V
Line output for 0dB/maximum	n/a
IM distortion 1kHz, ref 10kHz/11kHz 0dB	299mV/3.4V
Azimuth check R-L phase at 8kHz	5.5%
	25 degrees

VU indication at IEC 0dB
Dimensions (w x h x d)
Typical Retail Price
*f = forward; R = reverse
**with sidecheeks

+ 3dB
37/40** x 12.9 x 28.2cms
£199



KENWOOD KX550HX

TRIO KENWOOD, 17 BRISTOL ROAD, THE METROPOLITAN CENTRE, GREENFORD, MIDDX UB6 8UP. TEL: 01-575 6030.



Rather than trying to be all things to all men, Kenwood's design brief for this deck was to produce a relatively simple and stylish £150 machine which would include everything important whilst concentrating on good, sound engineering and simple, Europeanised aesthetics. The headlines read Dolby B and C, auto tape type selection, and the increasingly popular Dolby HX Pro.

The KX-550 is a 2-head deck, with separate reel and capstan motors and conventional single capstan drive. Instead of the usual level plus balance, individual channel controls are used to adjust relative balance, paralleled by a much larger ganged master control. Alongside, the very fetching vertical bar-graph meters have 2dB resolution around 0VU, a 32dB dynamic range, and red LEDs above 0VU.

The KX-550 also has microphone and headphone sockets, and a bias adjustment facility. There's even a handy feature to seek out and play any track up to 16 away from the current position, according to the number of times the button is pressed.

LAB REPORT

Pitch resolution is well defined in the spectrogram. The next most prominent feature are the 'shoulders' at -43dB , $\pm 10\text{Hz}$ - hum ripple modulation perhaps? Flutter distribution is rather complex, but pretty good in view of the moderate amplitudes involved (0.085% wtd).

The various responses were mostly satisfactory, but two of them deserve comment. The Type IV record/replay response shelves down in the treble, which should result in a rather damped sound quality. Otherwise, this deck certainly has the wherewithal to make good use of metal tape. Finally, although response integrity is maintained with Dolby B, this isn't the case with Dolby C, where some mistracking - or at least a modified tonal balance - is inevitable.

SOUND QUALITY

Pre-recorded cassettes sounded a little thin, with a vaguely unstable quality on top, which appeared to be related to a degree of dropout rather than wow or flutter. There was also some low frequency noise, rather like the

vinyl roar you thought had gone out of fashion with the LP (no, I know it hasn't really!).

Information losses were noticeable in a number of ways. As an example, the effect on a particular solo Steinway recording that was used throughout this project was heard as muting of transients, a loss of 'richness' and a lack of the characteristic bell-like qualities which are especially apparent in the notes in the couple of octaves below middle C. The end result seemed quite clear and certainly stable in its own way, but ultimately also a little 'wooden' and mechanical.

Dolby HX Pro did its stuff well, so that much of the best of this deck was available with all species of tape, not just the high bias ones. The noise reduction systems on the other hand did less than wonderful things to the music. As anticipated from the measurements, Dolby C did put a particularly insidious barrier between the recording and the listener - and incredibly didn't appear to reduce hiss by as much as usual.

CONCLUSIONS

This is a good cassette deck, but ultimately lacks the edge to stand out in a competitive field. I don't think anyone owning one would reasonably be less than delighted, but the conception outweighs the quality of the execution when assessed for its musical qualities. Nevertheless, the KX-550HX is well laid out and attractive from the user's point of view, and comes within a whisker of being a fine sounding deck.

TEST RESULTS

Rec/replay response - 3dB ref 1kHz	
IEC Type I	20Hz - 16kHz
IEC Type II	20Hz - 16kHz
IEC Type IV	20Hz - 17kHz
Wow & Flutter - Peak DIN wtd/unwtd	
	0.085%/0.32%
Speed error	
	-0.4%
Type I signal/noise CCIR/ARM 315Hz	
	49dB
distortion 0dB	
	0.9%
Type II signal/noise CCIR/ARM 315Hz	
	50dB
distortion 0dB	
	0.95%
Type IV signal/noise CCIR/ARM 315Hz	
	51dB
distortion 0dB	
	0.95%
Channel separation 0VU/1kHz	
	-47.5dB
Line input sensitivity/overload	
	112mV/>7V
Mic input sensitivity/overload	
	0.53mV/28.6V
Line output for 0dB/maximum	
	536mV/2.6V
IM distortion 1kHz, ref 10kHz/11kHz 0dB	
	2.0%

Azimuth check R-L phase at 8kHz
VU indication at IEC 0dB
Dimensions (w x h x d)
Typical Retail Price
Reprinted from issue No. 52

10 degrees
4dB
420 x 11.3 x 32.6cms
£149



LUXMAN K-112

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



This minority interest model sells for a not inconsiderable £350, and is targeted firmly at the enthusiast user. The *K-112* is a three head recorder with traditional manually switched source/tape monitoring, and equipped for recording exclusively from line sources - there's no mike input. Signal processing includes Dolby B and C and also *HX Pro*.

Apart from the 3-head facility, the equipment level is surprisingly rudimentary. The record level meters for example offer a meagre 5 steps over a 16dB operating range. Tape type selection is manual, and the cassette well is not illuminated and has a non-removable door, which makes life a little awkward when cleaning or demagnetising. One tale of woe concerns the limited number and remote placement of the control tell-tales.

Amongst those features that *are* included, the *K-112* provides a bias control with ± 20 per cent range, an output level control and an electronic memory counter. A Luxman system remote control socket is also available. The only tape search aid is a counter memory, while timer play and record switching complete the features count. Build quality is of average commercial standard, which is slightly disappointing at the price, though finish is A1.

LAB REPORT

IEC 0dB appears at +6VU on the meters, which is why the signal/noise figures look poor and the distortion figures correspondingly good. The reality of course is that it's possible to over-record substantially, and in practice the effective dynamic range is a tad above average, particularly with Type IV metals.

Results from the spectrum analysis on the other hand were wholly unexceptional, and generally similar to the performance standards of decks below £200. Frequency response linearity was partly compromised by low frequency lift, which is most clearly seen in the Type IV response plot (the only one where the standard setting proved accurate). The fall in output amounts to no more than 2dB between bass and treble, but it's a wideband phenomenon involving a consider-

able amount of energy, and is therefore important. When 'corrected' by the bias control, the other tapes gave much the same results. Note how Dolby exaggerates the non-linearities, and also the 20 degree azimuth phase error at 8kHz.

SOUND QUALITY

Sad to relate, the Luxman fails at the first fence because its electronics are far from transparent (we're talking here about monitoring with the tape stationary). The amplifier sections detract from imaging and altogether set the pattern of the sound, which is decidedly imprecise.

Further deterioration was apparent with the tape in motion. The music had a luxuriant, spreading quality that could prove attractive on first acquaintance but has little to do with accuracy or maximising information. Beneath the surface are some real losses in the fine structure, the kind of clues that help determine stereo soundstage boundaries and depth, for example, and also dynamics.

Nevertheless, tonally the deck sounds sweeter than usual, and this does help the *K-112* sound *nice*, even if it doesn't sound especially *good*. The sound was a little livelier with Dolby B than Dolby C. Prerecorded material tended to sound a little pale.

CONCLUSIONS

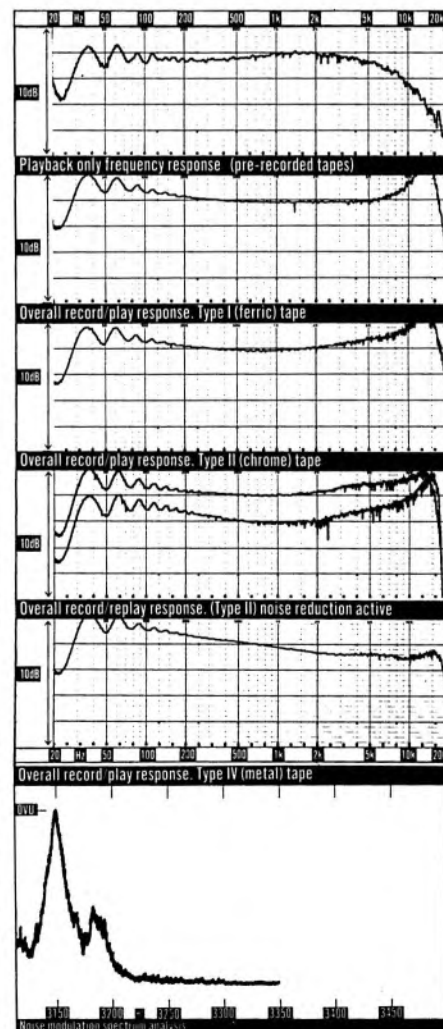
Like margarine, this is definitely a case of a recorder that looks better than it tastes. Unlike margarine however, it's expensive.

TEST RESULTS

Rec/replay response - 3dB ref 1kHz	
IEC Type I	<20Hz - 19kHz
IEC Type II	<20Hz - 20kHz
IEC Type IV	<20Hz - 19.5kHz
Wow & Flutter - Peak DIN wtd/unwtd	
Wow/Flutter Peak DIN wtd	0.18%/0.24%
Speed error	+0.175%
Type I signal/noise CCIR/ARM 315Hz	
distortion 0dB	48dB
Type II signal/noise CCIR/ARM 315Hz	
distortion 0dB	52dB
Type IV signal/noise CCIR/ARM 315Hz	
distortion 0dB	52dB
Channel separation 0VU/1kHz	0.7%
Line input sensitivity/overload	44.5dB
Mic input sensitivity/overload	110mV/>7V
Line output for 0dB/maximum	n/a
	446mV/1.65V

IM distortion 1kHz, ref 10kHz/11kHz 0dB
Azimuth check R-L phase at 8kHz
VU indication at IEC 0dB
Dimensions (w x h x d)
Typical Retail Price

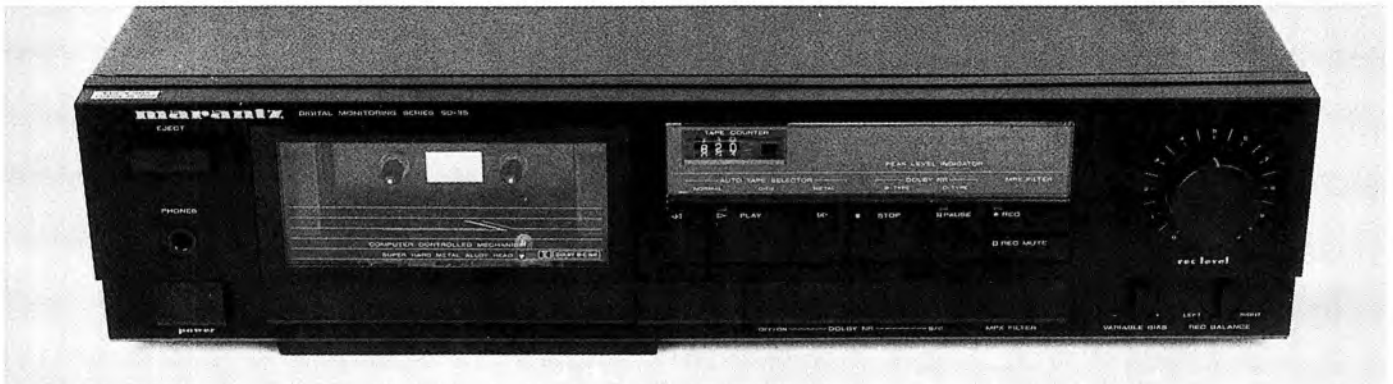
2.2%
20 degrees
+6dB
43.8 x 11 x 31.9cms
£349



MARANTZ SD-35

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

BEST BUY



Marantz have made quite a splash (for want of a better term) in the budget esoteric market, largely through the efforts of designer Ken Ishiwata and product manager Steve Harris, both of whom are keen audiophiles.

Applying audiophile criteria to cassette decks, especially low cost cassette decks, might be regarded as novel, if not in danger of being revolutionary. This one is actually subtitled as an 'audiophile deck', a label it earns by, for example, incorporating a number of audio grade components in sensitive circuit areas. The quality theme is continued externally with a smooth and attractive three dimensional gold and satin black fascia, and a reassuringly solid and expensive feel.

Annoyingly, single finger record/pause starts are not allowed, and as a matter of personal preference I missed a memory stop feature, which is about the most rudimentary way there is of finding your way around a tape. However, the SD-35 will find the start point of a recording that has just been made if rewind is selected direct from record.

The other facilities are straightforward and neatly executed, and the deck is blessed with a transport that fairly glides about its business, with little of the clankiness or lack of feel of many rivals. Tape selection is automatic, and noise reduction is by Dolby B and C, with an independent MPX filter.

The usual transport modes include a one touch four second mute feature. Record bias is adjustable for all but metal tapes (the usual exclusion).

LAB REPORT

The numbers suggest that the SD-35 should reproduce timbre and pitch accurately, and the noise spectrogram is extremely clean, with all residuals -40dB or better. The spectrogram does show some complex noise modulation, with a number of small but clearly defined sidebands. However, the pitch centre is sharply defined, and sidebands are adequately controlled.

The record/playback responses are quite satisfactory, allowing for a mild tendency to brightness, especially with metal and Dolby C. The effect is smooth and far from severe though, and curable (if it seems like a problem) by choosing tapes with a falling top end

response (see tape reviews, March issue). Other test results are at worst unremarkable - so no remarks.

SOUND QUALITY

Headphone listening was spoiled a little by random variations in output caused by slightly 'iffy' tape-to-head contact. This, and a rather bright replay only response (applicable to prerecorded material) were perhaps the only obvious snags with this machine.

The SD-35 is a remarkably successful recorder, with much of the credit due to the rock steady transport. The consistent measured performance between tapes was reflected in relatively consistent sound, though predictably Type I ferric tapes often sounded rather flattened when pushed hard.

Sound quality was best without noise reduction, where it was characterised by excellent resolution, a tidy and tuneful bass, and well resolved stereo imagery. With Dolby the sound stayed very good on the whole. But there was some mild Dolby mistracking, along with quite severe noise pumping with transient material (piano etc).

Commercial prerecorded material sounded fine, the added brightness being perfectly tolerable due to the precision and cleanliness of high frequency reproduction.

CONCLUSIONS

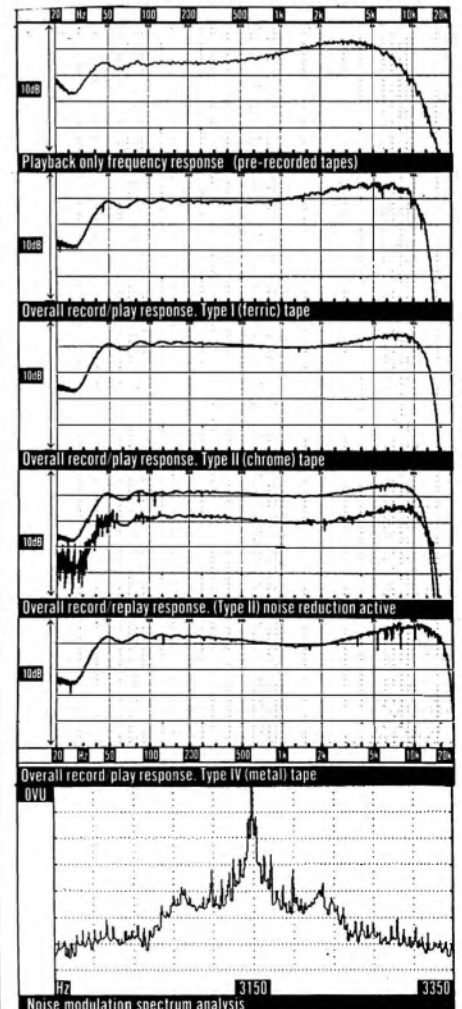
Good quality, properly aligned electronics combine with an excellent tape transport and good ergonomics to make the SD-35 an obvious Best Buy.

TEST RESULTS

Rec/replay response - 3dB ref 1kHz	
IEC Type I	32Hz - 13kHz
IEC Type II	30Hz - 14kHz
IEC Type IV	29Hz - 19kHz
Wow & Flutter - Peak DIN wtd/unwtd	0.07%/0.19%
Speed error	+0.25%
Type I signal/noise CCIR/ARM 315Hz distortion 0dB	50dB
Type II signal/noise CCIR/ARM 315Hz distortion 0dB	0.6%
Type II signal/noise CCIR/ARM 315Hz distortion 0dB	52dB
Type IV signal/noise CCIR/ARM 315Hz distortion 0dB	0.95%
Type IV signal/noise CCIR/ARM 315Hz distortion 0dB	53dB
Channel separation 0VU/1kHz	1.5%
Line input sensitivity/overload	49.5dB
Mic input sensitivity/overload	98mV/>7V
Line output for 0dB/maximum	n/a
IM distortion 1kHz, ref 10kHz/11kHz 0dB	507mV/2.9V
	1.26%

Azimuth check R-L phase at 8kHz
VU indication at IEC 0dB
Dimensions (w x h x d)
Typical Retail Price
Reprinted from issue No. 52

16 degrees
0dB
42 x 10 x 26cms
£169



A BREATH OF FRESH SOUND



Heybrook brings a breath of fresh sound to your listening environment with a brilliant realism that's almost beyond belief.

Savour aural excellence from an award winning range of audio products; contact your Heybrook dealer listed opposite, or send the coupon today.

HEYBROOK



66

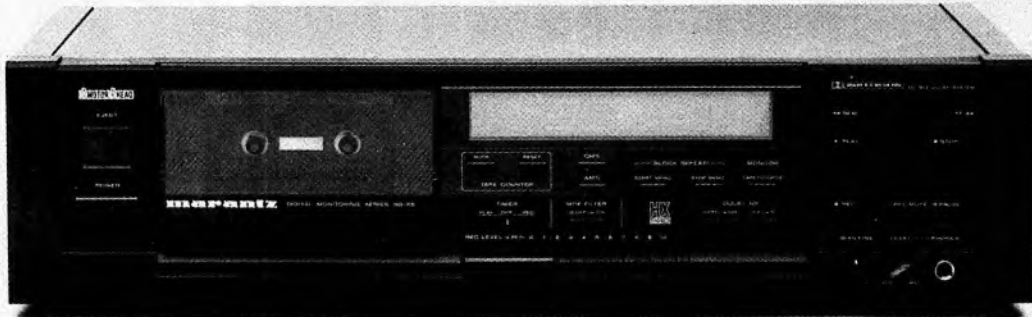
HB1 LOUDSPEAKER OF THE YEAR 1984, 1985, 1986 - WHAT HI-FI BEST BUY 1983, 1984, 1985 - HI-FI CHOICE. **HB2** RECOMMENDED 1979, 1980, 1981, 1982, 1983, 1984 - HI-FI CHOICE. "THEY POSSESS THAT EFFORTLESS SOUND QUALITY WHICH WAS ALMOST IMPOSSIBLE TO BELIEVE". PRACTICAL HI-FI 1980. "...A CLEAR RECOMMENDATION". HI-FI NEWS 1983. **HB3** "EXCITING AND VERY DRAMATIC ...WITH AN EFFORTLESSNESS AND EASE. RHYTHMS ARE WELL DEFINED AND CRISP ...A WARMTH AND RICHNESS OF TONAL COLOUR ...HIGHLY INFORMATIVE ...EXCELLENT LEVELS OF INSTRUMENTAL SEPARATION ...AND DYNAMICS". PRACTICAL HI-FI 1983. "HIGH SOUND LEVELS WITHOUT ANY NOTICEABLE COMPRESSION... CONVINCING REALISM. ANALYTICAL SOUND REMINISCENT OF STUDIO MONITORS". HI-FI FOR PLEASURE 1984. **TT2** RECOMMENDED 1983, 1984, 1985 - HI-FI CHOICE. "IN TERMS OF PERFORMANCE THE TT2 CAN BE WELCOMED TO THE SELECT BAND OF HIGH QUALITY UNITS". GRAMAPHONE 1984. "...EXCELLENT WELL MADE, ABOVE AVERAGE PERFORMANCE". HI-FI ANSWERS 1983. "THE TT2 IS A SUPERIOR PRODUCT". HI-FI NEWS 1984. **HB51** LOUDSPEAKER STAND OF THE YEAR, FEDERATION OF BRITISH AUDIO AWARDS 1984. **C2/P2** "...ONE OF THE VERY BEST COMBINATIONS AVAILABLE UNDER £1000". NEW HI-FI SOUND 1986. "...BETTER THAN ANY EQUIVALENTLY PRICED AMPLIFIER I HAVE HEARD". HI-FI ANSWERS 1986.

99

MARANTZ SD-55

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

RECOMMENDED



This is the first 3-head Marantz cassette deck in (the author's) living memory. Styling is unmistakably Japanese home market plastic, but does have deep gloss rosewood-like end cheeks as a mildly redeeming feature (see also Nikko *D-80II* review).

Three heads enable real-time off-tape monitoring whilst recording. In this case, source/tape monitor switching is performed automatically so that there is always a signal on the output, but with manual override as an option. Noise reduction is by Dolby B and C with defeatable MPX. Dolby *HX Pro* is also on the menu – this circuit seems to have become flavour of the month this year, after a long period during which Japan Inc all but ignored its existence. A variable bias complements the recording facilities.

The meters, picked out in red at high levels, cover 32dB with good resolution. The electronic tape counter shares the level display, and can be switched to read elapsed time. Remaining features include such handy inessentials as a variable output headphone socket and a batch of search/play gizmos including track skip, random track access (up to 15 tracks away) and random block repeat.

LAB REPORT

The Marantz gave a slightly off-beat set of numbers. The frequency responses were on the whole quite impressive. Low frequency behaviour is well controlled due to favourable head geometry, and the treble is reasonably well extended in each case. However, some tweaking of the fine bias control is likely to prove essential. It's easy enough by ear using the tape/source monitor switch whilst making a short test recording – aim for an accurate sounding upper midrange, leaving the extreme top to take care of itself. Metal tapes as usual do not have bias adjustment, so it's all down to experimenting with tape types; Sony *Metal-ES* and Maxell *MX* gave good results on test.

Signal/noise ratios were disappointing for all tape types considering the measured distortion levels – don't exceed 0VU on a regular basis with chromes or metals! On the other hand, the transport proved excellent, with low wow and flutter and subjectively better

than average tape/head contact. Dolby B tracking was very accurate, but the C curve shows some modification of bandwidth. The playback only response shape was satisfactory.

SOUND QUALITY

This is yet another of those cassette decks which sound tangibly better without noise reduction at all, and better with Dolby B than Dolby C. Unfortunately, however, the Marantz is not sufficiently well endowed in the dynamic range department to justify recording without Dolby as a matter of course; it all depends on your personal priorities.

With a correctly matched tape – metal if funds permit, chrome otherwise – the *SD-55* sounded well above average, only the slightly restricted headroom letting it down a little. It managed to convey something of the stability and solidity of the original, and the mid-range and top end sounded uncommonly sweet and articulate by cassette deck standards. Dynamics that could be recorded without clipping were accommodated gracefully, without evident squash, and low frequency control and timing were also well above average.

CONCLUSIONS

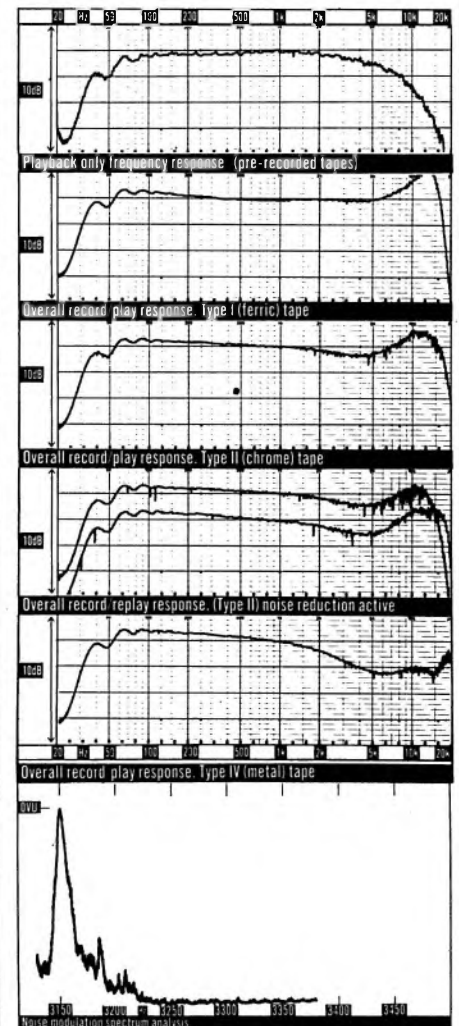
Some care over transport integrity and the design of the audio amplifiers appears to have paid off in a machine that sounds surprisingly realistic, despite some minor measured shortcomings.

TEST RESULTS

Rec/replay response – 3dB ref 1kHz	
IEC Type I	31Hz – 18kHz
IEC Type II	31Hz – 19kHz
IEC Type IV	32Hz – 21kHz
Wow & Flutter – Peak DIN wtd/unwtd	0.10%/0.18%
Wow/Flutter Peak DIN wtd	0.075%/0.17%
Speed error	+0.225%
Type I signal/noise CCIR/ARM 315Hz distortion 0dB	48.5dB 0.7%
Type II signal/noise CCIR/ARM 315Hz distortion 0dB	51.5dB 2.9%
Type IV signal/noise CCIR/ARM 315Hz distortion 0dB	50dB 2.2%
Channel separation 0VU/1kHz	47dB
Line input sensitivity/overload	123mV/>7V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	51.1mV/3.11V

IM distortion 1kHz, ref 10kHz/11kHz 0dB
Azimuth check R-L phase at 8kHz
VU indication at IEC 0dB
Dimensions (w x h x d)
Typical Retail Price

0.73%
36 degrees
+3dB
46.5 x 12 x 26.5cms
£349



NAKAMICHI CR-1E

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



New cassette decks from Nakamichi are not an everyday occurrence, so the announcement of the simultaneous release of four new models provides an unprecedented feast of riches. They told me to say that . . .

The CR-1E is the cheapest of the four, and will allow aspirants to 'go Nakamichi' for £345 – not exactly 'budget', but precisely the same price as the BX-100E it replaces. This is a two-head machine, with Dolby B and C (the 100E had Dolby B only), 11 step 37dB record level meters and switchable MPX filtering. The tape counter is a simple mechanical type, but does have a memory stop and auto-repeat capabilities.

There was a slightly disappointing lack of innovation. Manual tape type selection is surely an unnecessary complication these days, especially when perversely labelled as it is here with Nakamichi's own type numbers. On the other hand, I was favourably impressed by the utter absence of dispensable gadgetry, by the sober and sensible control layouts, and by the fine transport control section – not to mention the transport itself, which went about its business with an almost eerie decorum. Most of all though, I was taken by the high standard of build quality which permeates the design internally more than externally.

LAB REPORT

The CR-1E is very well engineered under the skin too. The various record/replay responses are adequately optimised, the top end lift with Type I and II tapes being within the range of variation of alternative tape types. Head contour effects are extremely well controlled, which pays obvious dividends on audition. Speed stability is also good. Wow levels are practically negligible, and although there are some discrete flutter sidebands, they're at a low level. Signal/noise ratios are also fine for all three tape types, taking into account the quite considerable headroom available above 0VU.

SOUND QUALITY

Some cassette decks fail to sound any good even before the tape starts to roll, when monitored *via* their line amps (*viz*: through the system amplifier tape monitor circuit

whilst recording). The Nakamichi isn't one of these. It sounds clear and translucent, which is both a prerequisite and a good start.

The good news continues. The bass is warm and powerful – a bit too warm and powerful in fact – and under moderate control. Ideally the '1E' should have sounded rather leaner in this region. Mid and top end quality were good, again without danger of cracking any moulds. The deck sounds highly articulate and barely smothers detail, but as usual there's a perceptible sense of 'spread', both spatially and dynamically.

This Nakamichi extracts much from compatible metal tapes, the other tape groups sounding a little lazier and softer, as expected. Prerecorded cassette replay is also good, and rather cleaner than usual. Hiss levels apart, Dolby C sounds essentially the same as Dolby B – both have a mild dampening effect on the sound, especially strings and material rich in upper harmonics. (Naturally this comment takes tape hiss into account, hiss by its mere presence tending to make things sound falsely livelier.)

CONCLUSIONS

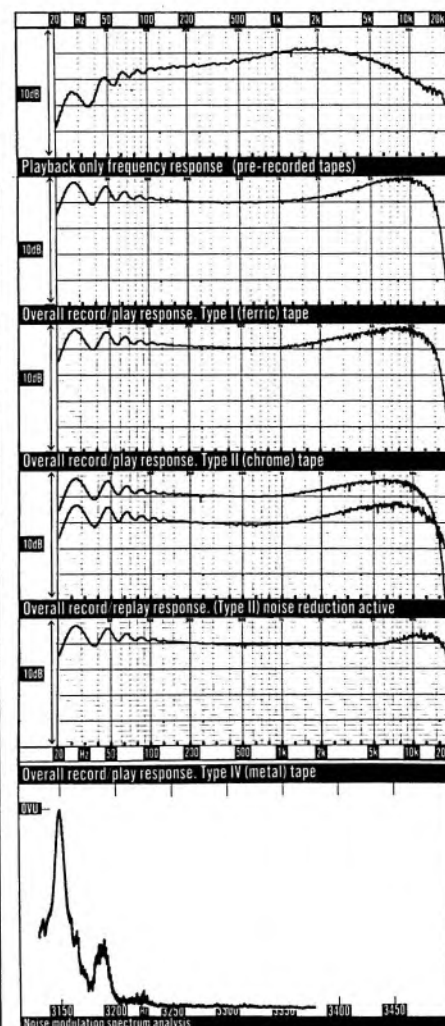
Whilst it fails to excite great enthusiasm and is far from cheap, the CR-1E is highly competent all round. If it wasn't for the existence of the only slightly more expensive CR-2E, it would easily rate Recommended status.

TEST RESULTS

Rec/replay response – 3dB ref 1kHz	
IEC Type I	<20Hz – 17kHz
IEC Type II	<20Hz – 17kHz
IEC Type IV	<20Hz – 20kHz
Wow & Flutter – Peak DIN wtd/unwtd	0.10%/0.17%
Wow/Flutter Peak DIN wtd	0.058%/0.15%
Speed error	+0.17%
Type I signal/noise CCIR/ARM 315Hz	50dB
distortion 0dB	0.7%
Type II signal/noise CCIR/ARM 315Hz	54.5dB
distortion 0dB	1.2%
Type IV signal/noise CCIR/ARM 315Hz	54.5dB
distortion 0dB	0.8%
Channel separation 0VU/1kHz	47dB
Line input sensitivity/overload	82mV/>7V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	755mV/6.2V
IM distortion 1kHz, ref 10kHz/11kHz 0dB	1.4%
Azimuth check R-L phase at 8kHz	12 degrees
VU indication at IEC 0dB	+3dB

Dimensions (w x h x d)
Typical Retail Price

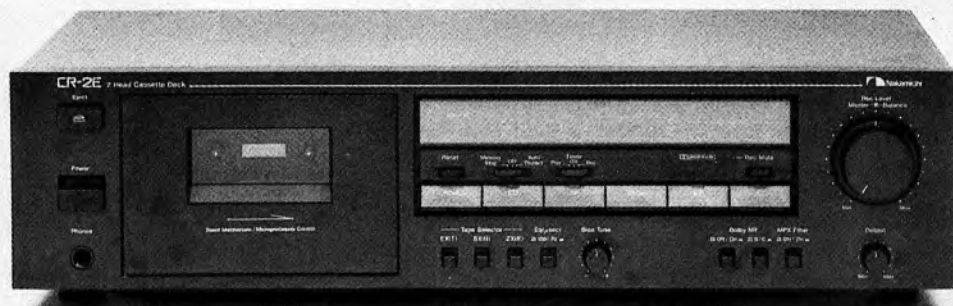
43 x 10 x 26.5cms
£345



NAKAMICHI CR-2E

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

RECOMMENDED



Number two from the bottom of the Nakamichi hierarchy, there is considerable commonality between this deck and the *CR-1E*. Both are two-head, two motor recorders with Dolby B and C. The *CR-2E* costs £395, the same as the *BX-125E* it replaces.

You could look on the *2E* as a de-luxe *1E*. The 3-digit mechanical tape counter has been replaced by a 4-digit LED one, there's now a fine bias adjustment knob, and an output level control has also been added. Internally, the *2E* also has a laminated Sendust cored record/playback head, which allows greater headroom, and is contoured to give a smoother bass (but see pen charts).

Criticisms made of the cheaper model apply equally here, none being more heart-felt than the badly labelled, manual, separate bias and equalisation controls – seemingly a Nakamichi blind spot. But elsewhere there is real attention to detail, for example in the back illumination for the cassette well, and in the quiet acting cam-operated transport mechanism. The transport controls are fully logic interfaced, and operate in user friendly fashion (the one-touch 'record pause' feature is particularly welcome).

Some of the key features of this deck are hidden from view, notably the full complement of internal bias and sensitivity controls for each tape type – with most decks you get one set, allowing only a compromise setting for all three. Other circuit features include extensive regulation (separately for the various circuit blocks), extra shielding around the transformer, and high grade discrete circuitry where other decks employ less exacting grades of ICs, for example in the playback amplifiers.

LAB REPORT

The lab performance is very similar to the *CR-1E*, confirming their close relationship. The various frequency responses are just as accurately aligned, while the bias adjust feature enables the top end to be ironed out where a discrepancy arises. Dolby exaggerates existing errors by about the right amount, and can thus be said to be correctly aligned, which is how it sounded too. Noise and distortion levels were again similar to those of the cheaper model and were more

than acceptable. Wow and flutter was also very good – both numerically and when assessed in the frequency distribution (see spectrum analysis). But there was a mild azimuth error amounting to a 15 degree phase shift at 8kHz.

SOUND QUALITY

The *CR-2E* is supposed to have a smoother bass by virtue of the head design, but there was no evidence for this. In principle then, the only factors that should make this deck sound different from the *1E* are the addition of the line output level control, and the substitution of an LED tape counter. The first of these should definitely make the recorder sound worse, and there is slightly more noticeable compression here. But my impression of the review samples at least is that the *2E* sounds a little more lucid and tonally varied.

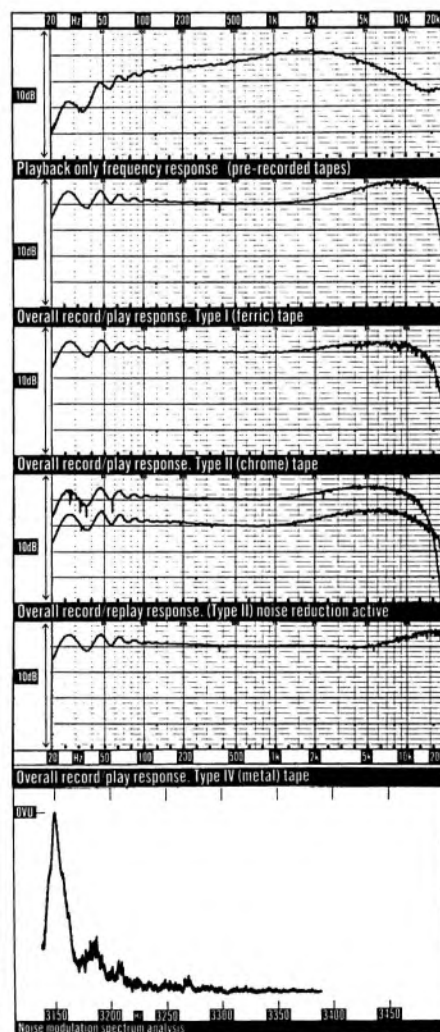
Prerecorded tapes sound clear, and only as lacking in dynamics as the original tapes. As a recording machine the Nakamichi is on very firm ground, with a solid, meaty and detailed presentation on all tape types, especially the higher bias ones.

CONCLUSIONS

The fine bias adjust feature brings more tapes within the *CR-2E*'s compass; otherwise it's a *CR-1E* reborn, which can't be bad news. But is there really room for both models?

TEST RESULTS

Rec/replay response – 3dB ref 1kHz	
IEC Type I	<20Hz – 19kHz
IEC Type II	<20Hz – 17.5kHz
IEC Type IV	<20Hz – 21kHz
Wow & Flutter – Peak DIN wtd/unwtd	0.11%/0.15%
Wow/Flutter Peak DIN wtd	0.984%/0.13%
Speed error	+0.18%
Type I signal/noise CCIR/ARM 315Hz distortion 0dB	50.5dB / 0.65%
Type II signal/noise CCIR/ARM 315Hz distortion 0dB	55dB / 1.2%
Type IV signal/noise CCIR/ARM 315Hz distortion 0dB	54dB / 0.85%
Channel separation 0VU/1kHz	48dB
Line input sensitivity/overload	82mV/>7V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	754mV/6.2V
IM distortion 1kHz, ref 10kHz/11kHz 0dB	0.45%
Azimuth check R-L phase at 8kHz	15 degrees
VU indication at IEC 0dB	+3dB
Dimensions (w x h x d)	43 x 10 x 26.5cms
Typical Retail Price	£395



NAKAMICHI CR-3E

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



The *CR-3E* is a direct replacement for the famous *BX-300E*, and sells for some £50 less than its predecessor. It lacks that model's pitch control, which was always of rather specialist interest, but does boast what Nakamichi baldly claim (WTWWT*) as significantly improved sound quality.

The *CR-3E* is a full three-head deck with off-tape monitoring. The heads are physically separate to reduce flux leakage, and magnetically aligned after installation. The smooth cam-controlled transport has twin capstans with Nakamichi's longstanding diffused resonance construction. The twin capstan design enables tension across the heads to be accurately determined, so the cassette's now redundant pressure pad is therefore lifted out of the way; Nakamichi claim very low scrape flutter and modulation noise as a direct consequence.

The supporting electronics feature discrete record and playback amplifiers, a claimed very clean bias waveform (at a high 105kHz), and an unusually elaborate earthing and power supply configuration. Output socketry is gold plated and the chassis is heavier than usual. Naturally, fit and finish are of the highest order.

Other features are much like the *CR-2E*. They extend from the poorly labelled separate bias and EQ switching for the three tape groups, through a fine bias adjustment facility, Dolby B and C noise reduction with separate MPX filtering, to an output level control. The tape counter is a 4-digit electronic device with auto stop and auto repeat facilities. However, the record level meters now cover a wider 50dB range (-40dB - +10dB), and a socket is provided at the back for an onboard remote control unit called the *RM-5*, or for indirect remote control *via* the *CA7* pre-amplifier.

LAB REPORT

Proof of the superiority of the dual capstan pressure pad-less transport and the diffused resonance construction is to be found both in the sound, and also the measurements. Note the low figures for both wow and flutter and the immaculate spectrum analysis.

The frequency responses are wide and mostly flat - the bias trim knob can take care

of the minor inaccuracies. The Dolby circuits are not quite perfectly aligned, resulting in a slight treble boost and some consequent brightness with Dolby C especially. Type II and IV signal/noise is good referred to 0VU, but there's still a lot of headroom in hand at these levels and the effective working dynamic range is wide. Alignment for prerecorded tapes was excellent too.

SOUND QUALITY

This is a very fine sounding deck, with notably better pitch resolution, a more explicit and stable stereo soundstage and a better grip on dynamics and detail than most. It has a light touch too in the sense that transients don't 'hang on' as they commonly do.

There's a real advantage in using metal tapes with the *CR-3E*, and so exploiting the machine's potential to record complex, high sound level music without excessive compression or distortion. But there was an occasional tendency for recordings to sound very slightly 'steely'.

Dolby processing was notably successful, even when using the more powerful Dolby C. Although it still wasn't quite as transparent a process as with the *CR-4E*, the sound lost little of its liveliness or openness.

CONCLUSIONS

A predictably first rate cassette deck, but bettered by the *CR-4E* and more limited for tape choice than that by the lack of sensitivity adjustment. Wonderful sound - Recommended.

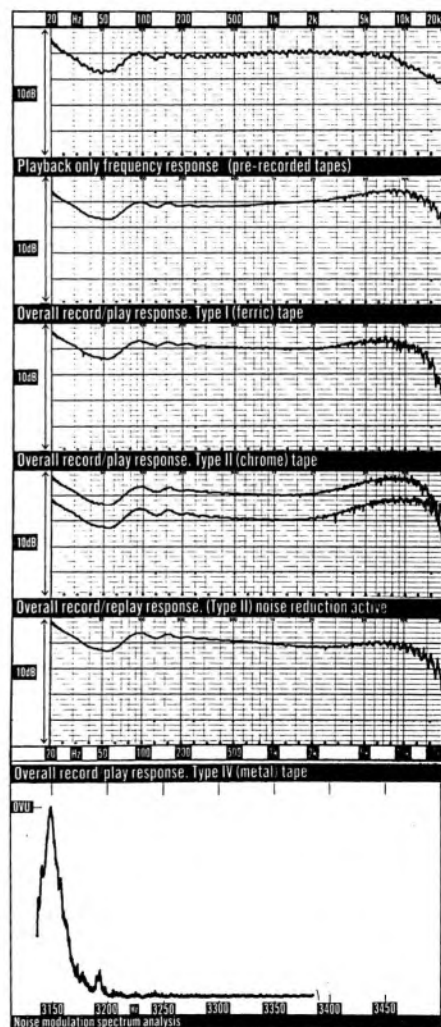
*WTWWT - Well They Would, Wouldn't They?

TEST RESULTS

Rec/replay response -3dB ref 1kHz	
IEC Type I	<20Hz - 20kHz
IEC Type II	<20Hz - 19kHz
IEC Type IV	<20Hz - 19.5kHz
Wow & Flutter - Peak DIN wtd/unwtd	0.10%/0.12%
Wow/Flutter Peak DIN wtd	0.09%/0.10%
Speed error	+0.23%
Type I signal/noise CCIR/ARM 315Hz	50dB
distortion 0dB	0.6%
Type II signal/noise CCIR/ARM 315Hz	54dB
distortion 0dB	0.9%
Type IV signal/noise CCIR/ARM 315Hz	53dB
distortion 0dB	0.65%
Channel separation 0VU/1kHz	48.5dB
Line input sensitivity/overload	80mV/>7V
Mic input sensitivity/overload	n/a

Line output for 0dB/maximum
IM distortion 1kHz, ref 10kHz/11kHz 0dB
Azimuth check R-L phase at 8kHz
VU indication at IEC 0dB
Dimensions (w x h x d)
Typical Retail Price

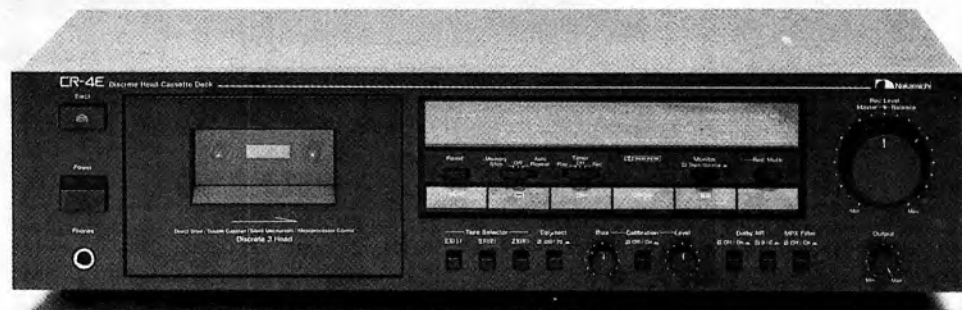
760mV/6.3V
0.13%
5 degrees
+3dB
43 x 10 x 26.5cms
£595



NAKAMICHI CR-4E

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

RECOMMENDED



Most expensive and ambitious of the four new Nakamichi cassette decks, this £745 machine is very similar to the CR-3E, which is reviewed separately. Thus it is a full three head design with off-tape and source monitoring (manually selected), a dual capstan, diffused resonance transport with cassette pressure pad lifter (Nakamichi's sophisticated dual capstan design renders pressure pads redundant), and more – the 3E review gives more detail.

The 4E additionally boasts a direct drive power plant in place of one of the 3E's two DC servo motors, extra screening and extensive audiophile cabling, and the Dolby circuits are also said to be new. The £150 premium for this model also goes to pay for a tape tuning system based on two built-in oscillators. A low frequency signal is used to set the correct level, basically so that Dolby replay integrity is not compromised by differences in tape sensitivities. The other, high frequency test signal is used to adjust record bias. The adjustment procedure is very quick and simple. With the tape set to record, the calibration switch is pressed and bias and equalisation controls adjusted for a zero reading on both left and right hand meters. The calibration button is then released, and the tape then automatically rewinds ready for recording proper.

The rest is as before. There are optional remote control facilities and on the whole the control disposition is easy to grasp. But Nakamichi persist with separate bias and EQ switching complete with Nakamichi tape labelling, and this is surely taking idiosyncrasy to the point of idiocy. The wide ranging meters could easily be improved too, for example with peak hold LEDs.

LAB REPORT

The CR-4E is well endowed from virtually all angles. Most of the frequency responses could have been drawn with a ruler, though they were made after alignment using the front panel bias and sensitivity controls. The metal tape upper -3dB point is a cool 23kHz, even using a signal level at -10dB in place of the less testing and more common -20dB.

The available dynamic range is also very

wide. The -53dB CCIR/ARM weighted signal/noise figure, for example, is achieved for just 0.5% THD. In practice it's possible to push all tape types very hard indeed, and to exploit some of the super high energy tapes (from Sony, That's and so on – see the tape tests in the last issue) to much better effect than usual.

Wow and flutter is also extremely low, and all discrete wow and flutter components were at a low level.

SOUND QUALITY

Sound quality is exceptional for the cassette medium. Even with this very costly recorder there was discernible softening and overhang of bass transients, and some smearing of mid/top information, but these things were never particularly obtrusive. The rock solid pitch stability and the easy dynamic abilities of the recorder more than made up for any shortcomings.

The Nakamichi was at its best with the very best tapes, generally the high energy metals along with one or two of the best chrome bias tapes. Dolby often wasn't needed to achieve decently quiet recordings, but in any case the noise reduction circuits did little to spoil the colour and liveliness of the music making. Pre-recorded tapes sometimes sounded home made. Well almost...

CONCLUSIONS

This high grade 3-head recorder offers a very impressive level of performance under all conditions of use, and is highly Recommended, if you can afford the entry fee.

TEST RESULTS

Rec/replay response – 3dB ref 1kHz	
IEC Type I	<20Hz – 18.5kHz
IEC Type II	<20Hz – 16.5kHz
IEC Type IV	<20Hz – 23kHz
Wow & Flutter – Peak DIN wtd/unwtd	0.058%/0.10%
Wow/Flutter Peak DIN wtd	0.048%/0.094%
Speed error	+0.18%
Type I signal/noise CCIR/ARM 315Hz	49dB
distortion 0dB	0.6%
Type II signal/noise CCIR/ARM 315Hz	55dB
distortion 0dB	0.75%
Type IV signal/noise CCIR/ARM 315Hz	53dB
distortion 0dB	0.5%
Channel separation 0VU/1kHz	49dB
Line input sensitivity/overload	77mV/>7V
Mic input sensitivity/overload	n/a

Line output for 0dB/maximum	752mV/50V
IM distortion 1kHz, ref 10kHz/11kHz 0dB	0.44%
Azimuth check R-L phase at 8kHz	6 degrees
VU indication at IEC 0dB	+5dB
Dimensions (w x h x d)	43 x 10 x 26.5cms
Typical Retail Price	£745



**SAVE
£12!**

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, not only can you guarantee to be one of the first to see *Hi-Fi Choice* but you can also save £12 by taking advantage of our special, limited period offer. Remember that's equivalent to almost *four* individual issues ordered through our mail order department. 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.

One year's subscription at special discount rate £30. U.K., £46 Overseas.
(offer limited to this coupon only – offer accepted only on orders received before April 29th)
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"/>		

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

SPECIAL SUBSCRIPTION OFFER

Please tick appropriate boxes:

- Please start my subscription at the special rate of £30 (UK) (£46 overseas) from the next available issue.
 Please start my subscription at the special rate of £30 (UK) (£46 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 _____

(57)

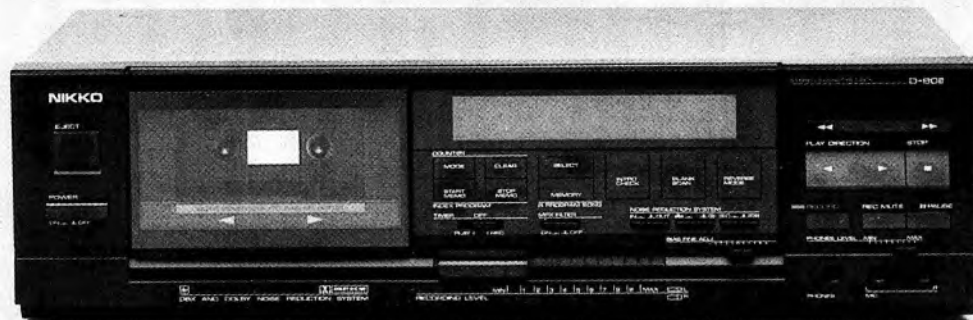
Please send order form and payment to:

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. and start date for subscription. No. 01-363 6693

NIKKO D-8011

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



The Nikko brand was widely available in the UK something like 15 years ago, at which time the company promoted itself (amongst other things) as a major manufacturer of circuit breakers. The hi-fi was moonlighting, I presume. For a name making a fresh start in this country, the product looks remarkably familiar, even derivative. I was intrigued to notice that many of the front panel components, including the main fascia panel, the tape counter and meter display, much of the major and minor switching and the input level control, are identical to that the Marantz SD-55. They must have come off the same shelf.

Functionally, however, the products are quite different. The Marantz is a unidirectional 3-head machine aimed at the semi-audiophile market; this is a 2-head auto-reverse deck that isn't. Main features are Dolby B, C and dbx noise reduction, with MPX switching alongside. Bias can be varied a small amount, and headphones (*via* a volume control) and microphones can be connected. A veritable platoon of tape search features include full random order programming for up to 19 tracks, blank skip, and phrase repeat using a dual mode electronic tape counter, one of the modes being elapsed time. The deck claims to offer the 'quickest possible head switching' at end of side, but mine switched laboriously (and noisily) only after the leader had run through, providing about eight seconds (approx) of deepest, darkest silence.

LAB REPORT

Head contour effects were very marked with this product, and led to severe LF 'woodles' and a premature loss of bass. The mid and treble can be made reasonably flat with a suitable choice of tape and/or adjustment of record bias. However, metals tend to be a little underbiased, and from other indications too this deck is not ideally suited for making the most of the potential of metal tapes. The playback response shape is very accurate, and head azimuth error was low.

Wow and flutter just scrapes below the magic 0.1% weighted figure in the forward direction, but exceeds it comfortably on the way back. The figures also conceal fairly sub-

stantial flutter energy, much of it outside the DIN weighting curve. Finally, the noise figures are satisfactory, but neither chromes nor metals have much headroom available, and the dynamic range is not as wide as some.

SOUND QUALITY

Nikko haven't been particularly successful with the noise reduction installation. Both Dolby circuits sounded damped and heavy, though some of this character remained even when noise reduction wasn't being used. As usual, dbx exacted the greatest penalties. The little bursts of hiss behind percussive notes (try almost any piano recording for starters) gave it away, but more significant still was the cramped, unexpansive and glutinous qualities imposed on the music; the results were simply unpleasant. The deck is too noisy to use without noise reduction at all, and as is often the case, the best general advice is to compromise by using Dolby B.

With a good chrome bias (Type II) tape and Dolby B, the Nikko was on its best behaviour and proved acceptable. Even so, by £300 standards, it sounded disappointingly 'slow', restrained and deficient in clarity.

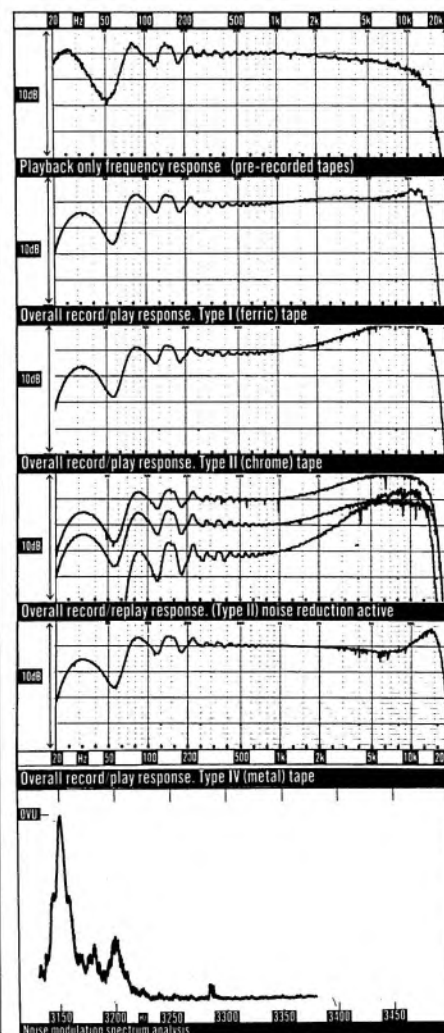
CONCLUSIONS

This Nikko offers a wide range of facilities, some useful (*eg* memo facility, auto-reverse) and some less so (*eg* dbx). Ergonomics were mixed to poor, and sonics unexceptional. The clincher is that it's also quite expensive.

TEST RESULTS

Rec/replay response - 3dB ref 1kHz	
IEC Type I	58Hz - 15.5kHz
IEC Type II	63Hz - 17kHz
IEC Type IV	59Hz - 18kHz
Wow & Flutter - Peak DIN wtd/unwtd	F = 0.098%/0.22%; R = 0.14%/0.26%*
Wow/Flutter Peak DIN wtd	F = 0.062%/0.23%; R = 0.13%/0.28%*
Speed error	F = +0.18%; R = +0.10%
Type I signal/noise CCIR/ARM 315Hz distortion 0dB	51.5dB 0.55%
Type II signal/noise CCIR/ARM 315Hz distortion 0dB	55dB 1.8%
Type IV signal/noise CCIR/ARM 315Hz distortion 0dB	54.5dB 1.8%
Channel separation 0VU/1kHz	47dB
Line input sensitivity/overload	99mV/>7V
Mic input sensitivity/overload	0.30mV/17.8mV

Line output for 0dB/maximum	488mV/3.75V
IM distortion 1kHz, ref 10kHz/11kHz 0dB	0.2%
Azimuth check R-L phase at 8kHz	5 degrees
VU indication at IEC 0dB	+2dB
Dimensions (w x h x d)	43.5 x 12 x 26.5cms
Typical Retail Price	£309
*F=forward, R=reverse	



PHILIPS FC566

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



Philips invented CD, and are currently working on in-car navigation (Carin), multi-aerial reception systems, CD-V, optical recording technology and more. To paraphrase one of their own advertising slogans (first spotted under a photo caption for an expensive and complex piece of medical test gear) – not bad for a light bulb manufacturer! Yet they have hitherto failed to capitalise on the success of their standalone CD players by offering other mainstream hi-fi products. This deck, made in Japan (by the ex-Marantz factory?) and the FC567 (reviewed separately) are intended to help put this paradoxical situation to rights, alongside the amplifiers reviewed last month.

The FC566 is a standard size component of wholly derivative appearance. It is competently presented, making due allowance for the slightly scrappy panel graphics inherited from its role models and peers. Alongside Dolby B and C, the DC566 has a full auto reverse record/playback capability, with quick optical detection and direction change at the tape/leader join. The user interface is functionally very well designed. The meters cover a useful 37dB range with good resolution (around 1dB near 0VU) and peak hold. Tape type recognition is automatic, and an electronic memory counter is included.

Additional features are available to assist in finding specific points on the tape. These include index scan (10 seconds played from each track), track search (up to 16 tracks away in either direction) and blank skip. Track search failed to operate as advertised, ie it failed to indicate the total of tracks to be skipped. The search features also failed to carry on to the second side of the tape. Finally, beware of a record mode which can be entered with one tap from a single finger – a recipe for accidental erasure if ever I saw one.

LAB REPORT

Signal/noise ratios are OK, but are achieved at a fairly high THD level (>2% at 0VU with Type II and IV tapes), which nets down to a somewhat restricted dynamic range. The IMD figure is high too, another nail in the coffin of wide dynamic range, but these turned out to be the only important points of

criticism with this machine.

Wow and flutter levels were quite modest, especially for an auto-reverse machine, the flutter components being well distributed and therefore innocuous. Slightly under-biased for many of the widely used tapes, the Type I response shape deserves real censure. However, adjustment was good for chromes and (especially) metals, with or without Dolby. The playback only response shape is fine too, the early HF rolloff being partly a measurement artefact.

SOUND QUALITY

Sound quality was pleasantly firm and stable, with fair detail combined with smoothness and some sophistication at low to medium levels. Bass was warm and euphonious, only becoming a little ragged when pushed hard.

This isn't the recorder for use without noise reduction of some kind because of the dynamic range limitations. Dolby B sounded noticeably better than the C circuitry, and provided sufficient noise reduction too. Pre-recorded tapes were in character with the rest of the story, sounding firm, stable and again full of detail.

CONCLUSIONS

My impression is that Philips have tried quite hard with this recorder – at least to keep the price within reason. It sounds OK, is jam full of facilities, is pleasing to use and is cheap.

TEST RESULTS

Rec/replay response – 3dB ref 1kHz

IEC Type I <20Hz – 15kHz
IEC Type II <20Hz – 14.5kHz
IEC Type IV <20Hz – 16.5kHz

Wow & Flutter – Peak DIN wtd/unwtd 0.15%/0.25%

Wow/Flutter Peak DIN wtd 0.09%/0.27%

Speed error +0.2%

Type I signal/noise CCIR/ARM 315Hz 52dB

distortion 0dB 1.2%

Type II signal/noise CCIR/ARM 315Hz 53dB

distortion 0dB 2.2%

Type IV signal/noise CCIR/ARM 315Hz 53dB

distortion 0dB 2.1%

Channel separation 0VU/1kHz 49dB

Line input sensitivity/overload 112mV/>7V

Mic input sensitivity/overload 0.91mV/24mV

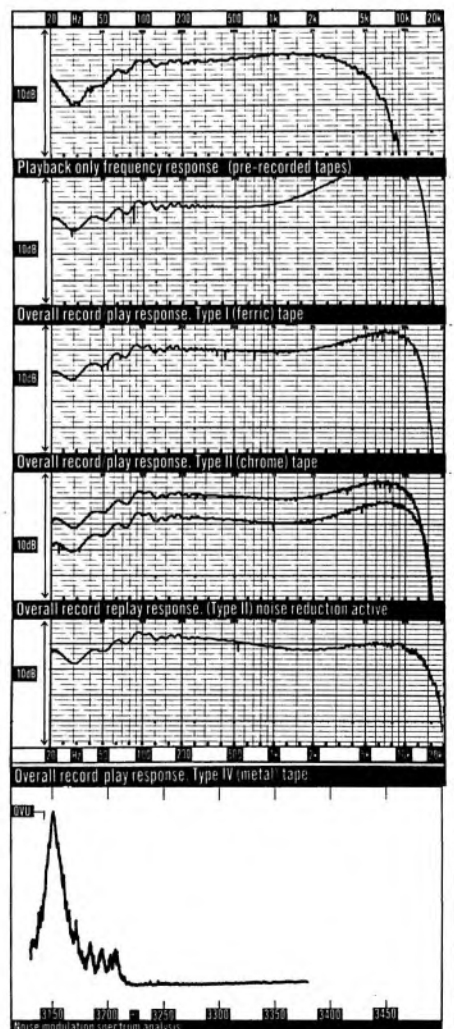
Line output for 0dB/maximum 553mV/2.2V

IM distortion 1kHz, ref 10kHz/11kHz 0dB 14%

Azimuth check R-L phase at 8kHz 2 degrees

VU indication at IEC 0dB
Dimensions (w x h x d)
Typical Retail Price

1.0dB
42 x 10.6 x 26cms
£179



PHILIPS FC567

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



Here is an all-singing cassette deck from Philips, probably manufactured in their ex-Marantz Japanese factory, making it a Firips. I think.

Your £279 buys a twin transport deck, both of which are capable of recording in both directions, which in turn facilitates sequential recording of two tapes. In principle this means up to four hours uninterrupted recording using C120s (you are recommended to stick to C90s though, giving three hours total). An equivalent playback facility is also provided, along with parallel recording (two tapes at once), plus normal and high speed dubbing. The usual comments apply – high speed dubbing is a convenience only feature which is very detrimental to sound quality etc etc . . .

The record level meters cover a meagre 15dB in five broad steps. Dolby B and C noise reductions are fitted, along with a mono microphone input, with rudimentary mixing *via* a separate input level control. Unusually, a switch is provided to change sensitivities and levels to correspond to the old DIN values, which could solve some recalcitrant compatibility problems. There are also system remote control terminals. The deck can be programmed to play up to 16 tracks in any desired order.

The deck also has optically triggered quick auto reverse, though a sample fault meant that only one of the transports would change sides correctly at the tape/leader join.

Although there are lots of features, they have been crammed and skimmed in places. The main control block, which consists of assignable controls for the two transports, is about as impenetrable as they come – even for the initiated. As an illustration, I was less than impressed by the cheapskate dot instead of a 1 (as the 10s indicator) in the track select display. There are other such examples too, and construction quality is average. But there *are* a lot of gadgets.

LAB REPORT

The numbers are very similar to those for the FC566. Low and mid frequency responses are good, but the high frequency responses show evidence of under-biasing with ferric Type I

tapes especially, and with Type IIs to an extent. Dolby tracking, however, is good, as is musicassette replay integrity. Working dynamic range is a little limited, and to avoid hefty audible compression, record levels should not be allowed to wander over the 0VU line. Wow and flutter is respectable by auto reverse standards, and comparable with the FC566 except that side 2 deterioration (not unusual in itself) was much more marked than usual. Wow was well contained, but there were significant flutter components.

SOUND QUALITY

Although it *measured* like the FC566, it didn't *sound* like the FC566. So much for taking things on trust. In a very superficial way the deck seemed a little brighter and more explicit than even the source. But the 566's relatively sweet, gentle character was here replaced by a surprisingly rough, 'hard-nosed' sound, with wooden, 'smeared' transients and a lack of internal consistency that made listening quite hard work. Effective resolution was low due to the smearing effects; ditto with perceived dynamic range. Changing tape types or messing around with the Dolby switching was like fiddling whilst Rome burned.

CONCLUSIONS

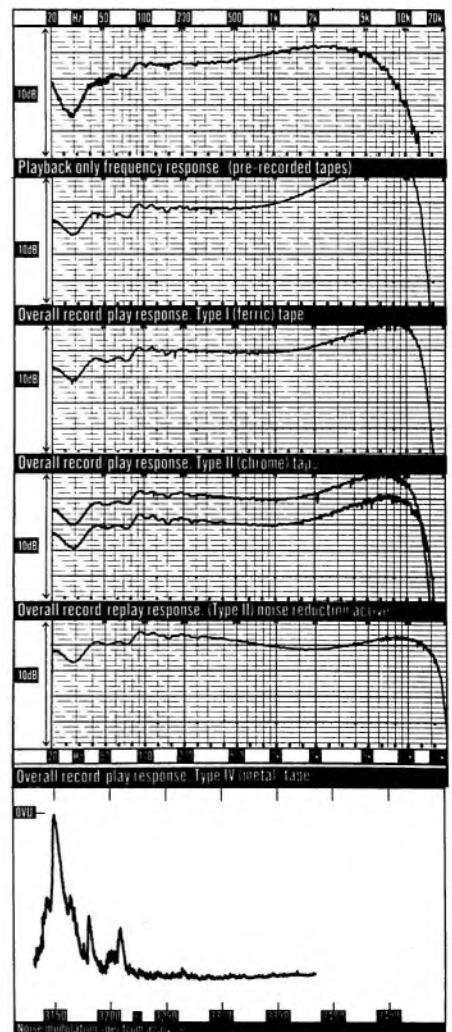
A bit like a decent cassette deck on an off day, the FC567 was rough, coarse and unappealing to listen to. Versatility is second to none at the price, but ergonomics are messy.

TEST RESULTS

Rec/replay response – 3dB ref 1kHz	
IEC Type I	<20Hz – 14kHz
IEC Type II	<20Hz – 14.5kHz
IEC Type IV	<20Hz – 18kHz
Wow & Flutter – Peak DIN wtd/unwtd	0.15%/0.26%
Wow/Flutter Peak DIN wtd	0.10%/0.24%
Speed error	+0.15%
Type I signal/noise CCIR/ARM 315Hz	52.5dB
distortion 0dB	1.2%
Type II signal/noise CCIR/ARM 315Hz	56dB
distortion 0dB	1.8%
Type IV signal/noise CCIR/ARM 315Hz	56dB
distortion 0dB	1.8%
Channel separation 0VU/1kHz	48dB
Line input sensitivity/overload	122mV/>7V
Mic input sensitivity/overload	n/a

Line output for 0dB/maximum
 IM distortion 1kHz, ref 10kHz/11kHz 0dB
 Azimuth check R-L phase at 8kHz
 VU indication at IEC 0dB
 Dimensions (w x h x d)
 Typical Retail Price

470mV/1.4V
 11.9%
 0 degrees
 0dB
 42 x 10.6 x 26cms
 £279



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

AT-95E

A no-nonsense moving magnet cartridge...



...the award winner for less than £20



W I N N E R

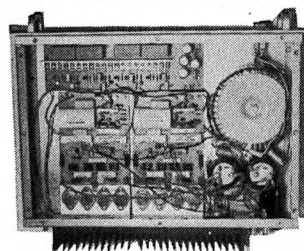
FOR MORE DETAILS CALL 0532 771441.



audio-technica

□ INNOVATION □ PRECISION □ INTEGRITY

AUDIOKITS Precision Components



The Virtuoso Power Amplifier

BUILD THIS SUPERB POWER AMPLIFIER

Read *Electronics Today International* for circuit description, design philosophy, and specification.

Complete kits available from Audiokits

- ★ 100W Stereo Standard Components
- ★ 90W Stereo Upgraded (illustrated)
- ★ 90W Stereo Upgraded with larger power supply in black case
- ★ 160W Bridged Mono Standard Components
- ★ 250W Bridged Mono Upgraded in larger black case

Upgraded versions use top quality components including IAR Wonder Caps, Bulk Foil Resistors, Matching Preamp available – was featured in ETI July-Nov. 1986

For full details of Audiokits, Amplifier Kits and Components send 9" x 4" sae (overseas 3 IRCs) to:

AUDIOKITS PRECISION COMPONENTS



6 Mill Close, Borrowwash, Derby DE7 3GV
Telephone: 0332 674929

PIONEER CT-880

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



In the UK at least, Pioneer concentrate on the low to middle price sector of the separates market; this low cost cassette deck is typical. The £130 CT-880 is an essentially straightforward unidirectional deck.

Like any well dressed cassette deck, it wouldn't be complete without Dolby C as well as Dolby B, and also has a standard set of logic interfaced transport controls which would do credit to a considerably more expensive deck than this one. A simple track search feature capable of locating the start of the current track or the start of the next is also provided, and that's about the lot.

If the front panel has been kept simple, the designer was obviously keen to conceal the fact. The meters have a meagre 16dB range and only 5 steps, but they're so gaudy and so brashly dressed, you might think they're something altogether more potent. Similarly, the panel graphics are designed to make the deck look more complex than it really is. In one respect it *is* more complex than it *should be*: the tape type selectors are not merely manual, they're of the most awkward type where two press buttons have to be juggled to provide the settings for three tape groups. This is a surely unnecessary example of penny pinching that is bound to lead to operating errors (and perhaps even to complaints in reviews).

LAB REPORT

Unusually and impressively, Pioneer have managed to engineer the CT-880 so that there are practically no discernible head contour effects of any kind. The bass just rolls in, rather late admittedly, and that's it. There's plenty of output at the other end of the frequency range up to 15kHz or so. The metal (Type IV) response run is very accurately tailored to the test tapes, and the chrome (Type II) scarcely less so. The two Dolby noise reduction circuits tracked more or less correctly. The playback only curve is also indicative of competent design. Head azimuth error is modest, and the various signal/noise and distortion tests gave straight down the middle results. Just what you'd expect from a deck at this price in fact.

The wow and flutter spectrum analysis reveals some broadening just below the peak

which is probably due to capstan induced wow. A significant flutter component is also visible. The figures - 0.18% wow, 0.27% flutter - back this up.

SOUND QUALITY

Pitch accuracy was reasonable. There was no suggestion of rock solid stability or 100% precision, but there was little obviously remiss either. More significant was a loss of weight in the bass, and also a variably poor image stability, partly because tape/head contact was decidedly suspect. Dynamic range was limited too, loud transients being distinctly held back, which tends to unsettle the stability and coherence of the stereo soundstage. Finally, the music had a slightly rough and obviously flat quality.

Offsetting these negatives, the CT-880 was at least quite crisp and detailed. The electronics had a light, 'agile' feel: lacking in bass and sounding a bit raw in the final analysis, at least it was possible to hear what was going on. Prerecorded material reproduced effectively on the whole, the only real problem being attributable to output variations caused by poor tape to head contact.

CONCLUSIONS

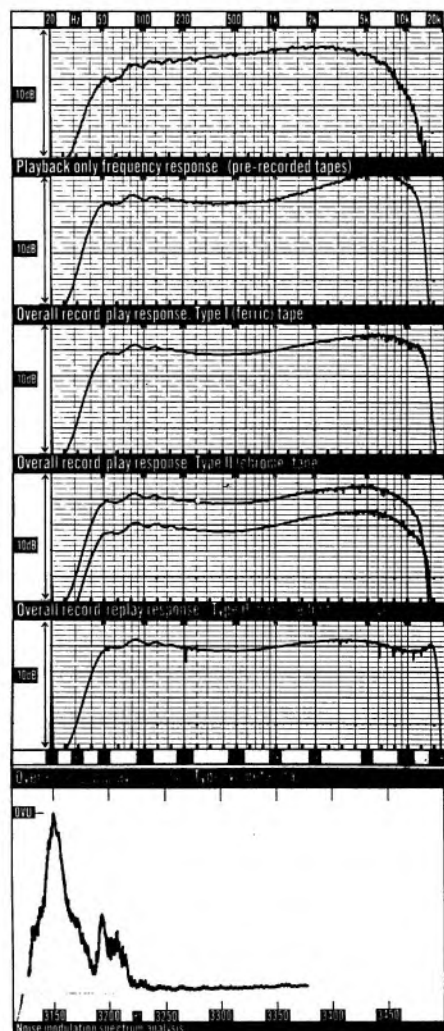
Sounding a little edgy and unsophisticated and with suspect head contact integrity, the CT-880 scores by being reasonably fast and articulate; not good, not bad.

TEST RESULTS

Rec/replay response - 3dB ref 1kHz	
IEC Type I	37Hz - 13.5kHz
IEC Type II	37Hz - 15kHz
IEC Type IV	37Hz - 17kHz
Wow & Flutter - Peak DIN wtd/unwtd	0.21%/0.30%
Wow/Flutter Peak DIN wtd	0.18%/0.27%
Speed error	+0.2%
Type I signal/noise CCIR/ARM 315Hz	51dB
distortion 0dB	0.55%
Type II signal/noise CCIR/ARM 315Hz	55dB
distortion 0dB	1.4%
Type IV signal/noise CCIR/ARM 315Hz	54dB
distortion 0dB	1.4%
Channel separation 0VU/1kHz	47dB
Line input sensitivity/overload	89mV/>7V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	521mV/2.8V
IM distortion 1kHz, ref 10kHz/11kHz 0dB	2.1%
Azimuth check R-L phase at 8kHz	6 degrees
VU indication at IEC 0dB	+4dB

Dimensions (w x h x d)
Typical Retail Price

42 x 10.1 x 21.1cms
£129.90



PIONEER CT-1380WR

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



Unlike the majority of double decks, both mechanisms of this two headed monster are equipped for auto-reverse operation, and both are record capable. The Pioneer solution allows parallel recording (the kind that gets up the record industry's nostrils), and also enables the user to make very long (almost) uninterrupted recordings – 3 hours using C90s.

The deck has Dolby B and C noise reduction, normal and high speed dubbing (the standard warnings apply), and compact disc style track programming, which means that up to 10 tracks on one tape (both sides if required, giving 20 tracks total) can be programmed for replay. Tape type recognition is fully automatic, with no confirming indicator. The record level meters are narrow in range (16dB) and coarse in resolution (5 steps), though easy enough to read with the indicators in red above 0VU. No adjustment of balance is possible. Almost all the deck's features can be controlled from the included 30-key infra-red remote control handset.

Characteristically (see *CT-880* review), Pioneer have done everything conceivable to make the deck appear even more fully equipped than it is. The admittedly limited free area available for controls has more of them per square inch than the flight deck of Concorde. The graphics appear designed only to make matters more confusing, and without exception this must be the most opaque and forbidding fascia the author has come across. Here's hoping the designer never gets a more consequential job like designing the flight deck of a passenger aircraft.

LAB REPORT

With no facility on offer for tweaking record bias, many tapes are going to reproduce as the test ones did, with a 2dB (approx) top end lift. Head contour effects are almost absent (as with the *CT-880*), but there's no deep bass anyway, output being on the slide from around 60Hz. A moderate head azimuth error was found, and the playback measured response was a little lacking in high frequencies (which didn't prevent it sounding excellent, however).

With the single exception of reverse direction wow (double the figures for the normal,

forward direction), both wow and flutter levels are quite good. There are some discrete flutter sidebands, but this is nothing unusual for an auto-reverse deck, all of which are compromised to at least some extent. Dynamic range is also quite good, with metal tapes especially, though the record electronics have some difficulty with high level/high frequency signals (see IM distortion).

SOUND QUALITY

In some ways the *1380* is like a grown up *CT-880* sonically. It has many of the same attributes – crispness, lots of information to chew on, along with a rather unsophisticated quality and some brashness (not necessarily in that order). But it is also a vast improvement, sounding a lot more 3-dimensional and vivid. There's no trace whatever of the spatial or dynamic flatness of the cheaper model.

The noise reduction circuits were a little less obstructive than usual too. There is some limited advantage in using (inevitably expensive) metals for the extra precision and clarity they provide, especially when driven hard by complex, high level signals. All tape groups were capable of acceptable recordings though, and prerecorded material was unusually well handled.

CONCLUSIONS

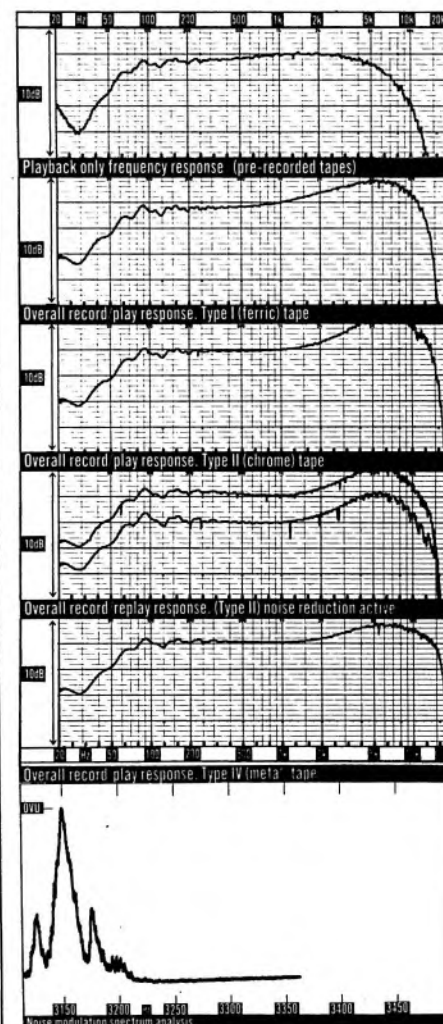
A *CT-880* with bells – and balls. The auto-reverse system has been implemented without too many compromises, and the sound, despite being a little thin, has that vital spark of life.

TEST RESULTS

Rec/replay response – 3dB ref 1kHz	
IEC Type I	39Hz – 14kHz
IEC Type II	39Hz – 16kHz
IEC Type IV	35Hz – 17kHz
Wow & Flutter – Peak DIN wtd/unwtd	F=0.15%/0.21%; R=0.17%/0.41%*
Wow/Flutter Peak DIN wtd	F=0.16%/0.21%; R=0.11%/0.39%*
Speed error	F=+0.15%; R=+0.20%*
Type I signal/noise CCIR/ARM 315Hz distortion 0dB	52dB
Type II signal/noise CCIR/ARM 315Hz distortion 0dB	0.8%
Type II signal/noise CCIR/ARM 315Hz distortion 0dB	54dB
Type II signal/noise CCIR/ARM 315Hz distortion 0dB	2.0%
Type IV signal/noise CCIR/ARM 315Hz distortion 0dB	54dB
Type IV signal/noise CCIR/ARM 315Hz distortion 0dB	0.95%
Channel separation 0VU/1kHz	49dB

Line input sensitivity/overload	94.5mV/>7V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	48.5mV/2.8V
IM distortion 1kHz, ref 10kHz/11kHz 0dB	7.8%
Azimuth check R-L phase at 8kHz	20 degrees
VU indication at IEC 0dB	+3dB
Dimensions (w x h x d)	42 x 10.1 x 31.5cms
Typical Retail Price	£399.90

*F=forward; R=reverse



PROTON AD-200

PORTFOLIO MARKETING, RIVER WALK, TONBRIDGE, KENT TN9 1DT. TEL: (0732) 365071.



The entry in the Proton brochure is succinct: 'Stereo cassette deck with Dolby B and C noise reduction system and full logic control' is what it says, and that indeed is practically all there is to tell. Although very humbly equipped, the instructions somehow manage to drag it out for several pages. Small pages though... and the last five are utterly blank.

Laid out in the typical fashion of a budget deck of a decade or so ago, the Proton has power assisted mechanical latching transport controls whose sole (but useful) additional feature is full audible cue and review, the speeded up output helping find track starts and the like. Record starts use a single button, so could be triggered accidentally - beware. The record level meters have seven steps and a 26dB range; the top LED is at an unusually low +6dB, but this in fact matches the sensitivity of the meters quite well.

Tape type selection is manual, noise reduction is by Dolby B and C, the MPX filter can be defeated *via* a switch on the back panel, and a simple mechanical tape counter completes the gadget count. And that's it - the easiest, simplest and most obvious to use cassette deck that was ever invented.

LAB REPORT

The major point of note is the spectrum analysis of noise modulation sidebands, which shows relatively little capstan wow, but very severe flutter sidebands (note the sharp peak to the right of the main 3150 test frequency).

The Type IV (metal) response shape is very accurately tailored, but the all important Type II (chrome) response shape sharply favours the treble. The average treble level here is more than 3dB above the bass/lower mid, which is well beyond easy rescue merely by selection of tape brands. Dolby mistracking was also significant. Note also that the very extended bass response is not quite what it seems - there appears to be some DC on the line out socket, and the signal level near 20Hz is almost certainly related to this.

Although the signal/noise figure looks good on paper, it is achieved at very high levels of distortion, largely because meter sensitivity is set low (IEC 0dB is about 3dB

lower on the meters than usual).

SOUND QUALITY

There's no other way to put it: sonically this player is a mess. The deck has an inordinately hard, 'edgy' quality under all conditions of use - not least when reproducing prerecorded material, despite the HF losses with such tapes. Transients in particular sound coarse and unyielding, and the midband is dreadfully 'fluffy', especially during louder, more complex passages. The level of detail extracted off tape is extremely low, and the result is a mere caricature of the real thing.

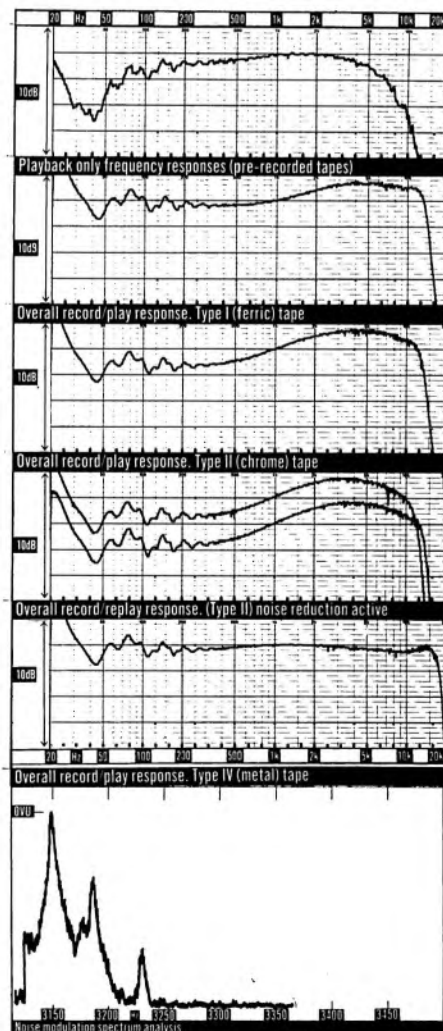
Recordings made on metal tapes sound better, which isn't surprising given that this is the only tape group for which the deck is adequately set up. Surprisingly, the hardness is ameliorated to an extent when noise reduction is used, and this is one of the few decks that sounds better with Dolby than without, leaving tape hiss out of the equation.

CONCLUSIONS

Bearing a (not coincidental) resemblance to an earlier NAD branded deck, the Proton 200 is ungracious and terminally short of resolving power. Very basic technology.

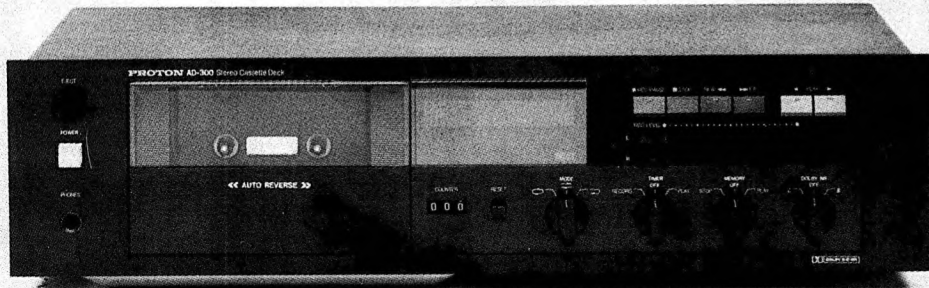
TEST RESULTS

Rec/replay response - 3dB ref 1kHz	
IEC Type I	<20Hz* - 14.5kHz
IEC Type II	<20Hz* - 14kHz
IEC Type IV	<20Hz* - 18.5kHz
Wow & Flutter - Peak DIN wtd/unwtd	0.22%/0.48%
Wow/Flutter Peak DIN wtd	0.13%/0.50%
Speed error	+0.35%
Type I signal/noise CCIR/ARM 315Hz	53.5dB
distortion 0dB	0.85%
Type II signal/noise CCIR/ARM 315Hz	57dB
distortion 0dB	2.3%
Type IV signal/noise CCIR/ARM 315Hz	56dB
distortion 0dB	2.0%
Channel separation OUV/1kHz	47dB
Line input sensitivity/overload	93mV/>7V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	68.4mV/3.8V
IM distortion 1kHz, ref 10kHz/11kHz 0dB	0.81%
Azimuth check R-L phase at 8kHz	7 degrees
VU indication at IEC 0dB	0dB
Dimensions (w x h x d)	42 x 10 x 24.5cms
Typical Retail Price	£139.50
*see text	



PROTON AD-300

PORTFOLIO MARKETING, RIVER WALK, TONBRIDGE, KENT TN9 1DT. TEL: (0732) 365071.



Proton's AD-300 is just as idiosyncratic if not quite as minimalist as the AD-200, but in reality it's a quite different kind of animal. The most obvious difference is of course that this is a full auto reverse deck, controlled by an almost conventional set of light touch transport buttons. It's also remote controllable: a remote control handset is not supplied, but the on board infra red receiver is capable of interpreting instructions received from a system handset which was supplied for our tests.

The transport is a fairly standard affair, the rotating record/playback head flanked by two pairs of erase heads and capstans, one for each direction. Noise reduction is by Dolby B and C, with MPX filtering switchable on the rear. Tape type is sensed automatically.

This Proton is not well endowed with track search facilities. It lacks the cue/review feature of the cheaper AD-200, which has assisted mechanical transport controls, and is left with only a counter memory stop/play feature - minimalism at its most minimal, though useful nonetheless. Aesthetically the AD-300 has many of Proton's characteristic distinguishing touches, with similar seven-step, 26dB meters to the 200, executed here in backlit LCDs rather than LEDs.

LAB REPORT

Again showing similarities to the cheaper AD-200, the lab tests are dominated by some vicious flutter sidebands, which show clearly in the noise spectrum analysis measured in the forward direction. And as the spot measurements show, flutter increases significantly in the other direction. Wow levels are under rather better control, but are still too high for comfort.

OVU meter sensitivity is set to correspond to IEC 0dB, so this gives good noise figures combined with the comparatively high distortion levels shown in the measurement table. Record levels should be kept well in check, especially in the case of Type II and IV tape groups.

The Type I and IV record/playback responses are mainly well engineered and indicate that someone cared. However, the Dolby circuits appear to have been aligned

with a flat Type II response in mind, and the actual response shape is therefore exaggerated slightly by the noise reduction circuitry.

SOUND QUALITY

This recorder sounds a lot better than the AD-200, but it's still a long way from being acceptable. On the positive side it sounds relatively clear, with a great deal more resolution than the cheaper model. This was particularly true when playing prerecorded cassettes, even though the tonal balance was quite similar. However, the AD-300 still sounded hard and unsubtle, even by the rather undemanding standards appropriate for middle market cassette based machinery.

The three tape types sounded relatively close to each other. Metal tapes sounded neither significantly better nor worse than the others, and there wasn't much to choose regardless of the noise reduction system active at the time. The reason, clearly, is that the other problems (flutter especially) predominate, swamping the more subtle effects.

CONCLUSIONS

This is another graceless and dry sounding recorder, though a considerable improvement on the cheaper model in the range. The electronics appear to be satisfactory, but the transport is poor.

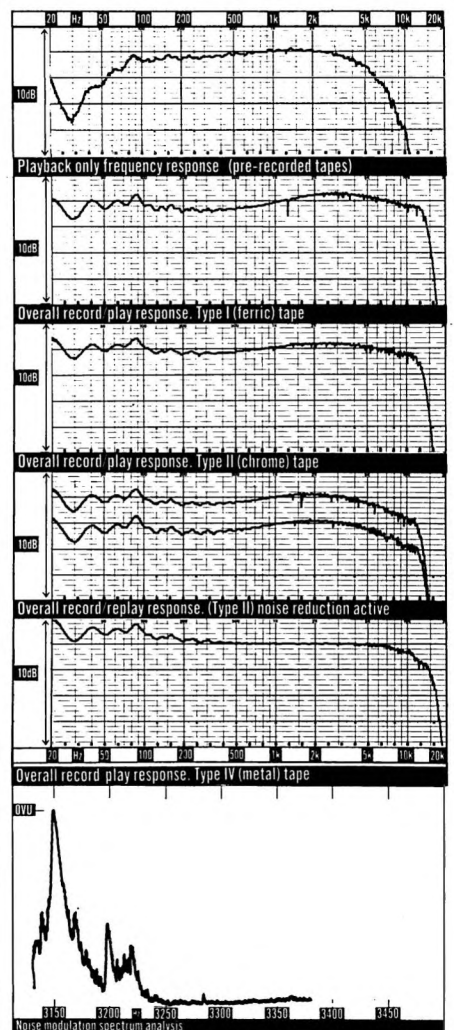
TEST RESULTS

Rec/replay response - 3dB ref 1kHz	
IEC Type I	<20Hz - 15kHz
IEC Type II	<20Hz - 14kHz
IEC Type IV	<20Hz - 15.5kHz
Wow & Flutter - Peak DIN wtd/unwtd	
Wow/Flutter Peak DIN wtd	F=0.14%/0.25%/ R=0.17%/0.52% F=0.10%/0.24%/ R=0.062%/0.48%*
Speed error	
Type I signal/noise CCIR/ARM 315Hz	+0.25%
distortion 0dB	51dB
Type II signal/noise CCIR/ARM 315Hz	55dB
distortion 0dB	1.8%
Type IV signal/noise CCIR/ARM 315Hz	55dB
distortion 0dB	1.7%
Channel separation OVU/1kHz	50dB
Line input sensitivity/overload	87.5mV/>7V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	670mV/3.6V
IM distortion 1kHz, ref 10kHz/11kHz 0dB	1.0%
Azimuth check R-L phase at 8kHz	3 degrees
VU indication at IEC 0dB	0dB
Dimensions (w x h x d)	42 x 10 x 24.5cms

Typical Retail Price

£249.50

*F=Forward, R=Reverse



SONY TC-FX 150

SONY UK LTD., SONY HOUSE, SOUTH ST., STAINES, MIDDX TW18 4PF. TEL: (0784) 67000.

RECOMMENDED



As the guy from Sony said, the *TC-FX150* 'looks the biz'. Although hardly a substantial piece of engineering, it is very smooth and glossy. The transport controls are entirely unassisted mechanical press buttons. But they are well anchored and positive in feel, and also allow free interchange between fast wind and play (and vice versa) apparently without damage.

Ultra simple 5-step meters with a bare 11dB range are the most obvious sign of cost paring. Dolby C (in addition to the ubiquitous Dolby B) is the most impressive inclusion. There's a mechanical tape counter and manual tape type setting using (thankfully) a row of three appropriately labelled press buttons.

LAB REPORT

The performance is above average – which is more than you've any right to demand in a cassette deck that costs a paltry £90. A couple of things are open to criticism however. One of which is the suspect bass behaviour seen in the response curves: note the sharp suckout centred on 50Hz. Head contour effects are unusually extended up into the midband too, and these factors can be expected to affect auditioning.

The top end of the frequency range seems to have been set up rather erratically – the responses were run with the recommended Sony tapes as well as the normal IEC standard tapes (which actually proved marginally better suited than Sony's own). Type I tapes are rolled off a little early at HF, whilst metal tapes gave the odd camel like hump you can see in the accompanying data panel. Performance with pre-recorded cassettes was a complete joke. There was a net loss of treble when replaying Dolby cassettes with the Dolby de-processing switched *off*!

Wow and flutter levels are moderate, the spectrograms identifying several discrete components sprinkled around, with dominant wow at 5Hz, -28dB. Speed drift, however, was very low. There are noise 'shoulder' like effects on the noise spectrogram at a just respectable -32dB between ±20-40Hz.

Intermodulation distortion exceeding 20% is very high indeed, which means comprom-

ised performance with complex, high level signals, especially with Type IV metal tapes. Harmonic distortion with metal tape is also very high at above 3%, but this is tied to quite good noise levels.

SOUND QUALITY

The *TC-FX150* auditioned better than expected *except* with pre-recorded stuff, where sound quality doesn't even come into the equation. This is odd considering Sony have aligned the machine with absolutely zero azimuth error.

However, recording and playing back on the deck itself, led to some quite acceptable results. There wasn't enough dynamic range between the noise floor and maximum level to allow serious use of the deck without noise reduction, but with Dolby B the sound was tolerably clear and lifelike, and superior to similar recordings made with Dolby C, which sounded oddly heavy. Ferric Type I recordings tended towards 'wooliness', and metal Type IV tape failed to offer any real advantage over Type II. Overall the best bet is to use Type II tapes like TDK SA or Sony UX-S, and Dolby B.

CONCLUSIONS

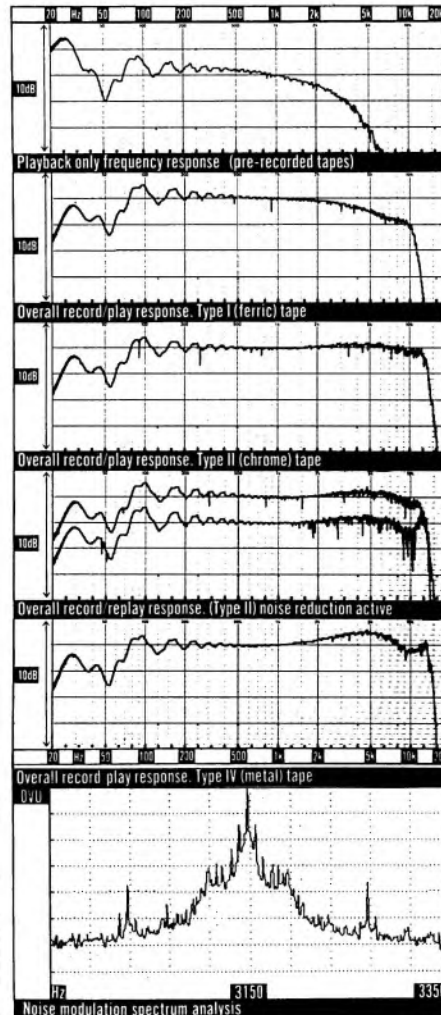
There's a lot of hedging about and many specific caveats, but the *TC-FX150* is obviously a good £90's worth, capable of results that generally deserve the high fidelity tag. Replay only performance, however, was unsatisfactory.

TEST RESULTS

Rec/replay response – 3dB ref 1kHz	
IEC Type I	22Hz – 11kHz*
IEC Type II	56Hz – 14kHz*
IEC Type IV	56Hz – 15kHz*
Wow & Flutter – Peak DIN wtd/unwtd	0.13%/0.24%
Speed error	+1.2%
Type I signal/noise CCIR/ARM 315Hz	55dB
distortion 0dB	1.7%
Type II signal/noise CCIR/ARM 315Hz	53.5dB
distortion 0dB	53.5%
Type IV signal/noise CCIR/ARM 315Hz	54.5dB
distortion 0dB	3.2%
Channel separation DVU/1kHz	46dB
Line input sensitivity/overload	86mV/>7V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	646mV/3.36V
IM distortion 1kHz, ref 10kHz/11kHz 0dB	20.7%
Azimuth check R-L phase at 8kHz	0 degrees

VU indication at IEC 0dB
Dimensions (w x h x d)
Typical Retail Price
*Sony tape
Reprinted from issue No. 52

43 x 11.3 x 24.5cms
£90



There's nowhere like it for Hi-Fi!

- 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
- 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



**NOW YOU'VE
READ THE
REVIEWS
COME TO US
FOR THE BEST
DEAL**

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

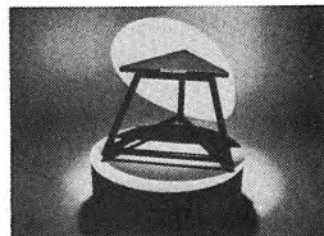
THE RIGHT CHOICE - GUARANTEED

Now used by 6 leading UK reviewers the Skyline platforms have broken all previous standards of performance.

"Definitely the best turntable support platform I have yet tried"

Hi Fi Review Buyer Guide '87

- STATE OF THE ART
- PROVEN
- SUPERB VALUE



WITH NOTHING TO LOSE WHY NOT HEAR FOR YOURSELF USING THE COUPON BELOW. YOU WON'T BE DISAPPOINTED WITH A MONEY BACK GUARANTEE IF NOT IMPRESSED

PLEASE SEND ME:- Tick Box req. & enclose cheque or P.O.

Version	Grade	Basic	Advanced	Super	Ultra
Table (suspended)		£46.50	£69.00	£99.99	£179.00
Table (solid floor)		£46.50	£69.00	£99.99	£179.00
Wall Mounted		£38.50	£61.00	£79.00	
Shelf Standing		£35.00	£57.50	£75.00	
Isolating Board with feet		£18.00	£27.00		

Required Topboard Shape:- Triangular Rectangular
Please send me more information POST & PACKING FREE

TO:- ORIGIN LIVE
87 CHESEL CRESCENT
BITTERNE, SOUTHAMPTON
SO2 4BT (0703) 671237

NAME.....
ADDRESS.....
.....
.....

CAMBRIDGE HI-FI

BRITAIN'S NO. 1 HI-FI DEALER

Voted by Hi-Fi News Readers -
1987 for Professional Advice and
Personal Service

NOW IN STOCK

The new Mission Cyrus 1 and 2
Crimson, MB Quart,
Kenwood, Technics,
Harman Kardon.



CAMBRIDGE HI-FI
HAWTHORN WAY
CAMBRIDGE
Tel: (0223) 67773

SONY TC-W250

SONY UK LTD., SONY HOUSE, SOUTH ST., STAINES, MIDDX. TEL: (0784) 67000.



The *TC-W250* comes in at the bottom end of the twin transport hi-fi cassette deck market, and is more of a utility product than one designed to purist high fidelity criteria. However, it's expensive enough to do a reasonable job if Sony have done their work right.

For those put off by the complexity of most dual decks, this one will be a revelation. One transport plays only and the other records as well; both are single direction mechanisms. The layout places the transport controls in a line below each loading drawer; in an arrangement that should be intuitively obvious. In between there is a short meter display (6 steps, 16dB only) with two parallel slider level controls underneath.

The remaining controls – there are not many of them – take care of Dolby switching (B and C as usual), tape type switching for the record mechanism only, and a dubbing speed switch. My only complaint about the ergonomics concerns the tape switching, which is amongst the most opaque and clumsily designed I have ever come across. That apart, the deck is a model of clarity and simplicity – and incidentally attractively finished and styled into the bargain. But the manual transport controls felt rather flimsy.

On our test sample the record mechanism made a regular mechanical clicking sound – obviously a sample fault.

LAB REPORT

Bench test performance isn't bad, apart from the wow and flutter that is. 0.38% weighted (0.62% unweighted) is within the range of many portables and transportables, and is poor even for a bi-directional deck. Closer examination shows a good, sharp pitch centre, which ties in with the observed good overall pitch stability, but a lot of flutter energy besides.

Like other Sonys, 0VU on the meters is already well into clipping – quite hard clipping in this case, as the distortion measuring equipment went off scale with metal (!) and chrome test tapes. Bass is absent below 60Hz (possibly a blessing), and 0VU IM distortion is also very high, suggesting the deck will also have problems with complex high level HF-rich music (confirmed). Head azimuth was

also well out of true.

SOUND QUALITY

The price is just about sufficient to feed expectations of reasonable sound quality, and in some ways this Sony delivered. The deck had an open, 'breathy' quality that brought the sound close to the listener. It was capable of withstanding scrutiny too, as recordings were rich with detail, though also very obviously bright with all tape types. Furthermore, treble quality was quite dirty, tending to 'thinness' with some roughness too.

For once, the two noise reduction systems worked well, with little smearing or other side effects. The Sony worked satisfactorily with all tape types, but extracted additional clarity and precision from metals. Pre-recorded material sounded just fair.

Speed stability was surprisingly good. Wow was rarely audible, though the subjective roughness was certainly flutter related. The positive side is that the deck's electronics sounded refined and clear. These – and the deck as a whole – had the kind of sonic honesty generally only associated with simple, direct circuits.

CONCLUSIONS

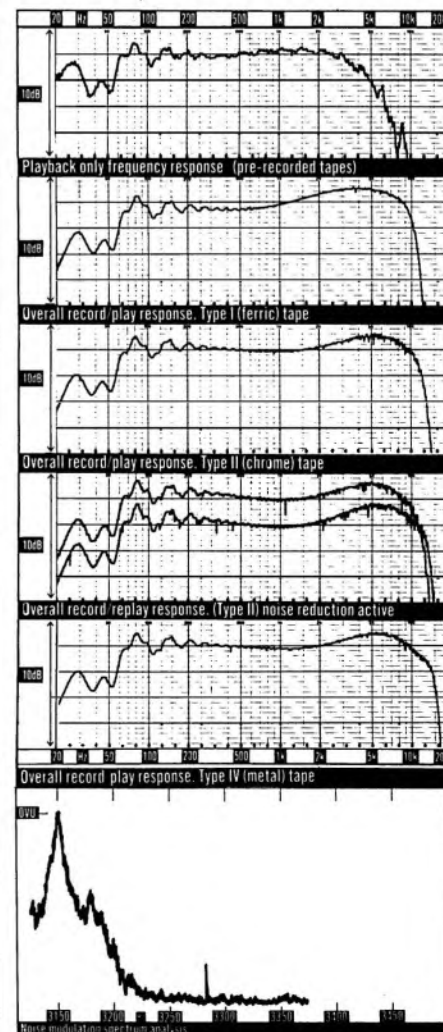
Good points are the good feature/price mix and the clarity of the sound. Even though it suffers some obvious graininess, at its price the *TC-W250* is a reasonable purchase.

TEST RESULTS

Rec/replay response – 3dB ref 1kHz	
IEC Type I	57Hz – 10.5kHz
IEC Type II	55Hz – 13kHz
IEC Type IV	53Hz – 15kHz
Wow & Flutter – Peak DIN wtd/unwtd	0.38%/0.62%
Wow/Flutter Peak DIN wtd	0.31%/0.54%
Speed error	+0.15%
Type I signal/noise CCIR/ARM 315Hz	57dB
distortion 0dB	2.0%
Type II signal/noise CCIR/ARM 315Hz	59dB
distortion 0dB	>3.0%
Type IV signal/noise CCIR/ARM 315Hz	59.5dB
distortion 0dB	3.0%
Channel separation 0VU/1kHz	48dB
Line input sensitivity/overload	106mV/>7V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	686mV/3.2V
IM distortion 1kHz, ref 10kHz/11kHz 0dB	12.3%
Azimuth check R-L phase at 8kHz	30 degrees

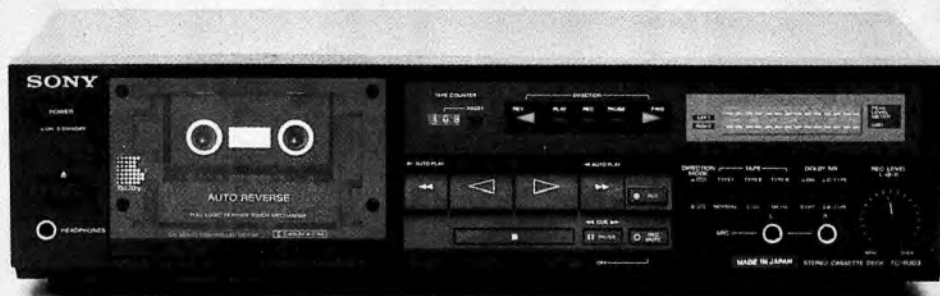
VU indication at IEC 0dB
Dimensions (w x h x d)
Typical Retail Price

43 x 13.5 x 250cms
£149



SONY TC-R303

SONY UK LTD., SONY HOUSE, SOUTH ST., STAINES, MIDDX. TEL: (0784) 67000.



It's rare these days that Sony manage less than excellent aesthetic design for their cassette decks – the low-to-middle price ones which are not overloaded with gadgets anyway. The *TC-R303* is a good example. It's a £179 auto-reverse model with conventional facilities, but with the major and most of the minor controls extremely well disposed for maximum clarity. It's the next best thing to granny proof. Or would be if . . .

There are two disappointing aspects of the user interface (to use the pompous term). One is the player's inability to accept single finger record starts – you know, one touch to enter record/pause, another to start the tape rolling. The other concerns switching – manual tape type selection in place of the now more usual automatic, and Dolby switching which is simply jumbled. The result is that it's unnecessarily easy to make errors when setting up.

Features of the Sony include the usual Dolby B and C, and less usual microphone inputs. Meters appear to have been lifted from the *TC-W250*, and have a meagre 16dB range over 6 steps. Side change is triggered at the far end of the leader rather than at the tape/leader join, so there is an 8 second (or so) downtime during changeover. The transport section has a cue and review facility, which is accessed *via* 'pause' from 'stop' (!). Well you work it out . . .

LAB REPORT

Bass head contour effects stretch way into the treble, though they are never of great magnitude. This apart, the various record/replay frequency responses, with and without noise reduction, are very accurate. Only the playback only response bucks the trend (see below).

Signal/noise performance is excellent, even taking the high 0VU distortion level into account, and it is possible to make fairly quiet recordings even without noise reduction using a good high energy tape. On a less positive note, the Sony suffers from some capstan wow and quite significant levels of flutter, with a couple of dominant discrete flutter sideband frequencies visible in the spectrum analysis.

SOUND QUALITY

Despite the poorer than expected speed stability – unfortunately all too common with auto-reverse cassette mechanisms – the *303* sounded surprisingly good. There were intermittent indications of speed instability, but 'intermittent' and 'indications' are the operative words, and on the whole the Sony, and for that matter the listener, escapes lightly. Ditto with the prerecorded tape replay, where the gods seems to have been on Sony's side – the deck sounded rather lacking in weight and stability, but not terminally lacking in top, despite the measurements.

The *303* was at its best making its own recordings, where some brightness and coarseness did little to offset the crisp, 'aliveness' of the recorder. The bass was thin and a little coloured, but full of detail, and a considerable improvement on typically 'fluffy', out of control cassette type bass. The Sony's transparency was particularly apparent with metal tapes, with and without Dolby processing. There was a tendency for loud instruments to dominate the mix with ferric tapes.

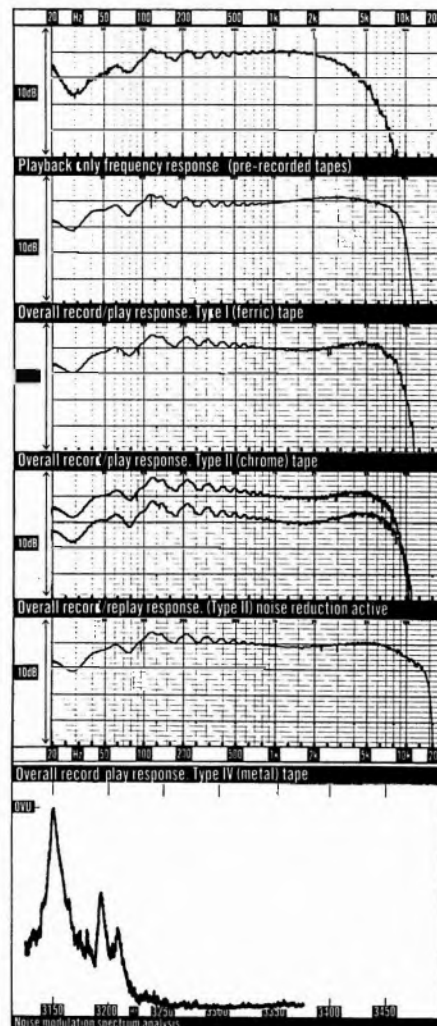
CONCLUSIONS

Well presented but with some thoughtless minor features (manual tape recognition etc), this reasonably priced auto-reverse deck is a little unrefined but was detailed and articulate nonetheless.

TEST RESULTS

Rec/replay response –3dB ref 1kHz

IEC Type I	<20Hz – 10kHz
IEC Type II	<20Hz – 9.5kHz
IEC Type IV	<20Hz – 15kHz
Wow & Flutter – Peak DIN wtd/unwtd	0.14%/0.30%
Wow/Flutter Peak DIN wtd	0.12%/0.26%
Speed error	+0.20%
Type I signal/noise CCIR/ARM 315Hz	58dB
distortion 0dB	1.7%
Type II signal/noise CCIR/ARM 315Hz	60dB
distortion 0dB	2.7%
Type IV signal/noise CCIR/ARM 315Hz	59dB
distortion 0dB	2.9%
Channel separation 0VU/1kHz	48.5dB
Line input sensitivity/overload	111mV/>7V
Mic input sensitivity/overload	0.37mV/16.9mV
Line output for 0dB/maximum	672mV/3.2V
IM distortion 1kHz, ref 10kHz/11kHz 0dB	1.3%
Azimuth check R-L phase at 8kHz	7 degrees
VU indication at IEC 0dB	-3dB
Dimensions (w x h x d)	43 x 11 x 25.5cm
Typical Retail Price	£179



SONY TC-R503ES

SONY UK LTD., SONY HOUSE, SOUTH ST., STAINES, MIDDX. TEL: (0784) 67000.

RECOMMENDED



This up-market brother to the *TC-R303* (reviewed separately) is a member of the prestige *ES* (son of *Esprit*) range, designed with special regard to sound quality, and succeeds the *TC-502ES* which achieved Recommended status in the last *Hi-Fi Choice: Cassette Decks*.

The main differences are the addition of a bias adjust feature to the existing sensitivity adjustment (for which a foolproof setup procedure is provided). Bias has to be tweaked by ear, which is harder here than with a three head deck where the tape/source comparison is always on tap. In addition, the *503* features a new cassette holding mechanism to reduce modulation noise, has an improved top end response and other minor changes. This Sony also now has Dolby *HX Pro* and claims sophisticated head technology.

Tape type sensing is fully automatic, with a confirming readout. The meters offer a wide 50dB range with very fine resolution and peak hold. One finger, two operation record starts can be made, and the auto-reverse mechanism uses optical leader sensing so there is only a very short break as the sides change. Various music search features complete the roster, including track search, blank skip and intro scan. The tape counter also plays its part, reading out elapsed time and being equipped with memory stop. A couple of minutes from the end of side when recording, the counter starts flashing; use it as an egg timer, if you like them runny.

LAB REPORT

Noise levels referred to 0VU are low, but distortion levels are high, which in practice means that careful watch should be kept on record levels. Speed stability is also rather below par, with some cyclic wow (scarcely audible in practice) and significant flutter sidebands. The figures were only moderately worse in reverse mode.

The Sony is otherwise a recorder which offers fine record/replay and playback only frequency responses, albeit a little bright with Type I tapes. The two Dolby circuits produced no obvious modification.

SOUND QUALITY

This recorder sounded much clearer and more refined than the already crisp sounding

TC-R303B, with an altogether sweeter and more tactile quality. Whatever else it may not do well, the Sony takes some beating on these grounds. These comments apply to pre-recorded cassettes too, which as well as sounding more detailed and tonally neutral, also sounded much firmer and more stable, which may indicate better tape-to-head contact.

Much the same applied to the recordings made on the *503*. The bass sounded a little fuller than the *303*, but retained the same essential crispness and tunefulness. The mid and top meanwhile sounded razor sharp, giving reproduction chock-a-block full of detail. This emphasis of transient leading edges is rather surprising, especially given that the recorder isn't notably bright, but it's a characteristic devoid of nastiness or temperament.

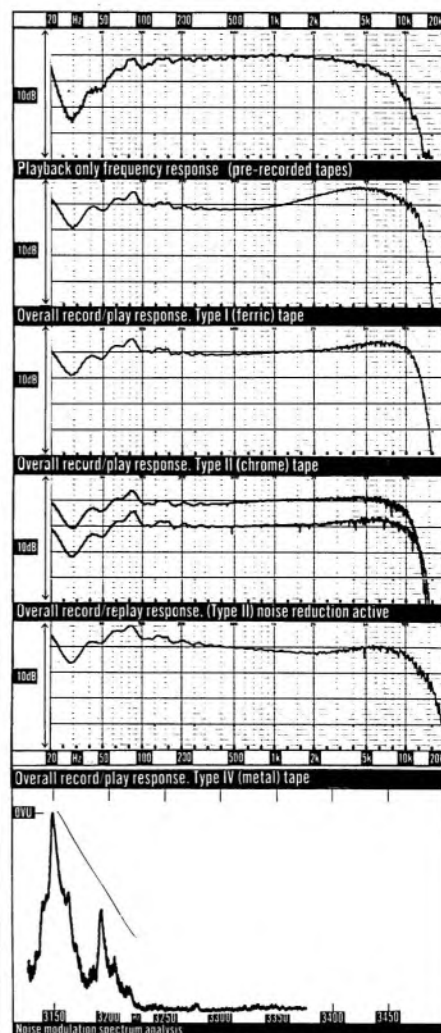
Engaging as it is, what this recorder lacks is a sense of power and weight, and it was also ultimately a little lacking in expressiveness. Stereo imagery on the other hand was explicit.

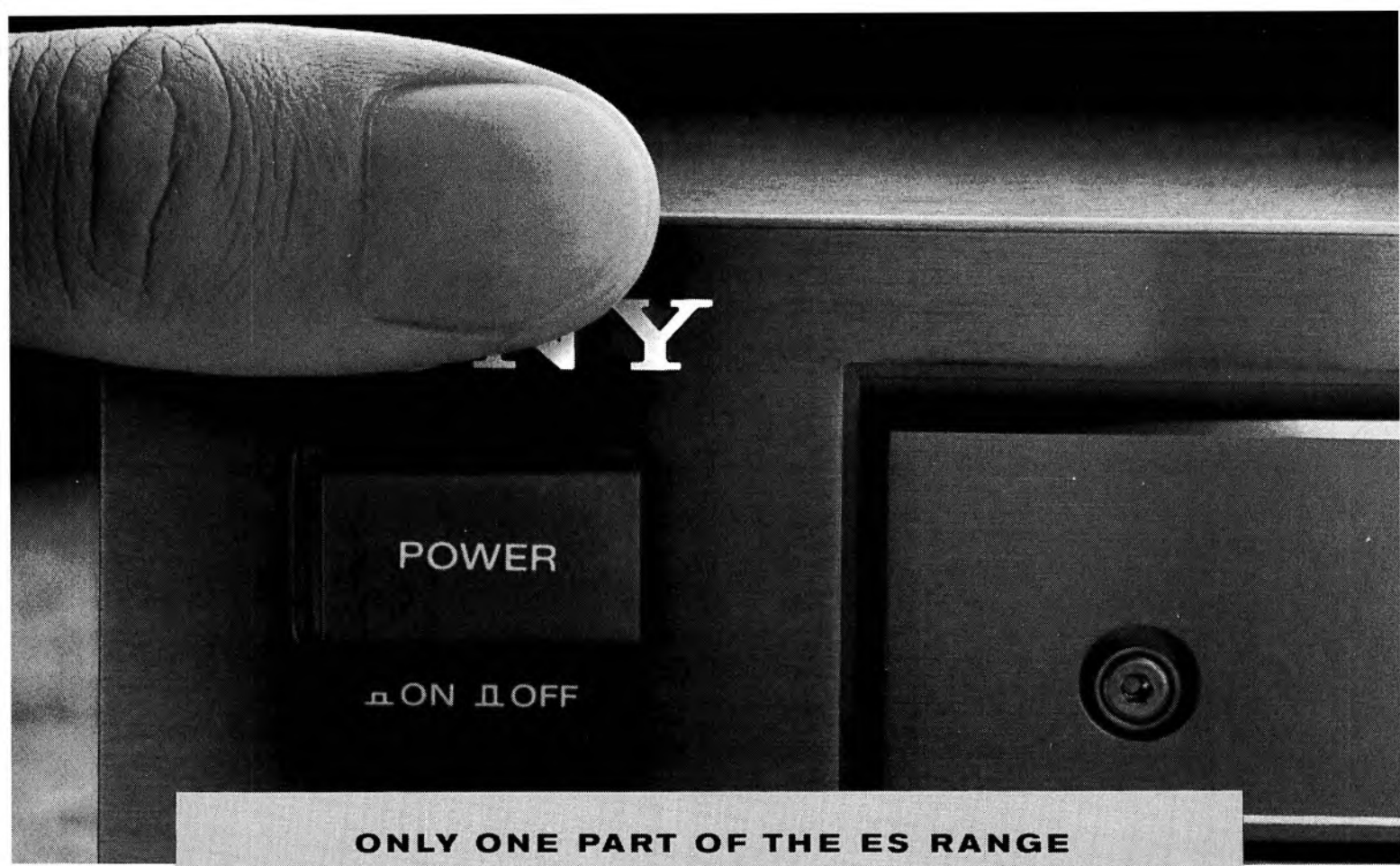
CONCLUSIONS

This is an excellent recorder which could usefully be a little more subtle, but which already wields a great deal of resolving power – an intriguing and usefully equipped Recommended model.

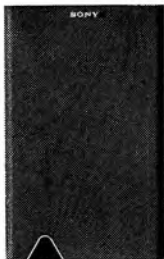
TEST RESULTS

Rec/replay response – 3dB ref 1kHz	
IEC Type I	<20Hz – 14kHz
IEC Type II	<20Hz – 13.5kHz
IEC Type IV	<20Hz – 16kHz
Wow & Flutter – Peak DIN wtd/unwtd	0.15%/0.24%
Wow/Flutter Peak DIN wtd	0.14%/0.19%
Speed error	+0.225%
Type I signal/noise CCIR/ARM 315Hz	54dB
distortion 0dB	1.3%
Type II signal/noise CCIR/ARM 315Hz	58dB
distortion 0dB	2.3%
Type IV signal/noise CCIR/ARM 315Hz	56.5dB
distortion 0dB	1.3%
Channel separation 0VU/1kHz	48dB
Line input sensitivity/overload	106mV/>7V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	699mV/3.79V
1M distortion 1kHz, ref 10kHz/11kHz 0dB	1.0%
Azimuth check R-L phase at 8kHz	12 degrees
VU indication at IEC 0dB	1.0dB
Dimensions (w x h x d)	43 x 11 x 28.5cms
Typical Retail Price	£299

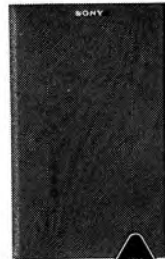




**ONLY ONE PART OF THE ES RANGE
DOESN'T SOUND LIKE THE BEST BRITISH HI-FI.**



APM 66 ES.
Award winning flat diaphragm design.
Hi-Fi Choice: 'Worth Considering'



APM 66 ES.
Award winning flat diaphragm design.
Hi-Fi Choice: 'Worth Considering'

No one appreciates good hi-fi as much as the British. That's why we consulted them when we wanted to improve our ES range.

As each new product was developed we sent a hand-built sample to a team of British hi-fi experts.

After the strictest examination, they suggested improvements which we took on board.

But even the toughest critics approved our Gibraltar Chassis.

The CDP 555 ES as well as each amplifier is built on a solid base of marble and fibreglass. So vibration and magnetic interference are kept to an absolute minimum.

Judging by their response, hi-fi magazines are impressed too.

Though if you think our separates sound good on paper, wait until you hear them in your living room.



CDP 555 ES.
CD player with Gibraltar Chassis, 4 times over sampling, and twin transformers.
Hi-Fi Choice: 'Recommended'



STS 700 ES.
FM stereo/MW/LW synthesiser tuner.
Hi-Fi Choice: 'Best Buy'



TCK 700 ES.
3 head quartz lock, direct drive, cassette deck.
Hi-Fi Choice: 'Recommended'

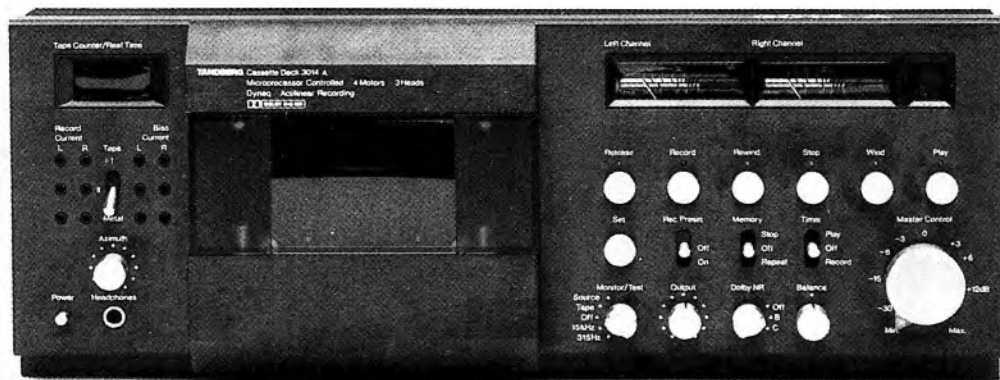


TAF 700 ES.
110W stereo integrated amplifier with Gibraltar Chassis.
Hi-Fi Choice: 'Worth Considering'

SONY ES

TANDBERG 3014A

ORTOFON UK LTD., DENMARK HOUSE, TAVISTOCK IND. EST., RUSCOMBE, TWYFORD, BERKS RG10 9NJ. TEL: (0734) 343621.



The *TCD3014* is an exactly specified and exotically built deck with four motors (two for reel drive, a capstan motor and a linear motor for head block drive) and dual capstans, built onto a solid base and using massive flywheels. The deck features three heads for real-time off-tape monitoring. The record head is driven by Tandberg's *DYNEQ* head-room extension system, which addresses more or less the same problem as Dolby *HX Pro*. Levels are set using analogue moving-coil meters, with fast attack for quasi-peak reading and a long decay time constant. In contrast the memory tape counter is electronic, scaled in revolutions or elapsed time.

Major operating features include a front panel azimuth alignment facility using an on-board oscillator. Most 3-head recorders use siamesed heads, which fix the azimuth relationship between record and replay heads. This is not true of the Tandberg, the compensating benefit being much reduced mutual interaction between the heads. The deck also has an elaborate bias and sensitivity adjustment feature, again using oscillators (at LF and HF) and the record level meters.

Operating the Tandberg has its satisfactions, but also its frustrations. What do you make of selecting rec. preset, followed by stop and then record in order to enter record mode? A remote control is available as an optional extra.

LAB REPORT

Head shaping appears to be near perfect, the LF response shapes being ideal. Mid/top behaviour, however, was a little erratic, careful optimisation of all the variables producing the meandering plots reproduced alongside, despite using the tape brands recommended by the manufacturer. Limits of about 2dB are needed to contain the best of them, and as the effects are wideband, the results inevitably involve audible coloration. The variations are fortunately not sharp or of a 'ringing' character, so are generally responsible for changing not completely spoiling things; even so...

The replay response looks like a mistake. Not so. The listening results confirm the measurements only too clearly, or rather muddily. The good news is the machine is

electrically quiet, and that wow and flutter levels are excellent, the spectrum analysis revealing just one significant flutter sideband.

SOUND QUALITY

I have to admit ending up a bit perplexed by this machine. In a lot of ways it seems that a great deal of effort has gone into building something good but to disappointingly little effect – the classic sledgehammer to crack a nut in fact. But the positive qualities of the deck are clear enough too.

Looked at as an object, the crowning glory of the deck is the massive and stable dual capstan transport. This mechanical integrity kind of infuses itself into the music, the outcome being a tremendous sense of solidity and stability. The word stability can mean several things; here it relates to the stability of centrally placed images, and the scale and stability of the whole soundstage. But also to the firmness and precision of pitch information, right down into the bass where cassettes traditionally become a bit vague. The deck also offered clarity and a real sense of power, particularly when recording on metal tapes with Dolby B. But prerecorded stuff was a dead loss.

CONCLUSIONS

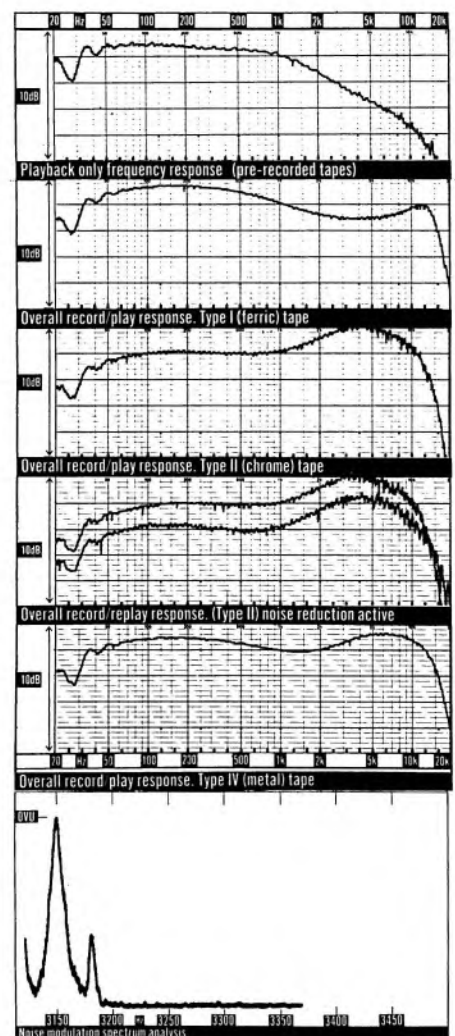
The poor playback response is undoubtedly correctable, and with a recorder of this type service backup should be readily available. The sound is very promising in many ways, but it *is* a bit of a dinosaur, isn't it?

TEST RESULTS

Rec/replay response – 3dB ref 1kHz	
IEC Type I	<20Hz – 19.5kHz
IEC Type II	<28Hz – 17.5kHz
IEC Type IV	<20Hz – 17.5kHz
Wow & Flutter – Peak DIN wtd/unwtd	0.094%/0.098%
Wow/Flutter Peak DIN wtd	0.078%/0.084%
Speed error	+0.13%
Type I signal/noise CCIR/ARM 315Hz distortion 0dB	50.5dB
Type II signal/noise CCIR/ARM 315Hz distortion 0dB	1.3%
Type IV signal/noise CCIR/ARM 315Hz distortion 0dB	54dB
Channel separation 0VU/1kHz	1.6%
Line input sensitivity/overload	57dB
Mic input sensitivity/overload	2.8%
Line output for 0dB/maximum	47dB
	12.6mV/0.7V*
	n/a
	715mV/4.9V**

IM distortion 1kHz, ref 10kHz/11kHz 0dB
Azimuth check R-L phase at 8kHz
VU indication at IEC 0dB
Dimensions (w x h x d)
Typical Retail Price
*variable; **fixed output; ***adjustable

4.2%
adjustable
0dB***
43.5 x 16.6 x 35cms
£1650



TEAC V-200

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



Teac have always concentrated on the budget end of the market, and this deck costs a mere £79.95, making it amongst the least expensive you can lay hands on.

At £80 you don't get fireworks. The transport controls are an old fashioned if practical set of power assisted piano keys. They wobble alarmingly, but they work, even allowing free movement from mode to mode without passing through stop. So the style of the deck is a bit agricultural, but is there anything so wrong with farming?

Facilities? Not really. You do get Dolby B, and tape type switching of the type that uses inscrutable permutations of two push buttons to cater for the three tape groups. Included is a mechanical tape counter, and around the rear DIN socketry parallels the phono sockets. The record level meters are very simple, with five active steps over a narrow 16dB range, plus a power status indicator misleadingly labelled 'infinity'.

The list of omissions includes a balance control, headphone and microphone socketry. There isn't even autostop on rewind or fast forward, which is practically prehistoric.

LAB REPORT

Noise modulation just scrapes an acceptable rating, though there is some highish mod noise around -23dB down between 20Hz-40Hz. Wow and flutter is poor, with prominent flutter components at -25dB, and a fair amount of audible wow below 7Hz.

IM distortion using the usual test is 10%, and harmonic distortion at 0VU is below 2% with a sufficiently good signal/noise ratio to make it practical to keep record levels well down. Still, this deck has a comparatively narrow working dynamic range, and as such is not well enough equipped to make much of metal tapes. The record/replay responses are almost a repeat run of some other Teac models, with Type II and IV tape being balanced to sound bright, and ferric Type I tape handled most neutrally of the lot. As you might have noticed though, nothing stirs below 80Hz. However, the playback only response is good, being essentially accurate through the midband with the -3dB point at 15kHz.

SOUND QUALITY

Forget the measurements, this deck works. Perhaps because it's so simple inside, the sound isn't as thoroughly processed as usual. Maybe there's another reason. Who knows?

It isn't a perfect recording machine. With ferric tapes it's inclined to sound 'woolly', and there are occasional traces of flutter and dropout. With higher bias tapes the sound comes to life, albeit with a tendency to compress and fall apart rather early at higher record levels. At other times the sound is a little jangly - incipient mistracking (I jest?) - but is otherwise surprisingly good. There is less midband, midlevel compression than usual and the soundstage remained surprisingly stable.

Transient edges are reproduced well, and the overall impression is that although this deck may not sound very expensive, it does sound fundamentally articulate, which is more than a lot of much more sophisticated decks can manage. The measurements indicate bass shortcomings, but in practice the main limitation was the waffly, blurred character that is frequently part of competing packages. Prerecorded material was handled every bit as impressively.

CONCLUSIONS

The V-200, as represented by our sample, offers real value for money. The only problems are that it looks cheap and nasty, and build quality really isn't up to much. The tape switching is obstructive and the metering scarcely less so. But the deck as a whole is open and honest, with less blurring of transients than usual.

TEST RESULTS

Rec/replay response - 3dB ref 1kHz	
IEC Type I	56Hz - 13kHz
IEC Type II	56Hz - 16kHz
IEC Type IV	54Hz - 16kHz
Wow & Flutter - Peak DIN wtd/unwtd	0.20%/0.40%
Speed error	+0.8%
Type I signal/noise CCIR/ARM 315Hz	53dB
distortion 0dB	0.9%
Type II signal/noise CCIR/ARM 315Hz	53dB
distortion 0dB	1.9%
Type IV signal/noise CCIR/ARM 315Hz	55dB
distortion 0dB	1.9%
Channel separation 0VU/1kHz	-45dB

Line input sensitivity/overload	91.5mV/>7V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	620mV/3.5V
IM distortion 1kHz, ref 10kHz/11kHz 0dB	10%
Azimuth check R-L phase at 8kHz	15 degrees
VU indication at IEC 0dB	+6dB
Dimensions (w x h x d)	43.5 x 12 x 21.5cm
Typical Retail Price	£80

Reprinted from issue No. 52



TEAC R515

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



Teac, who recently set up their own independent UK distribution company, manufacture three ranges of cassette decks. This £299 R-515 is from the middle of the range you might be able to afford. It is a full bi-directional deck, the auto-reverse mechanism featuring an optical leader detector for rapid side changeovers. It also boasts auto tape type sensing, and as you'd expect, noise reduction is courtesy of the standard Dolby B and C circuits (not dbx, as with some of the more costly Teacs). A fine bias control knob is fitted, and the MPX filter cannot be switched off.

Other features include an electronic tape counter with optional elapsed time readout, but rather surprisingly no counter memory. However, there is a phrase repeat feature which works in conjunction with 'start memo' and 'stop memo' keys. Finally, the headphone socket has its own dedicated volume control.

Build quality is a little below the best at the price, largely because some of the controls were heavy and even a little awkward, whilst the standard of fit and finish was only fair - I cite the record and record mute switches as examples here. The transport solenoids were also noisy (this isn't exactly unusual of course), but the deck operates smoothly and quietly when running, and the displays give no cause for complaint.

LAB REPORT

No wild enthusiasm is in order for the lab test results, but the deck has its high points. A case in point is wow and flutter, which is high when in reverse gear, though for some reason best known to itself the flutter component actually dropped in this direction.

Neither chrome nor metal tapes can be driven much beyond 0VU on the meters, and the 55dB measured signal/noise (CCIR/ARM) is about all you can expect, prior to Dolby anyway. Ferric tapes end up giving the same kind of numbers. IM distortion is low around the 0VU point, so the electronics at least are clean.

Note the erratic frequency response traces, which are all dished to a greater or lesser extent at both ends of the audio frequency spectrum. This bias control is a blessing in disguise with this machine. However,

deep bass rolloff is premature, probably due to head deficiencies. In contrast, no criticism can be made of the replay only response shape.

SOUND QUALITY

This deck sounded like just another auto-reverse deck. It worked reliably, and in audio terms self-effacingly, with little obvious to complain of, but little to excite either. At £200 or so it would have been a snip, but at just short of £300, it is matched or bettered by a number of others.

Although capable of making very good recordings, the deck persistently sounded grubby in the treble and muddled when things became loud or complex. The incomparable weight and sheer penetrating power of a Bosendorfer played *forte* was lost, and the fine harmonic structure of individual instruments on a range of high quality recordings was suppressed. Pitch accuracy, however, was quite acceptable, and with suitable tweaking of the bias control all tape types were at least capable of making tonally accurate and precise sounding recordings.

CONCLUSIONS

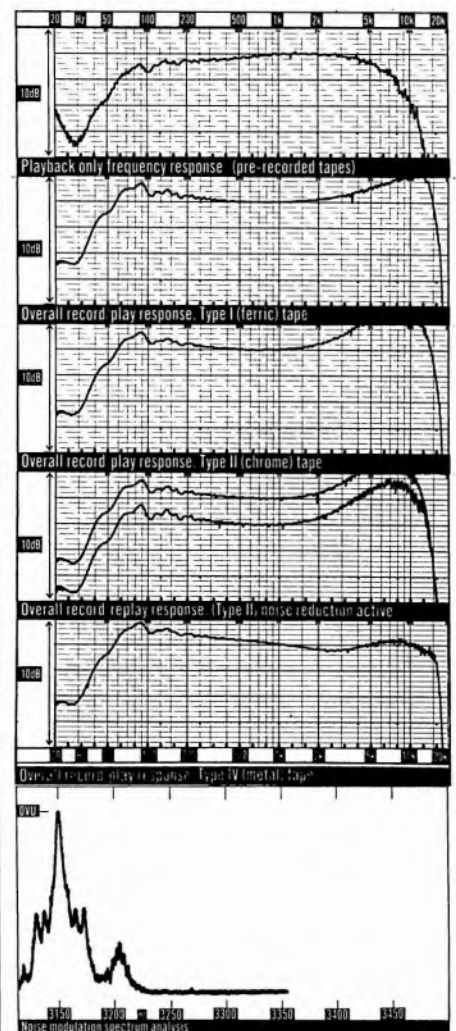
This is an average standard auto-reverse recorder with good ergonomics and build, and a good but not particularly exciting sound quality. On balance, the price seems slightly ambitious.

TEST RESULTS

Rec/replay response -3dB ref 1kHz	
IEC Type I	36Hz - 16.5kHz
IEC Type II	36Hz - 16kHz
IEC Type IV	36Hz - 16.5kHz
Wow & Flutter - Peak DIN wtd/unwtd	F=0.12%/0.19% R=0.27%/0.32%*
Wow/Flutter Peak DIN wtd	F=0.09%/0.17% R=0.16%/0.13%*
Speed error	0.25%
Type I signal/noise CCIR/ARM 315Hz	51.5dB
distortion 0dB	0.7%
Type II signal/noise CCIR/ARM 315Hz	55dB
distortion 0dB	2.0%
Type IV signal/noise CCIR/ARM 315Hz	55dB
distortion 0dB	1.7%
Channel separation 0VU/1kHz	50dB
Line input sensitivity/overload	100mV/>7V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	537mV/3.78V
IM distortion 1kHz, ref 10kHz/11kHz 0dB	0.47%

Azimuth check R-L phase at 8kHz
VU indication at IEC 0dB
Dimensions (w x h x d)
Typical Retail Price
F=forward direction; R=reverse direction

34 degrees
+3dB
43.5 x 10.9 x 29.5cms
£299



TEAC V970X

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



Teac's generously endowed £500 V970X has three heads, Dolby B, C and dbx (each doubled for real-time off-tape monitoring of the decoded signal), switching for the MPX filter, and Dolby HX Pro headroom expansion besides. The meters cover a 32dB range, and the electronic tape counter has an elapsed time mode. A variety of programme search modes are available, including intro scan, random block repeat (*ie* the end markers can be placed arbitrarily), and random track search (*eg* the fifth from the start of the tape). The headphone socket has variable output level, and the deck is even supplied with an infra-red remote control.

Mechanically this is no less elaborate a machine. It has three motors and a dual capstan cassette mechanism. The tape/source monitor mode is selected automatically, with override of course for quality checks when recording.

The high point of the Teac is perhaps the tape alignment facility, which optimises record bias and sensitivity. Although not fully automatic, it is very easily and rapidly accomplished, though not wonderfully accurate, as the metal plot in particular demonstrates. The Teac also features a CD level setting procedure which is supposed to assist when setting levels for CD dubbing, which hardly seems worth the effort.

The dbx feature is self-recommending for those who own dbx discs (does anyone own dbx discs?), and is great for those who measure sound quality in decibels. But dbx is a highly manipulative process...

LAB REPORT

With or without bias adjustment, the test tapes were all variously underbiased – a small amount with ferric tape, but substantially so with Type IV metals. The key feature to note is not necessarily the rise in the treble so much as the loss of output around 2kHz compared to the average level below 1kHz, which will affect perceived tonal quality. Dolby tracking was fair, but dbx exaggerated nonlinearities ruthlessly.

Working dynamic range is extremely wide, on all three tape types. Wow and flutter levels are equally impressive, no matter how they were checked out. However, the mea-

surement programme did show up a significant azimuth error (see test results).

SOUND QUALITY

dbx did unspeakable things to the sound, the varying strands of music seemingly coagulating and emerging in oddly rearranged proportions. Soundstage stability also went to pot. It's so clear – how could Teac have persisted with its inclusion? Dolby C sounded infinitely better, though perceptibly damped. Dolby B sounded altogether sharper and livelier, and restored most of the delicate but important minor detail that helps mark out such subtle information as the limits of the soundstage and the exact character of the instruments and voices.

The 970X can in fact be used quite successfully without noise reduction, but not too much is lost with Dolby B. It is then revealed as a cultured and sophisticated performer, with vastly better sonics than its cheaper R-515 stablemate. Chrome tapes (aligned by ear, which is easier to do than it sounds) seemed best equipped of all to exploit this Teac's talents.

CONCLUSIONS

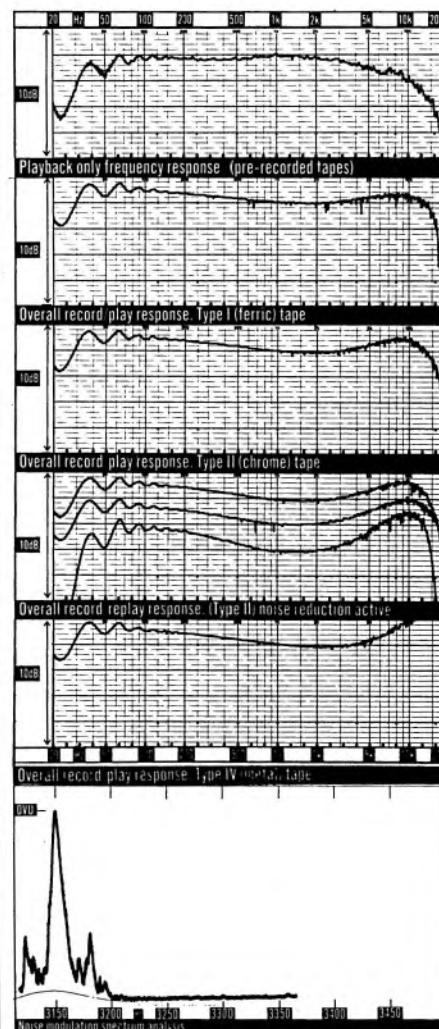
The features are aimed at the audiophile rather than the inveterate button pusher. The electronics are evidently of as high a standard as the transport, and all these things come together to result in a machine with real class.

TEST RESULTS

Rec/replay response –3dB ref 1kHz	
IEC Type I	<20Hz – 16.5kHz
IEC Type II	<20Hz – 17.5kHz
IEC Type IV	<20Hz – 22kHz
Wow & Flutter – Peak DIN wtd/unwtd	0.07%/0.11%
Wow/Flutter Peak DIN wtd	0.062%/0.10%
Speed error	+ 0.10%
Type I signal/noise CCIR/ARM 315Hz	53dB
distortion 0dB	0.65%
Type II signal/noise CCIR/ARM 315Hz	57dB
distortion 0dB	1.3%
Type IV signal/noise CCIR/ARM 315Hz	54.5dB
distortion 0dB	1.2%
Channel separation 0VU/1kHz	47.5dB
Line input sensitivity/overload	125mV/>7V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	541mV/3.1V
TH distortion 1kHz, ref 10kHz/11kHz 0dB	0.28%
Azimuth check R-L phase at 8kHz	40 degrees

VU indication at IEC 0dB
Dimensions (w x h x d)
Typical Retail Price

2dB
43.5 x 12.4 x 28cms
£499



TECHNICS RS-B305

PANASONIC (UK) LTD., 300-318 BATH ROAD, SLOUGH, BERKS SL1 6JB. TEL: (0753) 34522.

RECOMMENDED



Whilst standing clear of the truly low cost end of the market, the *RS-B305* gives a taste of what a sensibly engineered few-frills cassette deck can be like.

Light-touch powered transport keys include one that mutes the record circuitry for four seconds before switching to record standby. The input level arrangements consist of separate rotary level and balance controls; stereo stability during fades therefore depends entirely on the channel tracking integrity of the pot, which was OK. Crude 5-stage record level meters have coarse 5dB steps below 0VU, and 3dB steps above indicated in a different colour.

A vertical row of press buttons adjusts the recorder for the three tape types, but it would have been better had this been automatic; cheaper too, probably. Dolby B and C noise reduction are selected using an awkward twin switch configuration.

Other features include a simple mechanical tape counter, a timer switcher (record or play) and socketry for headphones and two microphones. The headphone outlet is at a fixed level and is best suited to moderate or low impedance cans. The transport logic control is extremely effective in all modes, and the transport itself is a relatively sophisticated two motor type with separate drive to the reels and the capstan/pinch roller.

LAB REPORT

There was some HF loss replaying prerecorded tapes (-3dB at 11kHz), much of which is due to an azimuth error calculated at around 19 degrees. The measured record/replay responses, however, were excellent on IEC Type I and II tapes, with virtually no Dolby tracking errors evident; the slightly truncated HF responses are due to the non-defeatable MPX filtering. The IEC Type IV (metal) response shape indicates very mild underbiasing.

This deck is on strong ground mechanically. Wow and flutter measures well, and spectrum analysis shows that frequency components are particularly low in level, a sure sign of a basically sound tape path design. Distortion levels are also satisfactory, and electrically the Technics seems quite clean. With better azimuth alignment back at the

factory, this deck could be above easy criticism.

Recording levels can be allowed to stray several dB over 0VU (by about 3dB-5dB for each tape type) without fear of severe compression or distortion.

SOUND QUALITY

In a word, and taking cost into the equation, the *305* sounded excellent. Even the audio amplifiers fitted are of good basic sound quality.

Notwithstanding the slightly poorer measured Type IV performance, it was with metal tapes that the Technics sounded at its most convincing. The strongest points were fortuitously in just those areas where inexpensive cassette decks most often come adrift. The *305* had a quality of solidity and stability in its music making, a sureness of pitch in the bass and an absence of flutter-related problems that was most welcome.

However, recordings made on Type I and II tapes sounded mildly flattened both dynamically and spatially: Type IV sound quality was simply livelier and more realistic.

There was relatively little loss of resolution with Dolby C switched in, though where noise was well masked by the music, non Dolby recordings sounded better still.

CONCLUSIONS

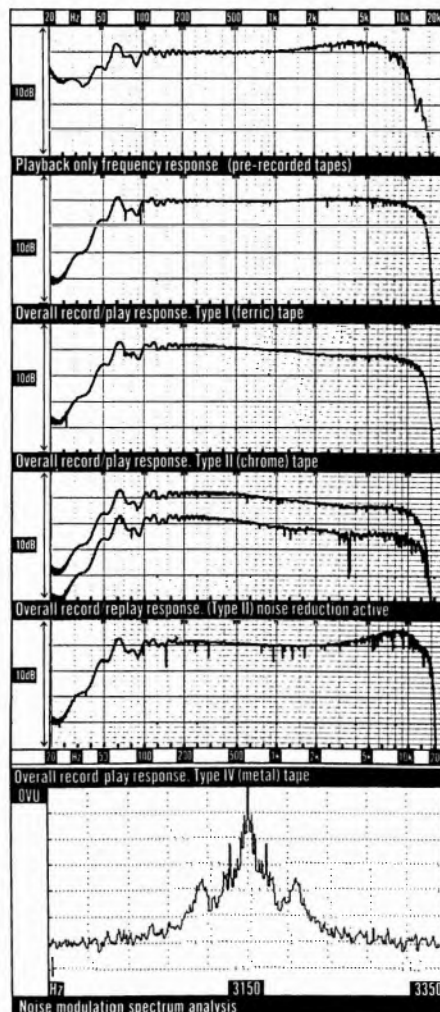
This is an excellent deck, well worth the price premium over the true budget price models for its stable build and sound quality.

TEST RESULTS

Rec/replay response - 3dB ref 1kHz	
IEC Type I	40Hz - 15kHz
IEC Type II	40kHz - 14kHz
IEC Type IV	40kHz - 16kHz
Wow & Flutter - Peak DIN wtd/unwtd	0.075%/0.27%
Speed error	-0.3%
Type I signal/noise CCIR/ARM 315Hz	48dB
distortion 0dB	0.6%
Type II signal/noise CCIR/ARM 315Hz	50.5dB
distortion 0dB	0.6%
Type IV signal/noise CCIR/ARM 315Hz	51.0dB
distortion 0dB	0.8%
Channel separation 0VU/1kHz	-49.5dB
Line input sensitivity/overload	650mV/>7V
Mic input sensitivity/overload	0.66mV/225mV
Line output for 0dB/maximum	650mV/2.25V
IM distortion 1kHz, ref 10kHz/11kHz 0dB	0.18%
Azimuth check R-L phase at 8kHz	+31 degrees

VU indication at IEC 0dB
Dimensions (w x h x d)
Typical Retail Price
Reprinted from issue No. 52

+3dB
43 x 10.2 x 23.7cms
£139.95



“Very singular behaviour!”

Remarked Sir Arthur, clasping a hand to his injured ear. . .

Call that music he shouted, it's a complete travesty of what the composer was trying to achieve . . .” and then his voice drifted off as he mumbled incoherently to himself . . .

Regaining his composure he apologised to the unfortunate couple who for weeks had endured the appalling sound which he had barely been able to tolerate for less than five minutes. His apologies were accepted but none the less Sir Arthur was perplexed by their reaction to his uncharacteristic outburst. It quickly became apparent that the unfortunate couple had tried in vain to explain to the anonymous (and misguided) retailer responsible for this fiasco that the sound was not to their liking – at all. Sir Arthur had been the first audio consultant to have actually agreed with their view and been sympathetic to their plight.

It wasn't so much that the equipment they had purchased was bad, more that it was not appropriate for their musical tastes and room acoustics.

Sir Arthur having now grasped the situation invited the couple to visit his demonstration studios the following Wednesday evening. Help was at last at hand.

Having weighed up the various factors, not the least of which was cost, our hero assembled a seemingly modest system (when judged by the absence of superfluous knobs, levers and lights) comprising of an ORACLE turntable, AIR TANGENT tonearm & KOETSU RED cartridge which passed a near perfect signal through to the remarkable AUDIO RESEARCH SP9 pre-amp. Via carefully chosen cable, the signal then passed through KRELL amplification (inevitable really) into the SONUS FABER speakers. Naturally Pi stands were in use.

Calm and quietly confident, Sir Arthur waited. The couple arrived early (such was their enthusiasm). Sir Arthur much to his surprise, discovered that within fifteen minutes they were asking when the system could be intalled, but he was not complacent and was surprisingly reluctant to accept the order because . . .

Ever cautious and vigilant, Sir Arthur insisted that more and more records be played in a vain effort to tease out any inconsistencies or inadequacies that might detract from 100% customer satisfaction. There were none. Fully confident, only then did he proceed with the sale.

Installation was completed on time and without mishap – as was the norm.

Soon after installation, he received written confirmation from the couple indicating quite clearly that he had succeeded fully in meeting their audio needs. Furthermore, their perception of recorded music in particular and quality of life in general (such was the

importance of music in their lives), had markedly improved. Sir Arthur paused to reflect how best he could meet the needs of another visitor with a completely different criteria . . .

Sir Arthur felt confident that Absolute Sounds equipment (once again) would provide the answer, but was uncertain at that stage whether APOGEE SCINTILLAS or MAGNEPLANAR TYMPANIES would be the chosen speakers. But having both of them on demonstration, he felt confident that the customer would be able to decide.

More certain however was that amplification would be KRELL or AUDIO RESEARCH or a combination of the two. Whilst ruminating on the possible course of events that afternoon, Sir Arthur unpacked the KINERGETICS CD player . . .

A thought crossed his mind – would he ever really find out how it was that Absolute Sounds always had so many musically extraordinary items which he could offer to his visitors. And as the MICRO-SEKI CD player's enormous weight caused his back to twinge, he wondered (out loud this time) why their equipment had to be so damn heavy . . .



Subjective Audio have an unrivalled range of the World's finest audio equipment available. Apart from being Europe's Number One Krell dealer, just look at what else we can demonstrate.

Demonstrations are restricted to just four a day, so if you wish to audition equipment of which dreams are made, please contact any of our experienced sales personnel on these numbers: 01-886 2650 or 01-882 4975.

Written Credit quotation available upon request.

Home demonstration facility

Installation facility

Part Exchange opportunities

All major credit cards accepted

Closed Sunday & Monday

Open 10am till late – daily – by appointment



Full export facilities available
Demonstrations by appointment only

01-886 2650 and 01-882 4975

Telex 895 1182 GECOMS G Fax 01-318 1438

Subjective Audio Ltd. FREEPOST, London, N13 5BR

AVAILABLE FOR AUDITION (BY APPOINTMENT ONLY) THE WORLD'S FINEST EQUIPMENT – AT BRITAIN'S MOST PROFESSIONAL DEALER.

Audio Research	SP11	M/300
	SP9	D/250
	SP10	
	Look out for the D/125 and the other fabulous new models – soon.	
Air Tangent	Mk2 Tone Arm	
	Apogee	
	Divina	
	Scintilla	
Goldmund	Caliper	
	Electronic crossovers	
	Studio deck & T3F arm	
	Koetsu	
Krell	Black K	
	Red	
	Red Signature	
	KSA/80	PAM 7
Magneplanar	KSA/160	KRS/2
	KSA/200	
	Look out for the fabulous new range coming soon at their No 1 dealer.	
	MG3/A	Tympani 4A
Micro-Seki	MG2/C	SMG/A
	MG2.5	MG1/C
	CD-M2 C/D Player	
	Oracle	Delphi Mk 3
Sonus Faber	Electra	
	P.S. Audio	
	4.5 Pre Amp	

TECHNICS RS-B505

PANASONIC (UK) LTD., 300-318 BATH ROAD, SLOUGH, BERKS SL1 6JB. TEL: (0753) 34522.



Technics have been hinting broadly that they would adopt the Dolby *HX Pro* headroom expansion system for at least two years. Now at last they've done so, and the *RS-B505* is the cheapest in a range of decks which feature the system.

The *505* is not typical of budget (all right, near-budget) cassette decks generally, but as expected it benefits from Technics' apparent inability to make their cheaper products look or feel cheap. Dressed in the usual house livery (chocolate with gold lettering), the standard of fit and finish is very high, though styling is not entirely free from the rather fussy awkwardness typical of this kind of product.

Features include a fully logic controlled set of transport keys, arranged neatly in a single row and including an auto record mute facility (there's no track search feature though), and a one finger, two action record start. The meters are simple (five step, only 16dB range) and the tape counter is electronic. Other facilities include automatic tape type recognition, cue and review, and microphone inputs. Noise reduction by Dolby B and C as usual. Tell-tales are provided for play and record, to show the tape type inserted and the noise reduction system currently active.

The *505* is a pleasure to use, well laid out and has well considered ergonomics – one strong point being the separate input level and balance controls, facilitating balanced stereo fades. Finally, the transport controls engage and disengage quite quietly.

LAB REPORT

The noise modulation spectrum analysis is very impressive for a player at this price level, so although the measured levels of wow and flutter (flutter especially) are not all that low, the pitch centre is very sharply defined and there are few obvious discrete flutter sidebands. A case then of never mind the measurements, look at what lies behind them.

The various frequency responses are tolerably well engineered, although metal tapes reproduce with a good deal of excess treble energy. Dolby tracking is excellent – there's no detectable modification of the inherent

response at all with the test tapes. However, prerecorded material reproduced with significant treble losses. The various noise and distortion results were satisfactory.

SOUND QUALITY

Numbers notwithstanding, there were quite severe quality losses with noise reduction engaged. The sound picture was sapped of energy and vitality, especially with lower bias tapes (*HX Pro* notwithstanding), yet there wasn't really enough headroom in the system to justify Dolby-less recording for most of the time. The Dolby B setting probably represents the optimum compromise between noise and fidelity.

That aside, the *505* has a strong, well characterised sound that eschews vagueness and uncertainty in favour of something stronger and better defined. Pitch stability is good, the bass was reasonably firm and articulate, and stereo image quality, that most ethereal of attributes, was quite satisfying. By budget standards this is a fine recorder, but there was a certain coarseness of tone (a side effect of the flutter?) especially with metal tapes, that illustrates why it is worthwhile paying more if possible.

CONCLUSIONS

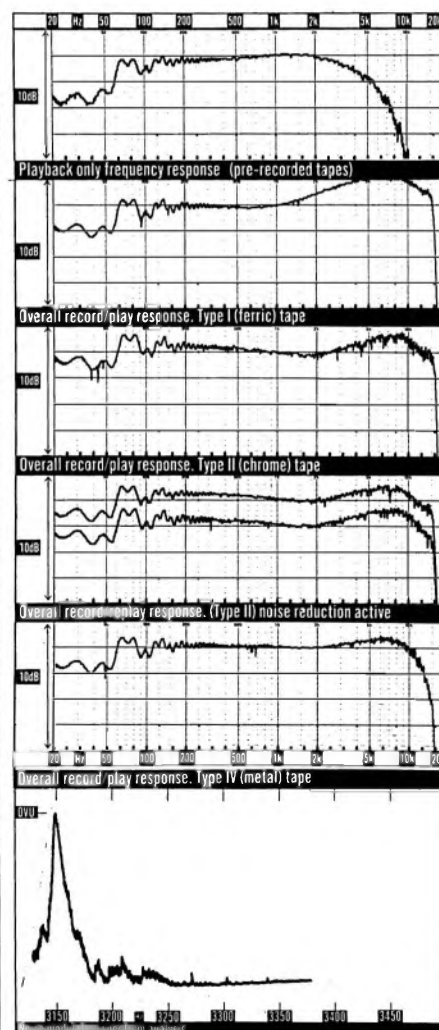
This is a good £160's worth – well screwed together, well equipped where it counts (and not where it doesn't), and presentable sonically besides.

TEST RESULTS

Rec/replay response – 3dB ref 1kHz	
IEC Type I	<20Hz – 16kHz
IEC Type II	<20Hz – 16kHz
IEC Type IV	<20Hz – 14kHz
Wow & Flutter – Peak DIN wtd/unwtd	0.18%/0.22%
Wow/Flutter Peak DIN wtd	0.11%/0.58%
Speed error	+0.18%
Type I signal/noise CCIR/ARM 315Hz	48dB
distortion 0dB	0.7%
Type II signal/noise CCIR/ARM 315Hz	51dB
distortion 0dB	1.6%
Type IV signal/noise CCIR/ARM 315Hz	51dB
distortion 0dB	1.3%
Channel separation 0VU/1kHz	48dB
Line input sensitivity/overload	130mV/>7V
Mic input sensitivity/overload	0.40mV/27mV
Line output for 0dB/maximum	639mV/3.4V
IM distortion 1kHz, ref 10kHz/11kHz 0dB	0.91%
Azimuth check R-L phase at 8kHz	10 degrees

VU indication at IEC 0dB
Dimensions (w x h x d)
Typical Retail Price

+ 3dB
43 x 11.5 x 24.8cms
£160



TECHNICS RS-B605

PANASONIC (UK) LTD., 300-318 BATH ROAD, SLOUGH, BERKS SL1 6JB. TEL: (0753) 34522.



This is another new modestly priced Technics model – a kind of *RS-B505* plus. The main plus is dbx noise reduction, which joins Dolby B and C. dbx is the most powerful hiss reduction system in domestic use, and has the great advantage over Dolby that the system doesn't require re-calibrating for different tape sensitivities. Record/replay integrity is therefore very robust, though it does magnify existing errors (see later). However, the sheer power of the system creates its own problems. The irony is that the lower the intrinsic noise of a tape recording system, the less audible the side effects of dbx – but the less important it becomes. And compact cassettes are of course amongst the noisiest of all tape media in common use.

The rest of the story is that this is a basic enough 2-head deck but with much better meters than those of the *505*. These read over a 58dB dynamic range (up to +18dB!), and incorporate a peak hold feature. But the rest is pure *505*. Tape type recognition is automatic, and the transport is fully logic interfaced, relatively quiet acting, and would be a credit to some much more expensive machinery. The electronic tape counter incorporates a tape running indicator, but unfortunately no counter memory feature. Microphones may be used directly.

LAB REPORT

Speed stability was satisfactory and the noise modulation spectrum analysis was clean – a feature shared with the other new Technics players. The wow contribution in particular was very low.

The three main record/replay frequency responses were very accurately engineered. The Dolby responses were also near optimum, except that high frequencies were generally depressed, which showed up as compression in the listening tests. Note the way the low frequency head contour effects are exaggerated by the action of dbx; unlike Dolby, dbx is a wideband signal compander system.

SOUND QUALITY

The electronics do not sound especially transparent, and impose a mild 'dampening' effect on the sound. That apart, this deck was

mostly good news. It sounded cleaner and sharper with metal and (to a lesser extent) chrome bias tapes than with ferrics – which is mildly surprising as Dolby *HX Pro* is particularly designed to help eliminate the self-biasing problem with low bias tapes. These tapes also suffered significantly with Dolby C switched in (the effect with B was less marked), but the deterioration was reduced with metal tapes, where the underlying positiveness and stability of the design shone through.

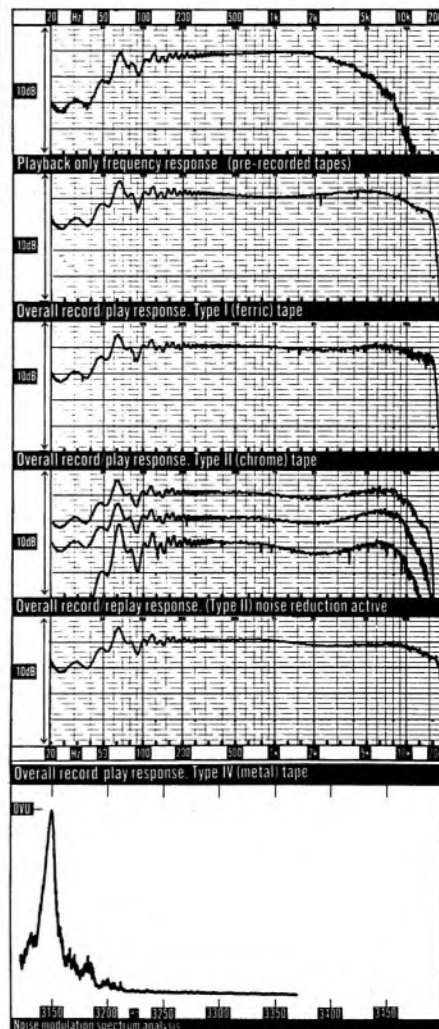
The dbx installation was basically good, in that intrinsic noise was low and the system was well adjusted. But there was still a loss of air and space, and the 'breathing', noise-burst effect behind notes was occasionally audible, especially with relatively open solo piano and chamber music. Undoubtedly dbx is inferior to Dolby C, in the sense that it is more manipulative and degrades the sound further. Regrettably, prerecorded tapes sounded just as dull as the measurements might lead you to expect.

CONCLUSIONS

This is a good deck, which is rather better set up than the cheaper *RS-B505*, and marginally tidier sounding as a result. The extra cost is also partly justified by the better record level meters, and a subjectively slightly wider dynamic range, though not by the dbx circuit.

TEST RESULTS

Rec/replay response – 3dB ref 1kHz	
IEC Type I	<20Hz – 16kHz
IEC Type II	<20Hz – 16.5kHz
IEC Type IV	<20Hz – 16.5kHz
Wow & Flutter – Peak DIN wtd/unwtd	0.10%/0.14%
Wow/Flutter Peak DIN wtd	0.066%/0.15%
Speed error	+0.1%
Type I signal/noise CCIR/ARM 315Hz distortion 0dB	48dB
Type II signal/noise CCIR/ARM 315Hz distortion 0dB	0.7%
Type IV signal/noise CCIR/ARM 315Hz distortion 0dB	51dB
Type I signal/noise CCIR/ARM 315Hz distortion 0dB	1.0%
Type II signal/noise CCIR/ARM 315Hz distortion 0dB	49.5dB
Type IV signal/noise CCIR/ARM 315Hz distortion 0dB	0.8%
Channel separation DVU/1kHz	47dB
Line input sensitivity/overload	137mV/>7V
Mic input sensitivity/overload	0.43mV/26mV
Line output for 0dB/maximum	642mV/31V
IM distortion 1kHz, ref 10kHz/11kHz 0dB	2.2%
Azimuth check R-L phase at 8kHz	0 degrees
VU indication at IEC 0dB	4dB
Dimensions (w x h x d)	43 x 11.5 x 28.7cms
Typical Retail Price	£179.95



TECHNICS RS-B905

PANASONIC (UK) LTD., 300-318 BATH ROAD, SLOUGH, BERKS SL1 6JB. TEL: (0753) 34522.



Styled and finished in keeping with other Technics models, the *RS-B905* is an all-singing model which features three heads (for full off-tape monitoring) and a twin capstan transport. Of course it also has the key features of the cheaper models, which include dbx in addition to Dolby B and C noise reduction, and the Dolby *HX Pro* head-room expansion system. Auto tape type recognition, wide ranging (58dB) peak hold meters and an electronic tape counter are also included.

Then there is a host of minor and not so minor extras, such as variable bias and sensitivity (for Dolby record/playback integrity), a volume control associated with the headphone socket, audible cueing, MPX switching, repeat and automatic source/tape switchover with manual override. On the other hand microphone inputs have been ditched – not inappropriately with a deck of these pretensions, though perhaps inconveniently for some users. The deck also has a track search feature but no counter memory. It is well finished and operates slickly, though wind operations are mechanically noisy.

LAB REPORT

The *905* has wide, smooth frequency responses, which can be tuned arbitrarily and easily flat as required. Head contour bass effects were restrained, and Dolby tracking also gives no cause for complaint. Not so with dbx, however – note the dished response sweep.

Wow and flutter are adequately low, with virtually no discrete frequencies apparent in the spectrum analysis, and low levels of wow in particular. The deck has a quite wide operating dynamic range – a prerequisite for it to be used without noise reduction. The playback only frequency response was 3dB down at 10kHz, which is not disastrous with much material, but isn't accurate either, and does take the edge off the sound, blunting the impact.

SOUND QUALITY

I have to confess to a mild sense of disappointment with the sound of this recorder. Although significantly better than either the

RS-B505 or *605*, the audible differences hardly seem to justify the hefty price premium involved. The slight 'dampening' effects noted on cheaper Technics models were equally apparent here, especially with lower bias tapes and in particular when using the more powerful noise reduction systems. dbx cannot be recommended for quality sensitive purposes, sounding constrained and uneven with a more obvious dulling effect than Dolby C; the extra few dB of hiss reduction is pure specmanship, especially as noise pumping is often perfectly audible.

Compared with the cheaper Technics models, the bass did sound cleaner, fuller and (most important of all) less 'boomy'. And there were suggestions too of a cleaner treble. Certainly tapes that elsewhere suffered dropout seemed magically cured here, so the dual capstan transport mechanism is obviously doing its job well. Moreover, pre-recorded material was also a little livelier, though still not up to par. Otherwise the story is much as with the *505* and *605*.

CONCLUSIONS

Again, dbx comes across as an unnecessary extravagance that pays no real dividends. The transport is excellent, however, and the deck sounds clean and potent, albeit mildly restrained by the best standards at this price.

TEST RESULTS

Rec/replay response –3dB ref 1kHz	
IEC Type I	27Hz – 16kHz
IEC Type II	26Hz – 18kHz
IEC Type IV	26Hz – 23kHz
Wow & Flutter – Peak DIN wtd/unwtd	
	0.10%/0.13%
Wow/Flutter Peak DIN wtd	
	0.09%/0.098%
Speed error	
	+0.18%
Type I signal/noise CCIR/ARM 315Hz	
	49dB
distortion 0dB	
	0.65%
Type II signal/noise CCIR/ARM 315Hz	
	52dB
distortion 0dB	
	0.9%
Type IV signal/noise CCIR/ARM 315Hz	
	51dB
distortion 0dB	
	0.7%
Channel separation 0VU/1kHz	
	49dB
Line input sensitivity/overload	
	104mV/>7V
Mic input sensitivity/overload	
	n/a
Line output for 0dB/maximum	
	624mV/2.8V
IM distortion 1kHz, ref 10kHz/11kHz 0dB	
	0.63%
Azimuth check R-L phase at 8kHz	
	80 degrees
VU indication at IEC 0dB	
	+4dB
Dimensions (w x h x d)	
	43 x 11 x 28.5cm
Typical Retail Price	
	£349.95



YAMAHA KX-200

YAMAHA HOUSE, 200 RICKMANSWORTH ROAD, WATFORD, HERTS WD1 7JS. TEL: (0923) 33166.



Although the *KX-200* is constructed to an adequate commercial standard, and although the transport works with acceptable levels of smoothness and finesse, there is no excess of build quality over what is basically necessary. The controls and displays are grouped according to function, and the deck is undoubtedly workmanlike.

The *KX-200* is a unidirectional deck with two heads and two motors – one for the reels, the other the capstan. Noise reduction is courtesy of the ubiquitous Dolby B and C. Headphones are fed at fixed level, but microphones are not accepted. The record level meters have five active steps, plus one which is permanently lit.

Although basically straightforward, the *KX-200* is well equipped, and includes track search, intro scan, automatic 4 second mutes at the press of a button, a repeat mode that will either repeat complete sides or between two previously set markers, and automatic tape type recognition. One unusual provision is a socket for an optional infra-red remote control.

Recordings may be started with one finger though you might have more trouble doing a fade with the twin rotary input pots, and pause only operates in the record mode. One nice touch: if you stop a recording by using the rewind button, the deck rewinds only to the start of that recording, and is therefore either ready to start over again or replay what has just been recorded. The deck also handles 'punch in' recording by holding the play button in and pressing record/pause.

LAB REPORT

Both metal and chrome tapes (Types IV and II) are a little underbiased on this machine, which in the case of the IEC Type II leads to a substantial response lift centred on 5kHz, but starting below 2kHz. The bass lift around 50Hz is also unusual, and is of course substantially independent of tape type. The replay only trace shows a typical Yamaha characteristic: slightly bright in the mid treble.

The *KX-200* is a little noisy, but well behaved. The noise spectrogram shows that it has a good stab at the pitch centre, with the main sideband shoulders a satisfactorily low

–40dB. Wow and flutter measures rather high at 0.12% weighted; this is explained by the 50Hz fluttergram which shows –30dB harmonic flutter components at 30Hz and 40Hz. However, the overall base level of this speed instability analysis is quite low.

SOUND QUALITY

At its price, the Yamaha proved excellent bordering on exceptional. The basic electronics monitored *via* the system amplifiers (for example whilst making a recording) sound surprisingly un-electronic and un-processed in character. Sound quality from pre-recorded tapes was most satisfactory.

Much the same holds for recordings made on this deck. On the negative side there is a tendency to flatten imagery, the sound is a little soft and wayward at times, and is also surprisingly lacking in bass weight and impact, though the quality of the bass that remains is quite good. What impresses however, is the clean, open mid and top end.

In this instance, somewhat unusually, Type I and IV tapes provide the best match overall – the latter preferable for the utmost clarity and precision (at the cost of a little steeliness). Most good chrome bias tapes simply sound harsh.

CONCLUSIONS

Cheap, well equipped and workmanlike, sound quality is less obviously processed than usual, and altogether this is one of those decks where the whole is more than the sum of the parts.

TEST RESULTS

Rec/replay response – 3dB ref 1kHz	
IEC Type I	<20Hz – 17kHz
IEC Type II	<20Hz – 17kHz
IEC Type IV	<20Hz – 17kHz
Wow & Flutter – Peak DIN wtd/unwtd	0.12%/0.31%
Speed error	+0.4%
Type I signal/noise CCIR/ARM 315Hz	48dB
distortion 0dB	0.85%
Type II signal/noise CCIR/ARM 315Hz	49.5dB
distortion 0dB	1.4%
Type IV signal/noise CCIR/ARM 315Hz	51dB
distortion 0dB	1.5%
Channel separation OVV/1kHz	48dB
Line input sensitivity/overload	80mV/>7V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	538mV/2.83V
IM distortion 1kHz, ref 10kHz/11kHz 0dB	3.2%

Azimuth check R-L phase at 8kHz

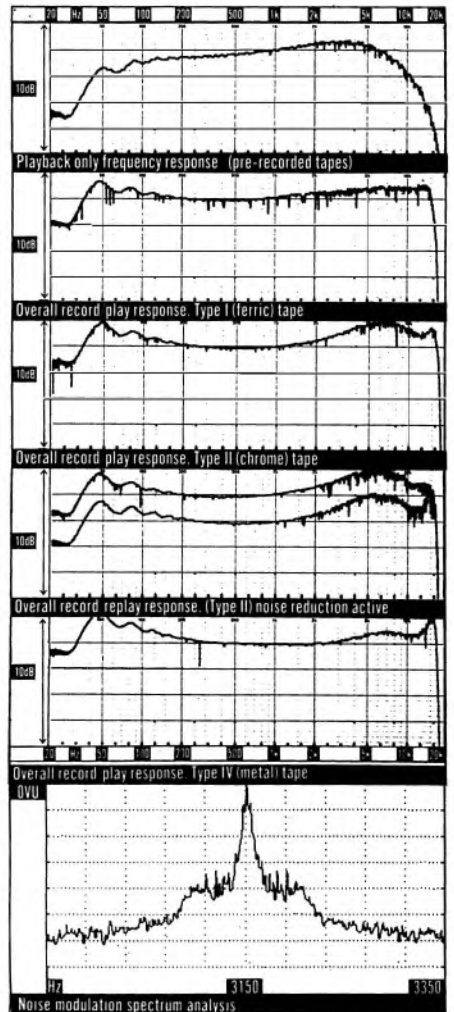
VU indication at IEC 0dB

Dimensions (w x h x d)

Typical Retail Price

Reprinted from issue No. 52

+ 10 degrees
+ 6dB
43.5 x 11.2 x 27.2cms
£140



YAMAHA KX-300

YAMAHA HOUSE, 200 RICKMANSWORTH ROAD, WATFORD, HERTS WD1 7JS. TEL: (0923) 33166.



Yamaha are amongst the first to recognise that not only CD player users like remote control. The *KX-300* is available with an optional infra-red remote control handset, which provides access to the main transport functions and record mode for under £15. Another quite unexpected innovation is a 'play trim' control which adjusts the playback equalisation, so that tapes recorded elsewhere can be made to 'fit' this deck and therefore play without Dolby mistracking; the adjustment is made by ear.

The *KX-300* has automatic tape type selection, Dolby B, C (with switchable MPX) and Dolby *HX Pro*, bias adjust and bi-directional intro scan, not to mention next/current track search. The meters cover a 26dB range in 7 steps. Other such features include auto-return following record, and side phrase repeat.

The deck is fitted with an amorphous record/playback head wired with LC-OFC coils. Overall build quality is typical of low and middle price Yamaha units, which means acceptable at the price. Control dispositions are well organised on the whole, and the deck is easy to use; panel graphics offer low contrast and could prove hard to decipher.

LAB REPORT

With IEC 0dB corresponding to +6dB on the recorder's meters, the *KX-300* does well to achieve the signal/noise figures measured, especially with chrome and metal tapes. Not surprisingly the 0VU distortion figures are low, and tapes can be safely over-driven by a dB or three on the meter reading.

The other characteristics are less wonderful. The response plots are dished, though mid/top balance can be adjusted with the bias adjust control. Dolby merely exaggerates the existing perceived bright, edgy and (in the case of Dolby C) rather 'splashy' balance. On the other hand the playback response was excellent when adjusted with the 'play trim' knob. (The plot shown is the best achievable.) Measured speed stability is about par for the course.

SOUND QUALITY

The recorder wasn't outstandingly successful on a number of counts, the main one being

that music sounded synthetic and manipulated in the final analysis. This was partly because it dissipated some of the temporal clues within a shallow, ill-defined bass, and a vague and imprecise sensation of pitch. Otherwise there was nothing to put a finger on, just a residual feeling that all wasn't as it should be.

High frequencies sounded OK (except at very high levels with metal tapes where the sound tended to clip prematurely), but the resulting overall balance tended to appear rather colourless and lacking in dynamics. Depth imagery also suffered, and the deck sounded none too precise laterally either.

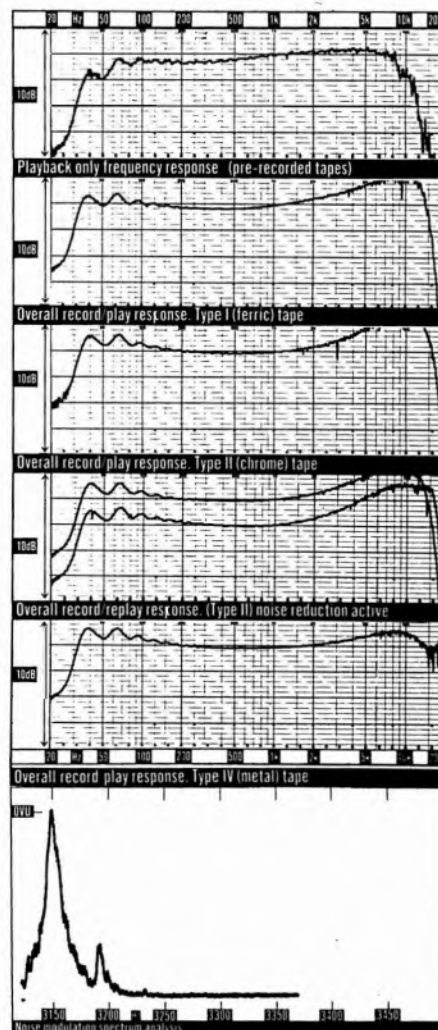
Headroom problems aside, Type IV metals made more believable and positive noises than the rest. Pre-recorded material reproduced quite well, but also suffered to a degree from the lack of stability and sonic precision that afflicted everything else.

CONCLUSIONS

Here is a cassette deck that sounds far too much like a cassette deck to be wholly convincing. Vagueness, instability and a reticent midband let it down. Amongst the wide range of features, the play trim adjustment is a particularly good idea, and so is the availability (at extra cost) of remote control.

TEST RESULTS

Rec/replay response - 3dB ref 1kHz	
IEC Type I	28.5Hz - 16kHz
IEC Type II	28Hz - 18kHz
IEC Type IV	26Hz - 20.5kHz
Wow & Flutter - Peak DIN wtd/unwtd	0.13%/0.18%
Wow/Flutter Peak DIN wtd	0.11%/0.14%
Speed error	+0.25%
Type I signal/noise CCIR/ARM 315Hz	50.5dB
distortion 0dB	0.85%
Type II signal/noise CCIR/ARM 315Hz	54.5dB
distortion 0dB	1.4%
Type IV signal/noise CCIR/ARM 315Hz	53dB
distortion 0dB	1.0%
Channel separation 0VU/1kHz	48dB
Line input sensitivity/overload	95mV/>7V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	617mV/3.7V
IM distortion 1kHz, ref 10kHz/11kHz 0dB	1.4%
Azimuth check R-L phase at 8kHz	6 degrees
VU indication at IEC 0dB	+5dB
Dimensions (w x h x d)	43.5 x 11.2 x 27.3cm
Typical Retail Price	£149.95 (remote control £14.95)



YAMAHA KX-500

YAMAHA HOUSE, 200 RICKMANSWORTH ROAD, WATFORD, HERTS WD1 7JS. TEL: (0923) 33166.



The *KX-500* is yet another in a long line of Yamaha cassette decks which bear a heavy burden of user oriented 'convenience' features (enough to make the deck a little inconvenient to use at times!), but which sells at a very moderate price. The under-the-skin story, however, is essentially standard stuff, though Yamaha lay great store by their use of an amorphous LC-OFC-wired record/playback head (this is a 2-head deck), and by the audio quality of the record and playback amplifiers.

All the features of the cheaper *KX-300* are included of course, including logic controls with intro-scan, auto tape type recognition, bias adjust and 'play trim' (which conditions tapes made on other recorders so that the Dolby circuits decode them correctly). Noise reduction is the ubiquitous Dolby B/C combination with optional MPX filtering; *HX Pro* headroom expansion is also fitted.

The numerous additions include an optional (£20) full-feature wireless remote control with additional random track access keys, allowing programming for random play of up to 9 tracks. The real-time, memory tape counter gives time to go or elapsed time, with no need to rewind the tape on insertion (though you do need to tell it what tape length has been inserted). (Why does it default to C60 when C90 is by far the most commonly used tape length?) The meters are excellent twelve step types reading over a 32dB range, and record levels combine a master for fades with individual channel controls.

LAB REPORT

The *KX-500* has low levels of cyclic wow, but significant flutter energy is demonstrated by both the numbers and the spectrum analysis. Some price must be paid for this of course, probably in loss of resolution and roughness of tone.

Elsewhere it's hard to pick fault. The smooth low frequency behaviour indicates good head geometry, whilst mid and top end linearity are amongst the most precise in this entire project. Frequency extension is impressive too, especially in the case of metal (Type IV) tape, where the -3dB point is above 20kHz. Dynamic range is satisfactory

rather than exciting, but with most tapes it's perfectly feasible to extract about 57dB or so (CCIR/ARM weighted) *before* noise reduction is switched in, which must be better than a kick in the groin.

SOUND QUALITY

A great improvement on the rather wayward sounding *KX-300*, the *500* simply sounds much tauter and more neutral. Pitch accuracy was very impressive indeed, the deck achieving almost CD style standards of rock solid stability on recordings. (I'm thinking of one particular baroque organ recording which really demands this ability and where any trace of wow is disastrous.)

The benefits of Dolby *HX Pro* were apparent in the consistency with which the recorder performed on all tape types, though metals still offered an advantage. Bass was firm and precise at all times, and the deck sounded tonally rich and varied. But the amount of detail was slightly limited - there was a certain lack of expressiveness and subtlety at times - and the treble did tend to sound slightly rough. Play trim meant that prerecorded tapes didn't lose out.

CONCLUSIONS

This is a well designed and well equipped recorder: only a little high frequency roughness which could well be improved on another sample, stands in the way of Best Buy status.

TEST RESULTS

Rec/replay response - 3dB ref 1kHz	
IEC Type I	<20Hz - 15kHz
IEC Type II	<20Hz - 15.5kHz
IEC Type IV	<20Hz - 20.5kHz
Wow & Flutter - Peak DIN wtd/unwtd	0.14%/0.13%
Wow/Flutter Peak DIN wtd	0.094%/0.22%
Speed error	+0.18%
Type I signal/noise CCIR/ARM 315Hz	52dB
distortion 0dB	0.95%
Type II signal/noise CCIR/ARM 315Hz	55dB
distortion 0dB	1.4%
Type IV signal/noise CCIR/ARM 315Hz	54dB
distortion 0dB	1.3%
Channel separation 0VU/1kHz	46.5dB
Line input sensitivity/overload	93mV/>7V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	569mV/3.7V
IM distortion 1kHz, ref 10kHz/11kHz 0dB	1.4%
Azimuth check R-L phase at 8kHz	24 degrees

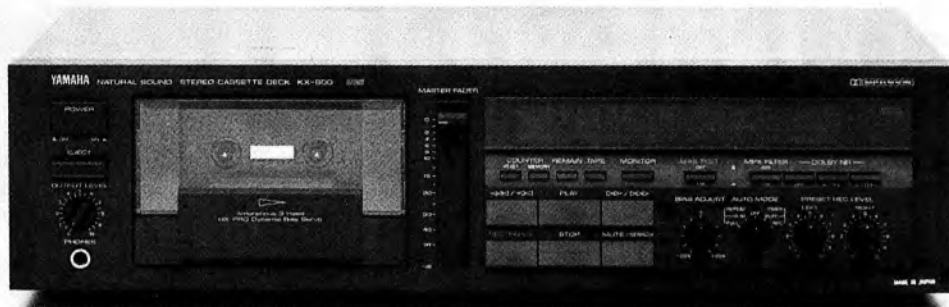
VU indication at IEC 0dB
Dimensions (w x h x d)
Typical Retail Price

+4dB
48.5 x 11.7 x 27.3cms
£209.95 (remote control £19.95)



YAMAHA KX-800

YAMAHA HOUSE, 200 RICKMANSWORTH ROAD, WATFORD, HERTS WD1 7JS. TEL: (0923) 33166.



From near the top of the Yamaha cassette deck range, this is effectively a 3-head version of the *KX-500* (reviewed separately). This means dedicated heads for record and playback functions, and off-tape monitoring whilst recording. In common with some other very recent designs, the tape/source monitor status is set automatically.

The *KX-800* also has a bias adjust facility, using a 'centre tune' arrangement like an old style radio tuner. It's easily accomplished and the tape returns automatically after use. There is one omission too – the 'play trim' facility of the cheaper models – perhaps through lack of room.

Otherwise it's pure *KX-500*. Features include the ingenious real-time memory counter that works out where it is and how much tape remains, having first been told the tape length. A whole tribe of track search facilities include intro-scan, tape and phrase repeat, random track search and random programming for up to nine tracks. The last two can only be accessed using the remote handset, which has a numeric keypad for track selection. A headphone volume control completes the tally.

Build quality is good, but not ostentatiously so. The deck is a little too complex to be regarded as genuinely ergonomic, but on balance the fascia is well organised, and the transport is mechanically very sweet and quiet.

LAB REPORT

Head contour effects were well controlled, giving a clean bottom end, and the responses were accurately engineered right up the frequency band, especially with ferric Type I and metal Type IV tapes when set up using the bias alignment feature. Dolby alignment, however, is suspect – note in particular the high frequency compression. Playback response was all over the place, rising smoothly up to 2.3kHz (presumably due to incorrect equalisation), and declining rapidly thereafter. Note also the significant measured 8kHz azimuth error.

IM distortion at 0VU is excessive, which suggests that the amplifiers are already running past the buffers with such (admittedly hot) signals. Most of the other figures were

much as expected for this class of product, but wow and flutter levels were a little disappointing, the unweighted wow figure being poor for a deck at this price level.

SOUND QUALITY

Lacking the 'play trim' feature of the cheaper model, prerecorded tapes were directly at the mercy of the hardware, and in practice sounded slightly wanting for depth and body.

The *KX-800* was a little below par as a recording tool too, especially given the very good showing of the much less elaborate *KX-500*. In this case recordings sounded disembodied and light in balance. One specific problem was a certain amount of hum, and some very high frequency 'spitchiness', which I could not eliminate and which even Dolby C failed to hide completely. The richness and depth of the original wasn't preserved through this recorder on any of the three tape types. In common with the much cheaper *KX-300*, there was what is best described as a veil of artificiality over the music.

CONCLUSIONS

Apparently purchased on less favourable terms from their Japanese principals, the *KX-800* looks significantly poorer value for money than the *KX-500*. The latter sounds better, is nearly as well equipped (three heads apart), and a lot cheaper to boot.

TEST RESULTS

Rec/replay response – 3dB ref 1kHz	
IEC Type I	<20Hz – 15kHz
IEC Type II	<20Hz – 15kHz
IEC Type IV	<20Hz – 23kHz
Wow & Flutter – Peak DIN wtd/unwtd	0.19%/0.36%
Wow/Flutter Peak DIN wtd	0.11%/0.28%
Speed error	+0.2%
Type I signal/noise CCIR/ARM 315Hz	47dB
distortion 0dB	1.2%
Type II signal/noise CCIR/ARM 315Hz	49.5dB
distortion 0dB	1.15%
Type IV signal/noise CCIR/ARM 315Hz	48.5dB
distortion 0dB	0.85%
Channel separation 0VU/1kHz	47dB
Line input sensitivity/overload	83.5mV/>7V
Mic input sensitivity/overload	n/a
Line output for 0dB/maximum	580mV/3.6V
IM distortion 1kHz, ref 10kHz/11kHz 0dB	6.6%
Azimuth check R-L phase at 8kHz	45 degrees
VU indication at IEC 0dB	+5dB

Dimensions (w x h x d)
Typical Retail Price

435 x 117 x 27.3cms
£329.95, (remote control £39.95)



84

CHARING CROSS ROAD

HOME OF

COVENT GARDEN RECORDS

84 Charing Cross Road, London WC2H 0JA

Tel: 01-379 7674/7635/7427

Open Mon - Sat 10am-7.30pm

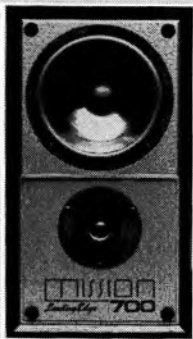
2 mins from Leicester Sq. and Tottenham Court Road Tube

BRITAIN'S LEADING COMPACT DISC CENTRE PRESENTS

MISSION ELECTRONICS

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

16 BIT x 4
OVERSAMPLING



MISSION 780
£699.00

REMOTE CONTROL
WITH VOLUME
CONTROL



MISSION PCM II CD PLAYER

CYRUS 1 AND 2 AND PSX IN STOCK



MISSION CYRUS 1 AMPLIFIER

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.

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, WHARFDALE, 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 30/4/88
NO TOKEN GIVEN

HFC/4/88

£50 OFF. Get £2 off your next 25 CD's
(£10.95+) when you buy a CD player

... Offer also applies to Hi Fi systems over £750

Ask for details Sale and special offer goods excluded valid to 30/4/88
NOT AVAILABLE ON PRODUCTS FROM MISSION, REVOX,
YAMAHA, ROTEL AND PIONEER.



£6 OFF

On Purchase Of
5 CDs Over £9.95
Each

Valid until 30/4/88
NO TOKEN GIVEN

HFC/4/88



TECH TALK

Alvin Gold describes the how and why of the various technical tests.

The true value of any *Hi-Fi Choice* project derives from covering a wide enough range of equipment to be fully representative of the market as a whole, and in reporting on them using common techniques and criteria, so that once the reader has learned to interpret the author's personal idiosyncrasies and prejudices, he can apply this knowledge to a large database of review information.

At the outset let me acknowledge the help I received from various sources: Robert King, an able assistant who did much measurement and donkey work; Chris Bryant, who did the sensitivity, overload, azimuth, intermodulation and VU indication at IEC 0dB measurements. All the remaining machine tests and most of the tape tests were done using the author's own facilities.

As in previous projects, the cassette decks were assessed in two distinct ways: first as hardware designed to play commercially recorded musicassettes, and secondly as recording tools. The vital distinction is that for the former the deck must correspond (in physical alignment and electrical equalisation) to the external standards applied during the duplication of prerecorded material. In the latter case, this stricture doesn't apply in quite the same way. Although a recorded tape ought still to replay accurately on other cassette decks (the owner's Walkman or ICE players, for example) some of the commonest errors (notably those due to head alignment) are essentially self-correcting with the same machine; they replay with the same error that was used at the record stage.

LAB TESTING

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

Wow and Flutter – Peak DIN wtd/unweighted. Central to the task of writing to and reading from tape is that the consequence of any lack of absolute speed stability will superimpose itself on the signal, and that you will hear the effect. In an analogue system like compact cassette, the inevitable variations in speed of the tape passing over the heads appear as momentary (and sometimes longer term) pitch variations. This class of variation is known under the blanket term wow and flutter, and is shown in unweighted and weighted form. Wow and flutter are also shown separately.

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

Signal/noise ratios are quoted with CCIR/ARM weighting. The test frequency is 315Hz, the distortion is shown at the same point (0VU on the deck's meters) for each of the three tape types.

Channel separation is measured with reference to a 1kHz signal at 0VU on the deck's meters.

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

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

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

IM distortion 10kHz 11kHz 0dB peak, 1kHz product. This test gives a useful measure of how well or badly the various machines respond when asked to record two high frequency signals at 0VU level simultaneously. Real life musical signals are much more complex still of course, and an inability to deal with this test cleanly suggests an inability to cope with up-front percussion or other high energy material without sounding hard, splattery or just plain distorted.

Azimuth check R-L phase at 8kHz. Expressed in degrees (of treble phase shift), this is a measure of azimuth misalignment. The higher the error, the greater the HF loss

when playing commercially recorded cassettes.

VU indication at IEC 0dB. In principle, the 0VU point on a deck's record level meters is arbitrary, but it is usually set around +3dB ref IEC 0dB.

Dimensions (w x h x d). In centimetres, of course.

PLOTS & GRAPHS

In addition, a number of plots and graphs are included with each review. The frequency response plots were run with the highest pen writing speed available, which means that dropouts tend to show up in all their glory, and frequency response errors are not 'sanitised' as is often the case. The chart recorder was used with its greatest vertical resolution. This exaggerates response aberrations by a factor of 2.5 times compared to previous cassette deck tests but brings them into line with CD players, cartridges and amplifiers. The record/replay sweeps were also continued right up to 40kHz. All response plots were run at –10dB, which stresses the machines rather more than the traditional –20dB.

Also included are similar, comparable plots showing the effects of the noise reduction systems in the frequency domain. The playback only plots were also run in exactly the same way, giving an indication of the frequency response available with prerecorded material. There is no available sweep test tape for this, so the author made his own, calibrated against the official 120µS Abex IEC calibration test tape. The accuracy of this test tape is not absolute, but error is estimated at around 1.5dB maximum – and is constant from machine to machine.

We also performed spectrum analysis tests to investigate the mechanical behaviour of each of the decks, though space prevented the publication of more than one of these. The noise modulation spectrogram graphically illustrates the mauling endured by a 3150Hz sinewave when recorded and replayed by the deck under test –

there are close parallels with a similar analysis carried out in last year's edition. The central peak should be as fine and as thin as possible, any problem here being heard as a lack of pitch stability.

Then there's the question of test procedure/presentation defaults. With twin cassette decks, all measurements and plots shown are for the main record/playback transport, but both were checked, and any discrepancies reported as appropriate. Response runs were also made using the high speed dub option, but have not been reproduced for space reasons. With auto-reverse decks, all data refers to Side 1, but the reverse side was checked in the same way, and again discrepancies are reported as they arose. In the case of decks with automatic tape alignment, the alignment procedure was followed, and where a bias adjustment facility was fitted, the setting recommended for TDK, AD, SA and MA was used if available. Otherwise the central (usually 12 o'clock) setting was adopted.

LISTENING TESTS

The listening was divided into two sections. The first involved using each deck in turn in a system which included a Sony *CDP-552ESDII* CD player, Musical Fidelity *A1* amplifier and a pair of Stax *Lambda Pro* headphones. Much routine listening was done with this system, along with all the functional work – which button does what and so on.

Finally, and most important of all, each deck was auditioned in a high grade loudspeaker based system. Equipment used included a Musical Fidelity preamplifier (my own DNM preamplifier has no tape circuit at present), Musical Fidelity *A370* power amplifier, a Roksan *Xerxes/Rega RB-300/Koetsu Rosewood Signature* record deck, the aforementioned Sony CD player with outboard *703 DAC* amongst others and a pair of Apogee *Caliper* loudspeakers, all wired with solid core DNM cables.

CASSETTE DECKS: CONCLUSIONS, BEST BUYS AND RECOMMENDATIONS

Back in Japan, the home of almost all of the decks reviewed here, sales of cassette decks have taken off again. What appears to have happened is that many people have simply become fed up waiting for the much hyped digital audio tape. In the first full month that the new season's DAT recorders were on sale (November '86), a paltry few hundred actually made it across the sales counters; meanwhile cassette deck sales soared . . .

Any sustained surge of interest in cassette hardware could have a significant effect on the way the medium develops. Hopefully stimulating the manufacturers to work hard at making their products better, in many cases for the first time in years. Improvement is, after all, much needed.

However, it's not all doom and gloom. My initial impression is that this year's batch of recorders shows a limited but nevertheless worthwhile advance in engineering and audio standards compared to the group tested a year ago, though the way the group was selected may have something to do with this. We have fewer very inexpensive recorders this time, for example.

One obvious development is the rapid adoption of Dolby *HX Pro*, a trend that was well under way last year, but was almost absent as a market force the year before. Now it seems that much of the Japanese industry has decided to switch, almost overnight, and suddenly the companies *not* using *HX Pro* are in the minority – a minority headed as before by Nakamichi. The circuitry is designed to give ferrics something of the qualities of chromes or even metals, especially in the interrelated areas of high frequency dynamics and saturation, and is partly but certainly not completely successful. On the whole, it does not seem to be a dominating factor in the way cassette decks perform, though it's difficult to make definitive judgements since it is not designed to be

removable from circuit.

Remote control is also just starting to appear on cassette decks, in some cases as an optional extra. This natural progression from the compact disc arena enhances the convenience aspects of the compact cassette medium, and is particularly welcome in view of the way recorders are typically used – for timeshifting radio broadcasts, for example.

These points apart, the technology of the compact cassette hasn't perceptibly altered – it is, after all, a supposedly mature technology.

Perhaps more directly relevant than the evolution of the technology, however, is the disappointing lack of standardisation between tape and machine, and the poor set-up standard of so many of the machines tested. These are perennial problems and damaging ones for the status and reputation of the medium. Why shouldn't a consumer be entitled to be assured that any Type I (or II, or IV) tape he picks up will work on any machine correctly, without need of further adjustment of fine tuning of bias, equalisation or sensitivity?

As far as the value judgements expressed in the reviews are concerned, it was felt that some narrowing of the goalposts was in order. As part of the general honing of criteria, the standards by which Recommended and Best Buy models are arrived at has been tightened significantly, one result being that only two newly reviewed models have been awarded Best Buy status. Some of the models carried forward here from the last issue have been regraded to match the new, more stringent criteria. One advantage of this change is that judgements are more directly transferable between cassette and other source components, though there is still no direct equivalence between, say, a Recommended tag on a turntable and one on a cassette deck

Continued on page 90

	Single deck	Dual deck/ single record	Dual deck/ dual record	High speed dub	Real-time counter	Counter memory
Aiwa AD-F26D	•					
Aiwa AD-F36D	•					
Aiwa AD-R46D	•					
Aiwa AD-WX707		•		•		
Aiwa AD-WX909		•		•		
Akai GX-52	•				•	•
Akai GX-6B	•				•	
Denon DRM07	•					
Denon DR-M12HX	•					•
Denon DR-M24HX	•					•
Denon DR-M30HX	•					•
Denon DR-M44HX	•				•	•
Harman Kardon TD202BL	•					
Harman Kardon CD491	•				•	•
Hitachi D-003		•		•		
Hitachi D-007		•		•		
Kenwood KX550HX	•					
Luxman K-112	•					•
Luxman K100	•					
Luxman K105	•					
Marantz SD-35	•					
Marantz SD-45 Mk II	•					•
Marantz SD-55	•				•	•
Marantz CP230	•					•
Nakamichi CR-1E	•					•
Nakamichi CR-2E	•					•
Nakamichi CR-3E	•					•
Nakamichi CR-4E	•					•
Nakamichi CR7E	•				•	•
Nakamichi Dragon	•					•
Nikko D-8011	•				•	•
Onkyo TA213D	•					
Philips FC566	•					•
Philips FC567		•	•	•		
Pioneer CT-1380WR		•	•	•		
Pioneer CT880	•					
Proton AD-300	•					•
Proton AD-200	•					
Revox B215	•				•	•
Rotel RD-830	•					
SAE C102	•				•	
Sony TC-FX150	•					
Sony TC-W250		•		•		
Sony TCR303	•					
Sony WM-D6C ProWalkman	•					
Sony TC-R503ES	•				•	•
Sony TC-K444ESII	•				•	
Sony TC-K700ES	•					
Tandberg 3014A	•				•	•
Teac V200	•					
Teac V210C	•					
Teac W300		•		•		
Teac W310C	•				•	•
Teac R515	•				•	•
Teac V-970X	•				•	•
Technics RS-T22		•		•		
Technics RS-T80R			•	•		
Technics RS-B305	•					
Technics RS-B505	•					
Technics RS-B605	•					
Technics RS-B705	•					
Technics RS-B905	•					
Yamaha KX200	•					
Yamaha KX300	•					•
Yamaha KX400	•					
Yamaha KX500	•				•	•
Yamaha KX800	•				•	•
Yamaha KX-1200	•				•	•

FEATURES COMPARISON CHART

Auto reverse play	Auto reverse record	Track (music) search	Dolby B	Dolby C	dbx	Dolby HX Pro	Auto tape sensing	Tape alignment adjust	Tape azimuth adjust	Record bias adjust	Remote control	Auto repeat	Pitch control	
			•	•			•			•				Aiwa AD-F260
			•	•			•			•				Aiwa AD-F360
•	•	•	•	•			•			•		•		Aiwa AD-R460
•	•		•	•			•			•		•		Aiwa AD-WX707
•		•	•	•		•	•			•		•		Aiwa AD-WX909
		•	•	•		•	•			•	•	•		Akai GX-52
			•	•			•			•				Akai GX-6B
			•	•			•			•				Denon DRM07
		•	•	•		•	•			•				Denon DR-M12HX
			•	•		•	•			•				Denon DR-M24HX
			•	•		•	•			•	•			Denon DR-M30HX
			•	•		•	•	•	•	•	•			Denon DR-M44HX
			•	•			•			•				Harman Kardon TD202BL
		•	•	•		•	•			•		•		Harman Kardon CD491
•	•		•	•			•			•		•		Hitachi D-003
•	•	•	•	•			•			•		•		Hitachi D-007
		•	•	•		•	•			•				Kenwood KX550HX
			•	•		•	•			•				Luxman K-112
			•	•			•			•	•			Luxman K100
•	•	•	•	•			•			•	•	•		Luxman K105
			•	•			•			•				Marantz SD-35
			•	•			•			•				Marantz SD-45 Mk II
		•	•	•		•	•			•		•		Marantz SD-55
			•	•			•			•		•	•	Marantz CP230
			•	•			•			•		•		Nakamichi CR-1E
			•	•			•			•	•	•		Nakamichi CR-2E
			•	•			•			•	•	•		Nakamichi CR-3E
			•	•			•			•	•	•		Nakamichi CR-4E
			•	•			•	•	•	•	•	•		Nakamichi CR7E
•			•	•			•	•	•	•	•	•		Nakamichi Dragon
•	•	•	•	•	•		•		•	•		•		Nikko D-8011
		•	•	•			•			•		•		Onkyo TA2130
•	•	•	•	•			•			•		•		Philips FC566
•	•	•	•	•			•			•		•		Philips FC567
•	•	•	•	•			•			•	•	•		Pioneer CT-1380WR
		•	•	•			•			•		•		Pioneer CT880
•	•		•	•			•			•		•		Proton AD-300
			•	•			•			•		•		Proton AD-200
			•	•			•	•		•		•		Revox B215
			•	•			•			•		•		Rotel RD-830
		•	•	•			•			•		•		SAE C102
			•	•			•			•		•		Sony TC-FX150
			•	•			•			•		•		Sony TC-W250
•	•		•	•			•			•	•	•		Sony TCR303
•	•	•	•	•		•	•			•	•	•	•	Sony WM-D6C ProWalkman
			•	•			•			•	•	•		Sony TC-R503ES
			•	•			•	•		•	•	•		Sony TC-K444ESN
•		•	•	•			•	•	•	•		•	•	Sony TC-K700ES
		•	•	•			•		•	•	•	•		Tandberg 3014A
			•	•			•			•		•		Teac V200
			•	•			•			•		•		Teac V210C
			•	•			•			•		•		Teac W300
			•	•		•	•			•		•		Teac W310C
•	•		•	•			•			•		•		Teac R515
		•	•	•	•	•	•			•	•	•		Teac V-970X
•	•	•	•	•			•			•		•		Technics RS-T22
			•	•			•			•		•		Technics RS-T80R
			•	•			•			•		•		Technics RS-B305
		•	•	•		•	•			•		•		Technics RS-B505
		•	•	•	•	•	•			•		•		Technics RS-B605
		•	•	•		•	•			•		•		Technics RS-B705
		•	•	•	•	•	•			•		•		Technics RS-B905
		•	•	•			•			•	•	•	•	Yamaha KX200
		•	•	•			•		•	•	•	•		Yamaha KX300
•	•	•	•	•			•		•	•	•	•		Yamaha KX400
		•	•	•			•		•	•	•	•		Yamaha KX500
		•	•	•			•		•	•	•	•		Yamaha KX800
		•	•	•	•	•	•			•	•	•		Yamaha KX-1200

Continued from page 88

BEST BUY BELOW £150

Yamaha KX-200 (£140)

The *KX-200* is well equipped with search facilities, including the capability to rewind to the start of a recording you've made ready to start over or play, and an option to take an outboard infrared remote control. Sound quality is simply good, with a lightweight but taut and tuneful bass.

RECOMMENDED BELOW £150

Teac V-200 (£79)

The Teac *V-200* is no bundle of miracles, but it does have a special place in this project because it's cheap, cheap, cheap. The extra £11 for the Sony *TC-FX150* would be worthwhile, but the Teac works adequately if you don't mind the tacky '60s packaging.

Sony TC-FX150 (£90)

Regraded from Best Buy to Recommended, the *TC-FX150* breaks the mould. It is up against very stiff competition from the Aiwa *AD-F260* (Aiwa of course being a sister company) which costs about the same, yet which is much more glamorously packaged and better equipped. But the Sony walks it on sound quality.

Denon DR-M07 (£140)

Regraded to Recommended status from Best Buy in the last cassette deck issue, the *DR-M07* shows what a little extra care in the design of the audio circuits can do. The gadget count is short, and the deck both feels good and handles well. It makes good metal recordings, but it is slightly disappointing with prerecorded stuff, and when using Dolby C.

Onkyo TA-2130 (£140)

This deck has some peculiarly thoughtless ergonomic shortcomings, but nothing that can't be accommodated given a little practice. Nevertheless it's a fundamentally sound design, with a consistency in its music making with all tape types and prerecorded material too that should win it many friends.

Technics RS-B305 (£140)

Also regraded to Recommended in line with the stricter requirements for endorsements in this issue, the *RS-B305* offers manual tape switching and two-button Dolby selection, but the *RS-B305* is electrically sound and mechanically well above average,

leading to a very stable sound. Prerecorded replay was a weakness, but the Dolby installation is good and metal recordings especially sound excellent.

BEST BUYS £151-£300

Marantz SD-35 (£169)

The *SD-35* is the first fruit of designer Ken Ishiwata's interest in the world of cassette. Starting with a basically modest but well built product he has modified some of the audio circuitry along established lines (better capacitors etc). Combined with a surprisingly good transport the result is a high level of clarity and stability. Almost uniquely, prerecorded material sounded bright.

Sony WM-D6C (£249)

Very simply, this is amongst the finest half dozen cassette decks of all types on the market today – battery, mains, or wind powered for that matter. It has excellent quartz-locked mechanics, even when judged without reference to size, and simple electronics that work. Incidentally, it is much better sounding than a personal portable CD, and more practical too.

Denon DR-M24HX (£290)

Off-tape monitoring and Dolby *HX Pro* are key features of this very well built and attractively laid out 3-head cassette deck. The cam-operated dual-castan transport (no solenoids!) is slick and quiet. Some attention has also been paid to the design of the audio amplifiers, and the result has more class than the rather ordinary standard of factory adjustment suggests.

RECOMMENDED £151-£300

Technics RS-B605 (£180)

Based on the *RS-B505* but with added dbx, the Dolby *HX Pro*-equipped *RS-B605* has wide ranging peak hold metering and a well designed set of transport controls, but is otherwise very simply equipped. Its real strength compared to the *505* is that it is better set up and it sounds rather tauter and more together. This is a good affordable middle of the road cassette deck, but was not on its best behaviour with prerecorded material.

Marantz SD-45II (£209)

Rather like the *SD-35*, the *SD-45* is the outcome of the application of a series of measures involving

systematic upgrading of audio signal processing components. Pitch stability is only reasonable, but the electronics sound less compressed and processed than normal.

Yamaha KX-400 (£200)

This is a very modestly priced but quite well equipped auto-reverse deck. Although prerecorded material playback is suspect, the *KX-400* makes excellent recordings, even on Type I ferric tapes, thanks to Dolby *HX Pro*. Tradeoffs due to auto-reverse working are modest.

Yamaha KX-500 (£210)

This Yamaha bears a heavy burden of added features, including a novel one called 'play trim' which adjusts equalisation so that tapes recorded on other decks can play back without Dolby mistracking. The deck is also optionally available with remote control, which is unusual even now. Sound quality, assisted for low bias tapes by Dolby *HX Pro*, is tight and clean.

Denon DR-M12HX (£220)

The consistency with which audio ideals have been allowed to predominate over gadgets and facilities is what marks the Denon range out, and the *DR-M12* is a typical beneficiary. A kind of up market *DR-M10*, the *12* has a very ordinary set of controls and displays which include good meters and an electronic memory counter. The transport is cam-operated and very slick, but not as pitch stable as some. This apart, sound quality is excellent all round.

Akai GX-52 (£249)

A classic Best Buy. The *GX-52* was amongst the best 2-head cassette decks in the project, with good (but not unflawed) electronics and a first class transport. Although there is some loss of detail and space, the sound is always stable, articulate and informative. This is also a highly appealing deck to use with good finish and excellent controls.

Marantz CP230 (£260)

The appeal of this deck is rather different from other Marantz models. It is larger than the Sony *WM-D6C* (one of the only near-equivalents available), and not as high flying sonically as that model. On the other hand it is very flexible, manages to sound pretty good, and doesn't cost an arm and a leg. An excellent multipurpose machine.

Sony TC-R503ES (£300)

This updated *TC-R502ES* is a junior member of the prestigious *ES* family. It is an auto reverse 2-head deck with the usual basic facilities, plus Dolby *HX Pro* and bias adjust, plus other internal detail changes intended to improve sonics. Sound is bright, sometimes clinically so, but there's a great deal of precision and detail too. The level of facilities is also very impressive.

BEST BUY £301-£450

Aiwa AD-WX909 (£400)

The writer found this irresistible. There are legitimate reasons for dual cassette decks – notably the ability to dub tapes – and there are good reasons for auto-reverse too – such as the possibility of longer uninterrupted recording or playing times. But inevitably there are compromises too. The *AD-WX909* has a 'low compromise' unidirectional recorder with three heads and off-tape monitoring, Dolby *HX Pro* and more. The second deck is *el cheapo* territory, fully auto-reverse and playback only. Brilliant – and it works.

RECOMMENDED £301-£450

Denon DR-M30HX (£319)

Unusually the *30HX* comes with a (simple) remote control. The deck also has three heads (for off-tape monitoring), and the excellent cam operated transport. Replay of pre-recorded material was excellent, and although metal tape tended to sound a little over the top, the deck was well suited to Type I and II formations.

Akai GX6 (£330)

Intriguing features of this well finished deck include a software set 'stop' point on the (excellent) record level meters, an electronic time reading tape counter that can work out what length of tape you've inserted, and a powered eject and loading system. Mid and treble sound quality were very clear and transparent, but bass quality was poorly resolved.

Marantz SD-55 (£350)

Marantz strengthen their position as fledgling high grade cassette deck manufacturers with this competent if derivative 3-head deck. Featured are automatic source/tape monitor status and such refinements as switchable MPX filtering, variable bias and Dolby *HX Pro*.

Also included are a variety of quite powerful track search and play options. Performance is little short of excellent, assisted by a well designed transport and more than usual care in the design of the audio amplifier stages. Signal/noise, however, is slightly disappointing.

Nakamichi CR-2E (£395)

The four new Nakamichi cassette decks neatly divide into two groups, the CR-2E being closely related to the CR-1E but with an electronic instead of mechanical tape counter, a fine bias adjust feature and some small but worthwhile internal electrical improvements. For a relatively modest additional cost, the CR-2E benefits disproportionately. Excellent transport controls (if diabolical minor switching), it will probably outlast most of its peers. It also sounds good (though not exceptional) with a strongly characterised, solid quality plus plenty of detail.

Denon DR-M44HX (£399)

Denon's top model at present, the 44HX boasts full off-tape monitoring, Dolby HX Pro, and automatic tape bias, equalisation and sensitivity adjustment. It is distinguished by a very slick cam operated transport, remote control is available as an option, and sound quality is aided by good electronics and an unusually stable transport.

Pioneer CT-1380WR (£400)

An idiosyncratic deck if ever there was one, the CT-1380WR has two transports, both of which record, facilitating recording durations of three hours or so using C90s. There are many other facilities too, including track programming and full infra-red remote control. Strangely, however, it's not possible to adjust the input gain of the two channels separately. The flight deck (sorry, control panel) is crammed and cramped, but the sound isn't. On test, the Pioneer performed creditably, with good soundstage space and resolution and fine musical results with or without noise reduction.

RECOMMENDED ABOVE £450

Teac V-970X (£499)

The V-970X is a full 3-head deck featuring off-tape monitoring and dbx as well as Dolby noise reduction and HX Pro circuitry, plus track search and block play

facilities. It even comes with a full infra-red remote control. The dbx circuitry proved less than successful - unusable is closer for those to whom quality is more important than a little background hiss - but with Dolby B at least the Teac is both an articulate and a sophisticated performer.

Sony TC-K700ES (£500)

There's a lot of fresh thinking in this deck, right down to the organisation of the front panel. The range of facilities offered is spartan for the price, but those it does have are very well designed and include 3 heads for off-tape monitoring. For once, the insides are interesting for their emphasis on performance, including often ignored considerations like resistance to microphony. Excellent soundstage resolution and separation were apparent on all tape types, with or without Dolby - even on prerecorded material.

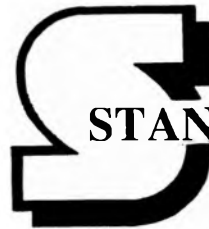
Nakamichi CR-3E & CR-4E (£595, £745)

These are both 3-head cassette decks with full off-tape monitoring and dual capstan, pressure pad-less transports. The CR-4E additionally includes more audiophile oriented electronic circuitry, and has a tape tuning provision for bias and record sensitivity. Both models come highly recommended, the additional cost for the lively, assured sounding CR-4E being fully justifiable on sound quality grounds, not to mention build.

Nakamichi CR-7E (£1,500)

Arguably the finest sounding cassette deck on the market today, the unidirectional CR-7E is also their most user friendly, even going so far as sporting automatic tape type selection and bias/sensitivity set-up. Replay head azimuth setting is available but manual.

Technically the CR-7E may be marginally inferior to the Dragon; sonically it eats it alive.



STANDENS FOR SOUND

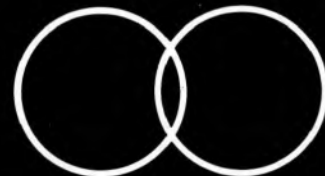
A&R	HEYBROOK	ROGERS
ALPHASON	INFINITY	RUARK ACOUSTICS
AR	KEF	SANSUI
AUDIO INNOVATIONS	LOGIC	S.D. ACOUSTICS
BLQ	MYST	SME
B&W	MORDAUNT SHORT	SNELL
CAMBRIDGE	MUSICAL FIDELITY	SONDEX
DEAN	PINK TRIANGLE	SPICA
DENON	PROTON	SPENDOR
DUAL	VOYD	THE ROCK
HELIUS	QUAD	TDL
	REVOLVER	LINX

THE ALBARRY M408 MkII
NOW ON DEMO
PLEASE BOOK AN APPOINTMENT AND
LISTEN IN OUR
DEMONSTRATION ROOM



92A High Street, Tonbridge, Kent TN9 1AP
Tel: Tonbridge (0732) 353540

BADABADABADABADABADA



sound advice

THE MIDLANDS LEADING
BRITISH EQUIPMENT SPECIALISTS,
FOR OVER A DECADE

A & R LINN MISSION ROYD
ROKSAN REGA MORDAUNT SHORT
CREEK EPOS CAMBRIDGE AUDIO
MONITOR AUDIO HEYBROOK NAKAMICHI YAMAHA
REVOX ROTEL
SENNHEISER

Callers welcome
Demonstrations are by appointment

SOUND ADVICE THE SOUND FACTORY, DUKE ST
LOUGHBOROUGH LE11 2ED TELEPHONE 0509 218254
SOUND ADVICE 162 ALCESTER RD, MOSELEY
BIRMINGHAM B13 8HS TELEPHONE 021 449 3328

Established TEN YEARS
East Midlands exclusive Rega agent

BADABADABADABADABADA

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 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.

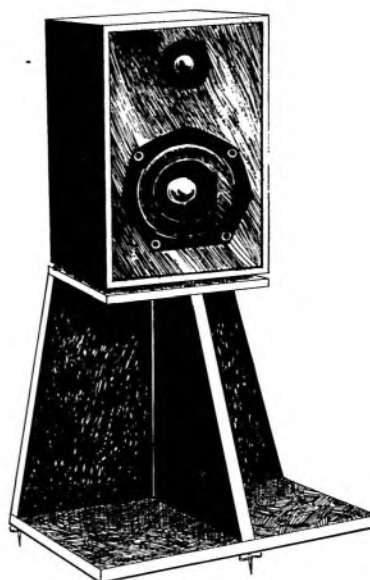
Torlyte is uniquely well-suited to the requirements of the ideal loudspeaker stand. It is ultra light, very rigid and has very good acoustic properties. Torlyte has a low-Q, broadband response, which means that it stores little energy at any one frequency. As a result, it contributes almost no character 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.



<i>model</i>	<i>height</i>	<i>top(w x d)</i>	<i>price</i>
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.



CHOOSING AND USING . . . VALVE AMPLIFIERS

Following last month's major review of the latest transistor technology, Martin Colloms measures and listens to ten new thermionic new arrivals, from the technology that refuses to die.

The single reason that valve amplification refuses to die despite its cost and inconvenience is that it sounds 'different'. Whether better or worse than solid state equivalents must be up to the individual to decide, because the acceptance thresholds and orders of priority of the various strengths and weaknesses do vary from one person to another.

Disregarding any romance factor induced by hot and glowing bottles, there are certain basic design differences, any or all of which probably influence the sonics to a degree. Valve amplifiers operate in class A, with comparatively limited amounts of negative feedback, at a high but reasonably consistent temperature. They also use transformer coupling between the output and the loudspeaker, which in turn tends to restrict the bandwidth somewhat (which is not necessarily a bad thing).

Whatever the reasons, those who get hooked on the 'valve sound' are rarely satisfied without indulging their addiction. Subjectively and stereotypically valve amplification leads with its midrange, delivering unique transparency, delicacy and 'space'. The overall sound tends to be 'softer' – critics would say less well defined – with some loss of 'impact', particularly at low frequencies. But the maximum loudness invariably belies comparatively modest measured power ratings. The decision to 'go thermionic' should therefore be subjectively based, almost inevitably arising out of dissatisfaction with the alternative transistor experience.

Besides the price in owning highly distinctive equipment, there are some practical penalties. Valve power amplifiers generate lots of heat even when idling, which may be a curse on a hot summer night. And like light bulbs, valves get old and tired and need replacing eventually. But for those prepared to enter

into an emotional relationship with their hi-fi system, there is often no alternative but the thermionic route to ultimate satisfaction!

FM

Judging by historical precedent, one would have expected amplifiers using thermionic valves to have disappeared from the audio scene as they did long ago from other fields of electronics – computers, telephony and the rest. These internally heated devices were invented just at the end of the Victorian era, but have been progressively supplanted by solid state transistors and their derivatives since the early 1950s, bringing the valve's 50 year reign to an end.

High quality valve power amps were developed as far back as the late '30s, subsequent decades seeing the emergence of many classic designs. With the benefit of hindsight many 'new generation' transistor amplifiers of the 'sixties and early 'seventies were audibly inferior to certain vintage valve models, so despite the rapid transistor takeover, some companies and enthusiasts continued to develop higher and higher performance valve models. As a generalisation, they have an appealingly relaxed and musical sound, and in many cases are very good amplifiers in their own right.

There is now a dedicated following for valve audio products, and like all such followings, it involves a certain amount of sacrifice. There are exceptions, but in general valve products tend to be more expensive than solid state equivalents, and are built in far fewer quantities. The power amplifiers run hot, consuming significant quantities of electrical power, and the valves themselves can suffer quality variations (particularly regarding noise in pre-amplifiers). Furthermore, some power amplifier designs appear to consume expensive output tubes at an excessive rate!

However, despite all such problems, valve amplifiers continue to score well in comparative reviews, and indeed some listeners will brook no alternative, in recent years a new form of hybrid valve circuit has emerged, where valves are mixed with solid state devices, for example in a power amplifier with FETs at the output stages. Audio Research mix tube and FET stages in pre-amplifier designs, and now use FETs for the driver stages in their power amplifiers. Luxman's *Brid* series of integrated amplifiers has valves in the power amplifier driver section. Another hybrid producer, with FET output stages, is US manufacturer Counterpoint.

The UK tend to go for all-valve designs, prominent amongst them being producers Beard, Croft, EAR, Audio Innovations, Radford and VTL, though new contenders appear at quite regular intervals.

Leading US companies not mentioned above include Conrad Johnson (now diversifying into solid state electronics with Sonographe and Motif) and Quicksilver. (This is by no means a comprehensive list, but the UK market is too small for many US valve companies to be represented over here.)

This valve review special brings together various all-tube and tube-hybrid models, taking into account previous *Choice* reviews of established designs. No special rules were devised; the test standards were exactly the same as those used for the major amplifier report in the last issue.

Inevitably there have been some omissions, due either to unavailability or to impending revisions to existing product. However, we have managed to obtain samples of new or updated product from Radford, Lux, Grant, Conrad Johnson, Croft, Vacuum State, Audio Research and Quicksilver, which covers a pretty broad cross-section.

LISTENING TESTS

A two-tier system of listening tests was employed, whereby the procedure was divided into two parts. A/B full blind listening was found to be impractical for all the models in such a large scale project. Instead, using listening techniques developed by the author and his assistant, the products were carefully assessed on an individual basis. Many of the products were subjected to repeat assessments, and a number were monitored under blind conditions to ensure that the panelists were not subject to significant errors or prejudice.

Key factors involved in arriving at satisfactory judgements included the author's personal experience of over 200 models over the past two years; the use of an acoustically controlled and neutral listening room; ancillary equipment of good accuracy, and the use of both analogue and digital programme. Typical listening levels were around 95dBA, which was within the compass of the smaller models. Following analytical auditioning *via* the disc inputs, (both mm and mc where applicable) and the auxiliary input, the amplifier's volume was increased to the onset of audible distortion under two conditions, namely on '8ohm' speaker load and a '3ohm' simulated speaker load. Peak programme power levels were also monitored to assess the adverse load capacity.

The latest 1988 auditioning mainly involved using special bi-wired Celestion *SL600s* on Cliff Stone π stands, with various exotic Van den Hul cables. Sources were Pink Triangle *PT Too*, SME *Series V* and Van den Hul *MC One*, and Cambridge Audio *CDA*. Reference amplification included Gello *Audio Suite* (premium) and Krell *KMA100 II*, plus Naim *NAT 01* for the tuners assessments, and a broad range of programme material, from Grandmaster Flash to Vivaldi was used.

♪ ADVICE, SERVICE, MUSIC ♪

for

OVER 50 YEARS



from

Jeffries
Hifi

4 ALBERT PARADE - GREEN STREET - EASTBOURNE - (0323) 31336
69 LONDON ROAD - BRIGHTON (0273) 609431

now with 3 separate demonstration rooms at each shop. Why not phone for an appointment?

CLOSED MONDAYS. LATE NIGHT WEDS - 8 p.m.

Agents
for:-

A & R CAMBRIDGE
AIWA
AUDIO RESEARCH
AUDIOLAB
CELESTION
CREEK
DENON
ELITE
EPOS
HEYBROOK
JPW
KEF
LINN
MARANTZ
MISSION
MONITOR AUDIO
MORDAUNT SHORT
MUSICAL FIDELITY
NAIM
QUAD
REGA
ROTEL
SONY ES
SYSTEMDEK
TANNOY
WHARFEDALE



STILTON AUDIO SYSTEMS

Simply better hi-fi

We have moved to new premises at:

**489 Lincoln Road,
Peterborough,
PE1 2PE.**

Tel: (0733) 558838

SPECIAL OPENING OFFER

0% interest free credit over 12 months

Written details on request

We are stockists of: A&R — Audio Technica — British Loudspeakers BLQ — Dual — Harman Kardon
— Inca Tech — Kuzma — Linn Products — Mantra — Mission — NVA — Revolver — Wharfedale
Yamaha

AUDIO RESEARCH SP9

ABSOLUTE SOUNDS, 318 WORPLE ROAD, LONDON SW20 8QU. TEL: (01) 947 5047.

RECOMMENDED



This American company is well known for its high class range of valve (or as they would have it, tube) equipment. In recent years, the designers have achieved considerable success in using FETs in valve circuits, supplanting valves in a number of positions and resulting in hybrid designs. The long awaited *SP9* is an up-to-date ARC hybrid at a competitive price, even below its established *SP8 II* predecessor, itself a classic pre-amplifier design. Our *SP9* was one of the very latest production samples, already incorporating some minor revisions to improve the performance of the disc input stage, providing a recognisable change when compared with the model first delivered.

The front panel strongly resembles the *SP8*, and like that pre-amp also has an on-board power supply with a low noise toroidal transformer vertically mounted as far from the disc input as possible. As a result it offers the considerable advantage of a moving-coil cartridge compatible disc input, both in terms of sensitivity and quiet noise backgrounds – the first benefit of using FETs at the input.

Built into a decent sized box, the *SP9* has inputs for vinyl disc, CD, 'aux', tuner, and two tape machines. A good warm-up period is recommended, and it is also suggested that the reduced power consumption compared to earlier models allows the unit to be left on more or less indefinitely. True to its straight-line origins, the *SP9* has no tone controls or filters, but does include that odd facility known as 'stereo mode' including left/right/mono. All the signal connections are made *via* high quality gold-plated phono sockets.

LAB REPORT

The *SP9* has three high quality regulated power supplies, one for the heaters, one for the RIAA sections, and one for the line stages. Like the previous valve circuits, the input is single-ended, this time with an FET followed by an *ECC88* valve. More FETs complete a discrete operational amplifier with

series feedback RIAA equalisation. The line amplifier is similar, but omits the central FET cascode stage as less gain is required; line gain may be reduced by 6dB by desoldering an indicated resistor. Current *SP9*s incorporate a small stabilising network for the disc input as well as a more powerful toroidal mains transformer. Loading resistors are also supplied for the dealer to set the correct matching impedance for various mm and m-c cartridges.

The 'aux'/line frequency response measures flat with a wide bandwidth, while the disc equalisation is perfectly matched between channels, and shows slight bass roll-off plus mild treble lift, shelved rather than continuously rising, which could give rise to a slight lightness of tonal balance on analogue disc.

The test programme gave very good distortion results, a traditional ARC strength, while the superb noise performance on 'mm' disc confirmed its suitability for the direct connection of most moving-coil cartridges. Overload margins were fine, input matching sensible, and the output tolerant of difficult power amplifier loadings. The fine channel matching and the generally good accuracy reflects the close tolerance components which have been used to build this product.

SOUND QUALITY

When first launched, this pre-amplifier delivered a strong performance *via* the line section, but showed some mild brightness, even a steely quality, *via* disc. However, the disc input of our latest sample sounds sweeter and better balanced, and now virtually matches the sound quality obtained with the line stage.

The rating was in the top class for its group. Traditional ARC qualities were in evidence, specifically a consistently high performance over the entire frequency range. The performance conveyed a strong sense of dynamic power and presence, yet depth, spatial perspectives and the recovery of a

recorded ambience were all to a high standard.

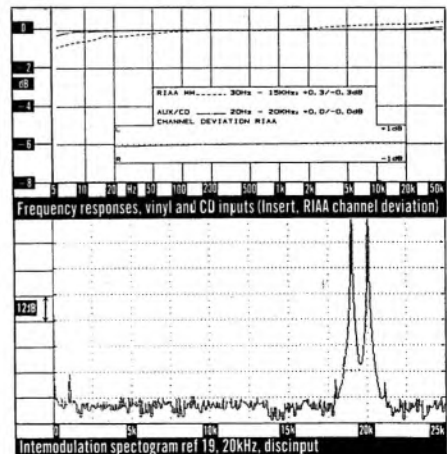
The bass was extended, crisp and clear, treble clean and detailed with little grain or edge, while the midrange certainly justified the 'high definition' description on the front panel. The disc input tonal balance was considered very slightly 'lightened', but this should not be viewed as strong criticism. Only in terms of stereo focus did the *SP9* make any significant concessions.

CONCLUSIONS

This high quality hybrid pre-amplifier is fully moving-coil compatible and built to ARC's excellent standards of engineering and finish, promising a long trouble free working life and surely representing their best value product to date. The sound quality was undeniably high, coming close to the original legendary *SFII*. Essentially neutral, the *SP9* offers a well balanced performance and is easily matched to both sources and other amplifiers, ensuring confident Recommendation.

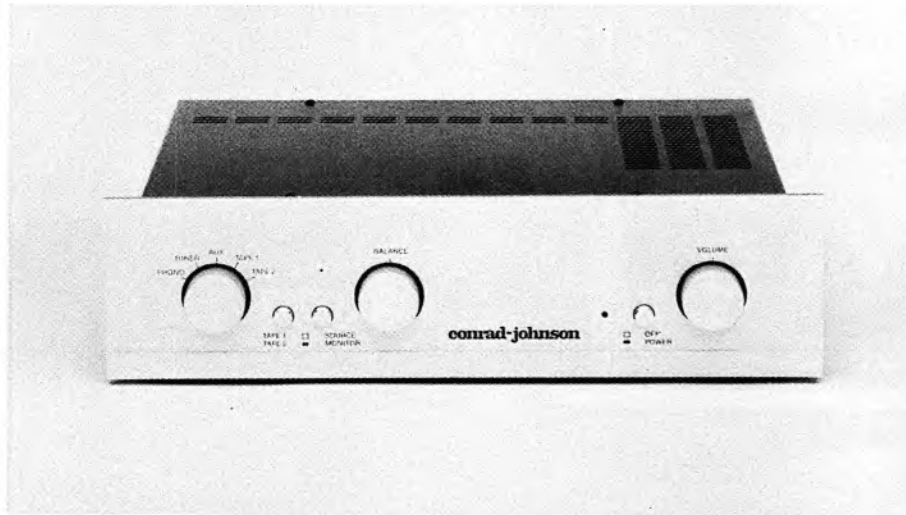
TEST RESULTS

Distortion			
Total harmonic distortion, at rated power	20Hz	1kHz	20kHz
	-96dB	-97dB	-93dB
Intermodulation, 19/20kHz, rated power, aux input	> -40dB		
Intermodulation, 19/20kHz, at 0dBW, disc (mm)	> -72dB		
Intermodulation, 19/20kHz, at 0dBW, disc (mc)	> -88dB		
Noise			
Disc (mm) input (IHF, CCIR weighted)	-78dB		
Disc (mc) input (IHF, CCIR weighted)	-63dB		
Aux/CD input (IHF, CCIR weighted)	-79dB		
Residual, unweighted (volume control at min)	-86dB		
DC offset, pre-amp	left 0mV, right 0mV		
Input overload	20Hz	1kHz	20kHz
Disc (mm) input (IHF)	32dB	35dB	35dB
Disc (mc) input (IHF)	52dB	54.5dB	55dB
Aux/CD input (IHF)	>26dB	>26dB	>26dB
Stereo separation			
Disc input (mm)	98dB	65dB	40dB
Aux/CD input	98dB	65dB	40dB
Channel balance, disc, at 1kHz			0.11dB
Volume/balance tracking:	0dB	-20dB	-60dB
Aux/CD input	0dB	0dB	1.1dB
Input data			
	socket type	sensitivity	loading
Disc (mm) input		0.22mV	49kohms 160pF*
Disc (mc) input*		0.22mV	49ohms 160nF*
Aux/CD input		50mV	53kohms 115pF
Output, pre-amp (tape)			28V max, 0.5kohms
Disc equalisation error, 30Hz-15kHz			+0.3dB, -0.3dB
Size (width, height, depth)			48 x 13.8 x 31.5cm
Typical price inc VAT			£1700
*Adjustable by dealer			



CONRAD JOHNSON PV7

AUTOMATION SCIENCES, 38 ONSLOW GARDENS, LONDON N10 3JU. TEL: (01) 444 4995.



This model is in the 'budget' class amongst US valve pre-amplifiers. A price reduction to £750 for a model of such high build quality and finish from such a well reputed manufacturer makes it an interesting proposition.

The '7 suits' moving magnet cartridge sources only, alongside line level sources such as tuner, 'aux', tapes 1 and 2. The omission of a labelled CD input is a little surprising in view of cj's involvement in this area, but naturally the 'aux' socket will deputise for silver disc fans.

The case is in black enamel, while front panel and controls are finished in traditional cj gold anodised satin aluminium. All inputs and outputs are phonos and tone controls and filters have been omitted in this 'straightline' design. In fact the unit is reportedly optimised to give best clarity with neutral sources and loudspeakers.

Users who attach importance to maintaining absolute phase should note that the line stage of the PV7 is inverting. This may be simply corrected in a given system by exchanging the plus and minus connections at the power amplifier or the loudspeaker to provide final correcting inversion. Since the disc stage *per se* is non-inverting, no further adjustment is required.

Two solid state power regulators are fitted, one for the heater supply and one for the high tension rail. Good quality polypropylene capacitors are used for coupling between amplifier stages and final supply line decoupling.

The disc amplifier uses a 3-triode feedback equalisation circuit with ECC83 valves for the earlier stages and an ECC81 for the higher power requirement at the cathode follower output. No less than five double triodes are in fact employed *in toto* with very little compromise in build quality or component selection, including a generously sized, mechanically quiet mains transformer. Warm up time is typically 45 seconds, but the sound will continue to improve over the first half hour; the low 30W power consumption

suggests that it could be left on for long periods if so desired.

LAB REPORT

Very low levels of harmonic and high frequency intermodulation distortion were recorded on test, *eg* 0.01% for both, *via* both disc and auxiliary inputs. Input noise levels were low, but not sufficiently so for direct use with a low or medium output moving-coil cartridge; a head amplifier or step-up transformer will be needed by m-c users. Nevertheless, the relatively high disc input sensitivity will accommodate a wide range of cartridges, even used with low sensitivity power amplifiers. Electrical hum was low.

Input overload margins were exemplary – essentially infinite *via* the auxiliary input, and averaging an ample 35dB *via* the moving magnet disc. However, stereo separation was an unexceptional 55dB or so midband, falling to 38dB *via* the disc input; different figures were obtained for left on right and right on left.

The disc RIAA equalisation response was sensibly flat from 20Hz to 5kHz; it then rolled off gently to -1.5dB by 20kHz, which is likely to 'sweeten' the tonal balance somewhat. Channel balances were very good, with close matching over a wide range of volume settings. A healthy output of up to 22V is available from a moderate 170ohms output impedance. The supply modulation graph showed negligible hum breakthrough.

SOUND QUALITY

The sound was eminently neutral, tidy and well controlled *via* the line stage. Clean and sweet throughout the audible frequency range the PV7 was pleasant and musical, setting good standards for definition clarity, focus and width; image depth was also quite good. Overall there was nothing one could object to, yet more drama and life would have been welcome. Nevertheless musical dynamics were well rendered.

The good midrange tonal qualities were much appreciated with analogue disc, and

the excellent measured treble performance was reflected in a refreshing freedom from sibilance or grain. The slight treble response rolloff sweetened and rounded treble transients, but the final result will also depend on the treble characteristics of the chosen cartridge. A mild loss of definition and focus was noted on the disc input, more speed and 'slam' would have been worthwhile in the bass.

CONCLUSIONS

There's no question that the PV7 is an excellently built and finished pre-amplifier from a highly respected US manufacturer. It carried that company's hallmark of a sweet natural sounding midrange, and offered low distortion both objectively and subjectively. Though results were good, the overall sound quality alone is not sufficiently competitive for a clear recommendation in a competitive context.

TEST RESULTS

Distortion

Total harmonic distortion, at rated power	20Hz	1kHz	20kHz
	-80dB	-80dB	-81dB
Intermodulation, 19/20kHz, rated power, aux input			-78dB
Intermodulation, 19/20kHz, at 0dBW, disc (mm)			-77dB

Noise

Disc (mm) input (IHF, CCIR weighted)	-68dB
Aux/CD input (IHF, CCIR weighted)	-84dB
Residual, unweighted (volume control at min)	-88dB
DC offset, pre-amp	left 0mV, right 0mV

Input overload	20Hz	1kHz	20kHz
Disc (mm) Input (IHF)	32dB	38dB	36dB
Aux/CD input (IHF)	>23dB	>23dB	>23dB

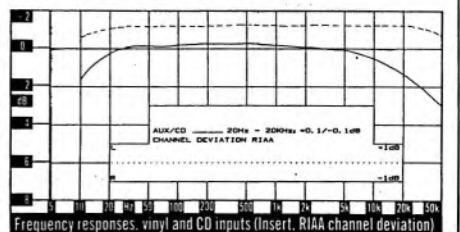
Stereo separation

Disc input (mm)	66dB	54dB	38dB
Aux/CD input	78dB	47/58dB	26/42dB
Channel balance, disc, at 1kHz			0.13dB

Volume/balance tracking			
Aux/CD input	0.11dB	0.09dB	0.10dB

Input data

Disc (mm) Input	socket type	sensitivity	loading
	phono	0.46mV	47kohms 300pF
Aux/CD input	phono	59mV	39kohms 100pF
Output, pre-amp (tape)			22V max, 0.17kohms
Disc equalisation error, 30Hz-15kHz			+0.13dB, -1.5dB
Size (width, height, depth)			37 x 10 x 28cm
Typical price inc VAT			£750



CROFT SUPER MICRO/SMA

CROFT ACOUSTICS, 15 HARRISON ROAD, ERDINGTON, BIRMINGHAM B24 9AB. TEL: (021) 373 1442.

RECOMMENDED



Since the last amplifier issue, Croft's *Super Micro* has become available in *A* form, built entirely using high performance Holco resistors with a couple of Vishays for cartridge loading. The aesthetics of this design were strongly criticised for their 'DIY kit' appearance but this aspect has also been revised. The latest models now look like rather better finished 'DIY kit' amplifiers. However, all this has cost money; the *Super Micro* now costs a modest £250 (modest for a valve product that is); the *A* version doubles that.

This pre-amplifier employs separate volume controls for each channel, an operating inconvenience but one which eliminates the need for a separate balance control. All input selector and tape monitor switches are little toggle levers, and in order to provide the most direct path the final switch selects between phono and all other sources. Note also that this pre-amplifier does have a unity gain line buffer but is not a line amplifier as such, and cannot provide the usual x6 or x10 amplification for low output sources such as some tape decks and tuners. The Croft power amplifier has higher than usual sensitivity specifically to help avoid any problems here.

A moving magnet input caters for vinyl disc, while Croft make fine £100 and £200 self-powered moving-coil head-amps, if such is required. We tried the £100 one, and were agreeably surprised at results good enough for several highly respected valve pre-amps costing up to several thousand pounds. All sockets are phonos, gold plated for 'phono in' and 'mains out' on the *A* version.

This preamplifier is unusual in its hard-wired construction with monofilament conductors; quality parts include polypropylene capacitors and Bourne plastic film potentiometers. The high tension supply has a high grade valve regulator circuit, the heaters solid state regulation. The disc input uses a double triode feedback amplifier with polystyrene equalisation capacitors, and the signal path follows the 'straight line' philosophy with no filtering or tone controls.

LAB REPORT

New computer controlled traces were taken for the frequency responses, and these showed little difference between the *A* and the standard model. Channel equalisation balance was excellent, while the overall response showed a mild upper bass lift of 0.4dB. The treble equalisation went on rising above 20kHz, which may need watching with some cartridges (*eg* wide bandwidth moving-coil types). The line stage has a wide flat response.

Normal harmonic distortions were moderate, but this model did not react too happily to the high frequency intermodulation test; such a result has been associated with audible treble distortion in other designs when the programme contains strong high frequency energy, though this is fortunately uncommon in practice. The disc overload margin at high frequencies has been improved, and is now satisfactory, as are all the remaining results. The disc input sensitivity was quite low, but fortunately it is accompanied by a good signal-to-noise ratio.

SOUND QUALITY

We were very impressed by the standard *Super Micro* in its original review, as it sounded very clear and detailed, full of life and presented dynamics naturally. The mid-range had first rate tonal balance and purity, though it was less impressive at the edges of the frequency range. The overall results were fine for the price.

The luxury *A* version with its new internal components produced a quite remarkable difference. Still more life and energy was revealed in the programme, and the mid-range was now undoubtedly in the highest class. Showing fine focus, stereo soundstages were reproduced with full ambience, atmosphere and especially depth. Over the broad midrange (100Hz to 10kHz), the transparency was most impressive. Offering an audiophile performance in these respects, it

is easy to forgive the mildly softened low bass and the hint of 'spitchiness' and treble 'grain' on explosive treble transients. Neither is this moving magnet input performance significantly compromised by Croft's dual moving-coil head amplifier – a testament to the quality of the latter unit.

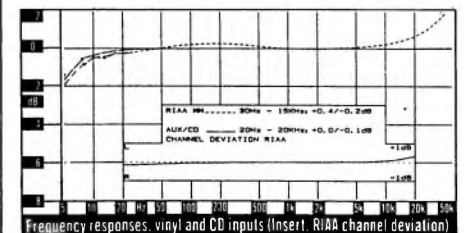
Generating foot tapping involvement, the *Super Micro A* is a force to be reckoned with for analogue disc. However, it must be said that the auxiliary input performance on CD was unexceptional, albeit fair enough for the price.

CONCLUSIONS

Several factors need to be weighed up when choosing one of these two pre-amplifiers. Both represent fine value, despite their primitive and utilitarian appearance. The standard model continues to merit firm Recommendation, while doubling the price to the *A* model brings unexpected rewards. This model belongs in the audiophile class in the midband, with a performance that falls little short of excellent when used for vinyl record replay. The CD performance is not as good, but is nonetheless ample for the majority of players. Another pleasant surprise was the excellence of the inexpensive Croft valve head amplifiers, despite some mild background noise when used with lower output moving-coil cartridges.

TEST RESULTS

Distortion			
Total harmonic distortion,	20Hz	1kHz	20kHz
at rated power, aux/CD in	-60dB	-68dB	-62dB
Intermodulation, 19/20kHz, rated power, aux input			-30dB
Intermodulation, 19/20kHz, at 0dBW, disc (mm)			-26dB
Noise			
Disc (mm) input (IHF, CCIR weighted)			-76dB
Aux/CD input (IHF, CCIR weighted)			-90dB
Residual, unweighted (volume control at min)			-40dB
DC offset, pre-amp			left 0mV, right 0mV
Input overload			
	20Hz	1kHz	20kHz
Disc (mm) input (IHF)	24.5dB	24.5dB	15.5dB
Aux/CD input (IHF)	>26dB	>26dB	>26dB
Stereo separation			
Disc Input (mm)	64dB	60dB	35dB
Aux/CD Input	100dB	40dB	58dB
Channel balance, disc, at 1kHz			0.13dB
Volume/balance tracking	0dB	-20dB	-60dB*
Input data			
	socket type	sensitivity	loading
Disc (mm) input		1.2mV	47kohms 100pF
Aux/CD input		560mV	100kohms 45pF
Output, pre-amp		20V max, 0.5kohms*	
Disc equalisation error, 30Hz-15kHz		+0.4dB, -0.1dB	
Size (width, height, depth)		38 x 7.5 x 26cm	
Typical price inc VAT		£250, £500	

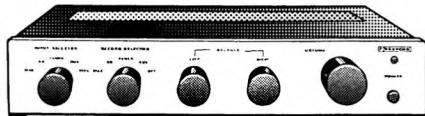


Frequency responses, vinyl and CD inputs (insert: RIAA channel deviation)

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.

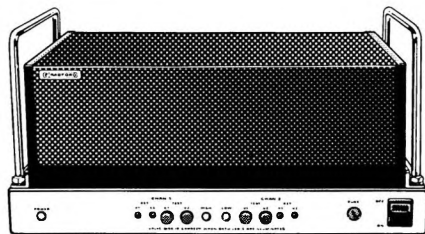


Hand built to the highest standards these new amps incorporate much of today's thinking

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 its 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: _____

Tel: _____

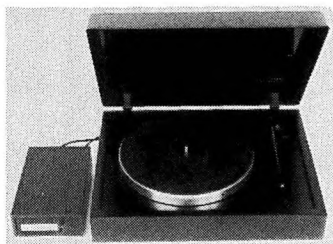
HOME
DEMONSTRATION
A
PLEASURE

Sussex Audio

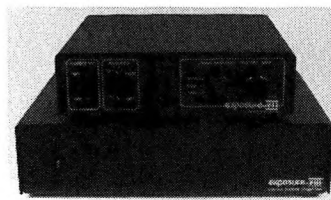
COME AND LISTEN TO THIS TOP QUALITY EQUIPMENT IN OUR SINGLE SPEAKER LOUNGE

VAN DEN HUL
Interconnects
Made to length
& Suppliers of
Chord Interconnects

ROKSAN XERXES



EXPOSURE VII & VIII PRE AND POWER AMPLIFIERS



CAMBRIDGE CD2



MANTICORE MANTRA (Electronic and Manual)



MAIN AGENCIES

EXPOSURE · MISSION · ELITE ROCK · MANTICORE · CAMBRIDGE AUDIO
ACOUSTIC RESEARCH (inc Electronics) · NAD · ROTEL · B&W (inc matrix)
NAKAMICHI · DENON · MISSION · BLO · INFINITY · THORENS · DUAL · KEF
(inc Reference) · ONIX · HARBETH · VAN DEN HUL · NAGAOKA · GOLDRING
ORTOFON · AUDIO TECHNICA · SENNHEISER · BEYER DYNAMICS · TARGET
MARANTZ · TANNOY · MORDAUNT SHORT · TDK · THATS TAPE · GOODMAN'S
MAXIM · HUNT EDA · QED (Accessories) · TRIO · AND MORE



MID SUSSEX ELECTRONICS
163/165 CHURCH ROAD
BURGESS HILL
SUSSEX. 04446 42336

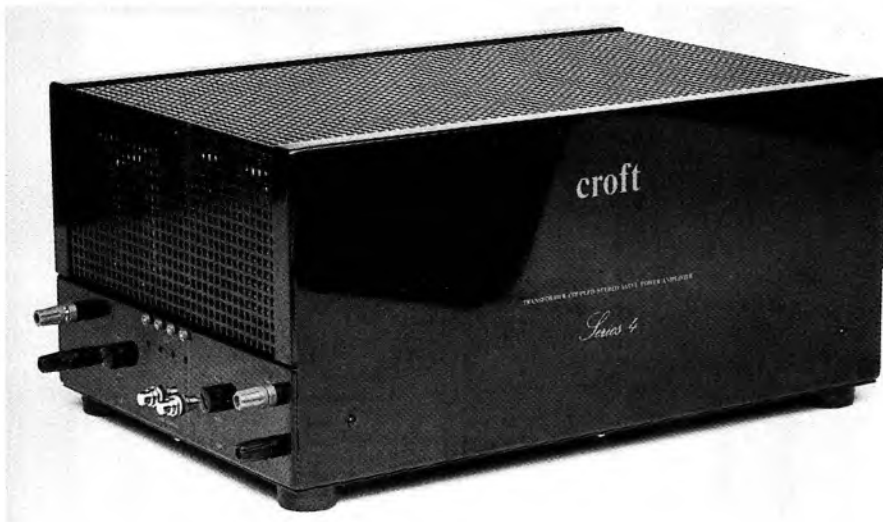
HI-FI MARKETS



CROFT 4/4S/4SA

CROFT ACOUSTICS, 15 HARRISON ROAD, ERDINGTON, BIRMINGHAM B24 9AB. TEL: (021) 373 1442.

RECOMMENDED



First reviewed in 1986, the *Series 4* stereo power amplifier is a modest 40W per channel device on a chassis of imposing physical size. No compromises are apparent in transformer ratings, and in fact the whole affair is conservatively rated and should provide a long working life (which is not always the case with some high performance valve equipment).

Finished in glossy black, and smelling of hot paint for the first few hours of operation, this amplifier has a high input sensitivity of typically 0.4V RMS for full power, which facilitates its use with the Croft pre-amplifiers that have unity gain auxiliary input terminals. (What goes for a Croft pre-amp also goes for other pre-amps with passive line stage options, or for those accessory passive line controllers that directly connect a CD player to a power amp.)

Test sockets are provided for adjusting output biasing, but an accessory voltmeter is needed to monitor the levels so this is probably best left to a service technician. Further bias adjustment may be necessary after the first few weeks of use. Speaker connections use 4mm socket/binding posts, and the audio input phono socket. A good length of mains cable is included, which eases a frequent source of frustration.

Built on the classic push-pull ultralinear configuration, an unusual feature is a fully regulated high voltage supply that uses valve regulator elements, a costly approach that reflects Croft's dedication to their own performance standards. Likewise, they eschew printed circuit boards on the grounds of sound quality; instead this amplifier is craftsman built with point-to-point air-spaced construction and single-strand wiring.

For the more advanced *SA* variant, the reservoir capacitors are doubled, all resistors are selected from the Holco or Vishay ranges, with some wirewound devices, and the regulator circuitry is improved. Briefly outlining *Series 4*, the £650 standard 40W model is still

available; the £730 *4S* has 60W per channel power output while the £999 *SA* offers the improved componentry besides.

Note that all these amplifiers may also be used as higher power monoblocks; the output impedance is halved, peak current doubled, output power increased, and the sound significantly improved.

LAB REPORT

The *SA* just met its 8ohm power specification at 1kHz, but with a notable shortfall at higher frequencies (not uncommon amongst valve power amplifiers). The 4ohm both channels delivery was a modest 14dBW, so monoblok operation is clearly worthwhile if used with more awkward loudspeaker loads is envisaged. Peak output current was a satisfactory ± 5.5 amps. Midband distortion was quite low at full level, but was rather poorer at the frequency extremes, measuring 8% at 20Hz and poorer than 10% at 20kHz (happily the harmonic content was comparatively benign), indicating some output transformer stress. However, some improvement was noted at lower powers, and the high frequency intermodulation results were quite satisfactory.

The *SA* has a slightly lower output impedance than the standard model. These fairly large values can be expected to modify the tonal balance of some loudspeakers subtly, usually in the direction of a brighter treble; electrostatics will scarcely be affected.

Channel balance was fine, with pretty good separation especially in the midrange. Background noise and hum were satisfactorily low. Easy to drive, the high input sensitivity has already been mentioned, and might impose rather low volume control settings for non-Croft pre-amplifiers which have a normal gain line stage. The frequency response was nicely flat, with a mild rolloff at high frequencies. The supply intermodulation spectrum was dominated by harmonic distortion, mains related components being nicely suppressed.

SOUND QUALITY

The standard *4* did well in earlier issues and remains a decent power amplifier for the money, with notably good focus and bass for its price. The *4S* with its slightly higher power delivery shows greater authority and improvements in clarity and transparency – again a good result for the price.

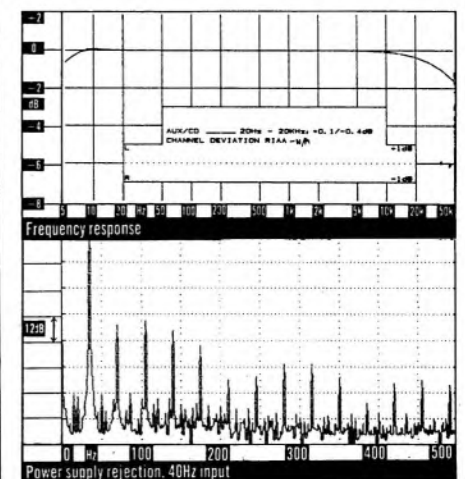
The *4SA* represents a further significant improvement. The bass sounds remarkably solid – fast and tuneful with satisfactory extension. The midrange delivers a full and generous sound, very clear and detailed at most levels, albeit revealing a compressed quality with mild glare towards full power. The treble had a touch of 'zing' and sibilance, but the overall rating was still fairly good, with strikingly well focused, wide and deep stereo images. Dynamics were very well conveyed.

CONCLUSIONS

This is a fine series of amplifiers. All deserve Recommendation, but the *SA* model showed touches of magic – given a little more mid dynamic openness and a tidier treble it could compare to some of the finest made today; as it stands, it is still a very worthy competitor.

TEST RESULTS

Power output			
Rated power into 8ohms, maker's spec		60W (= 17.5dBW)	
Power output	20Hz	1kHz	20kHz
One channel, 8ohm load	14.4dBW	17.6dBW	14.7dBW
Both channels, 4ohm load	13.4dBW	13.8dBW	12.4dBW
One channel, 2ohms, pulsed	—dBW	12dBW	—dBW
Instantaneous peak current		+5.5A, -5.5A	
Distortion			
Total harmonic distortion, at rated power	20Hz	1kHz	20kHz
	-22.0dB	-56dB	-18dB
Intermodulation, 19/20kHz, rated power			-51dB
Intermodulation, 19/20kHz, at 0dBW			-62dB
Noise			
DC offset, pre-amp			left 0mV, right 0mV
Output impedance (damp)	0.77ohm	0.74ohm	0.93ohm
Channel balance			0dB
Input data			
Power amp	socket type	sensitivity	loading
		51mV	88kohms 60pF
Typical price inc VAT			£650, £730, £999



GRANT G60 AMS

GRANT AMPLIFIERS, 145 GLADYS AVENUE, NORTHEM, PORTSMOUTH, HANTS PO2 9VD. TEL: (0705) 694347.



Entering the *Hi-Fi Choice* test arena for the first time, Grant have loaned us their new *G60AMS* monoblok power amplifiers, which come with distinctive solid wood side panels that incorporate useful lifting/carrying handles. Rated at 60W, 18dBW, the output transformer is tapped for 4, 8 and 16ohm speaker load options.

A noteworthy front panel feature is the bias adjustment, occasional re-setting being required to keep the output valves in their optimum idling condition. This is easy enough to set, with the correct indication given by a couple of light emitting diodes. The casework is sufficiently well ventilated to allow the two units to be stacked if this is required.

This design has a classic ultralinear output amplifier, using paired *KT77* or *EL34* output valves according to choice. The remaining circuitry comprises an *ECC83* triode input, an *ECC83* phase splitter (the other half valve) plus an *ECC82* double triode differential output driver. Both stages have traditional capacitor stage coupling. A single unregulated high tension supply is rectified to a combination reservoir capacitor of 400 μ F, the supply output protected by a 1A fuse. Earlier stage high voltage supplies are isolated by old fashioned resistance-capacitance decouplings.

The bias supply is half-wave rectified and roughly stabilised by a 39V Zener diode. Bias level sensing uses 10ohm output resistors, the voltage amplified by a dual *LM3302N* IC op. amp. There is little evidence of audiophile type selected passive components, but the design has fashionably low negative feedback, specified at 14dB, 1kHz, 8ohms.

LAB REPORT

The specified power output was met exactly at 1kHz 8ohms loading, falling a dB by 20kHz. Loaded by 4ohms the output fell typically 3.2dB, maintaining a respectable power bandwidth. The output impedance (damping) was a moderate 0.4ohms at 1kHz, but

increased to 0.7ohms at 20Hz and 1ohm at 20kHz; this might result in some mild tonal balance changes with some speakers of uneven impedance. A moderate peak output current of +8A was recorded, but this is sufficient in view of the output power.

Some mild bandwidth limitation can be seen on the frequency response, with a hint of transformer resonance at 75kHz (+3.7dB); however, the variation in level over the audible range was very mild. The supply modulation test gave a good result, with slight 150Hz hum; the graph is dominated by simple harmonic distortion of the 35Hz fundamental.

Full power harmonic distortion was a satisfactory 1%, 1kHz, rising to 3.3% at the frequency extremes. 0dBW (a 'music' level) gave more respectable figures - 0.16% at 20Hz, nearly 0.1% at 1kHz, and 0.5% at 20kHz. Intermodulation distortion was unexceptional - -43dB at rated power and -67dB at 0dBW. Noise levels were very satisfactory and the very high input impedance produces negligible loading. The 1.6 volts needed for full output indicates preference for higher output pre-amplifiers.

SOUND QUALITY

Defying any preconceptions concerning old fashioned circuitry or modest passive components, the Grant *60* sounded healthy, albeit achieving different scores on the 4 and 8ohm settings; we preferred the lower impedance tap with moving-coil loudspeakers, presumably due to its better adverse load control.

The sound just reached the 'very good' class on 8ohms, giving pleasantly relaxed and laid back stereo presentation, with very good perspectives and depth layering. The ultimate depth illusion was mildly curtailed, but that apart it sounded transparent, ambient and spacious with plenty of 'scale'. Focus was good and midrange tonality first class - very natural and free from strain or hardness. Bass was not its strongest point, but it was decent enough nonetheless.

The 4ohm winding produced clearer and

sharper focus, with superior definition right through the frequency range. Clearly very good here, it delivered power with ease, proved pleasant when driven into clip and so remained sufficiently loud on this nominally lower power setting.

CONCLUSIONS

Hearing is believing, and in this case Grant have proved the fact with a nicely balanced and well tuned amplifier that is as competitive as any of the new generation of valve amplifiers. The midrange was most seductive, clearly revealing the subtle textures in classical scores. Less well suited to rock music or more difficult loudspeaker loading, and on the face of it technically unexceptional, the results clearly justify firm recommendation.

TEST RESULTS

Power output

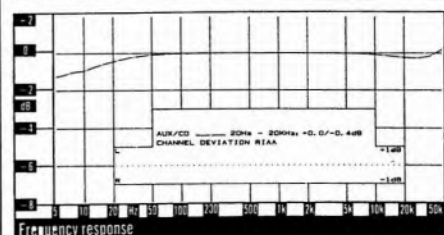
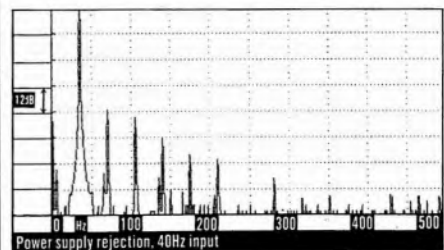
Rated power into 8ohms, maker's spec	60W (= 18dBW)		
Power output	20Hz	1kHz	20kHz
One channel, 8ohm load	18.0dBW	18.0dBW	17.1dBW
Both channels, 4ohm load	14.5dBW	14.8dBW	14.1dBW
One channel, 2ohms, pulsed	—dBW	12dBW	—dBW
Instantaneous peak current	+8A, -8A		

Distortion

Total harmonic distortion,	20Hz	1kHz	20kHz
at rated power	-38.0dB	-48.5dB	-27.9dB
Intermodulation, 19/20kHz, rated power, aux input	-43.0dB		
Intermodulation, 19/20kHz, at 0dBW	-67dB		
Noise 'A' wtd	0dBW-88dB, full power -98dB		
DC output offset	left 0mV, right 0mV		
Output impedance (damp)	0.69ohm	0.39ohm	0.99ohm
Channel balance	0.15dB		

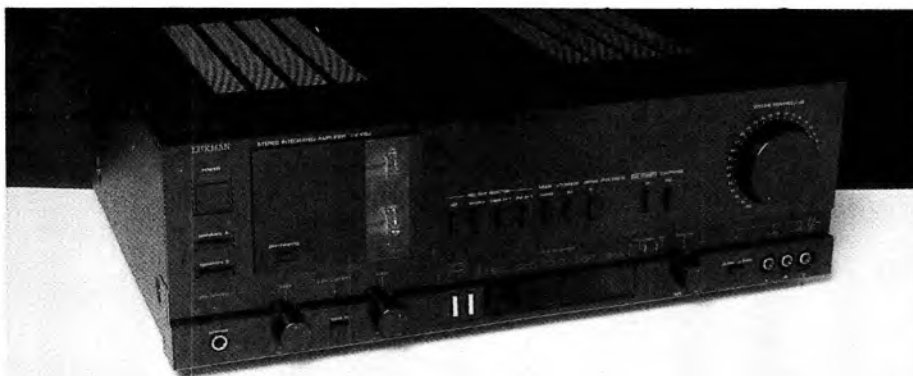
Small data

socket type	sensitivity	loading
Power amp	202mV	1mohms
Size (width, height, depth)	35.8 x 18 x 23cm	
Typical price inc VAT	pair £948	



LUXMAN LV105U

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



The LV105U is the latest in a line of Luxman hybrid (valve/transistor) integrated amplifiers. Although this model only uses valve stages to drive the output transistors, the designers make sure you know they are present by displaying them behind a tinted perspex window set into the front panel. The unit is fairly expensive but you get quite a lot for your money – good finish, the valves, 80W per channel, and a host of facilities including audio visual (AV) switching.

Inputs are provided for tuner, CD, signal processor (line in/out), two audio tape recorders and three AV machines of your choice. There is also a TV audio monitor output. The phono input can be switched between moving magnet and moving-coil sensitivity. There are two sets of speaker binding posts on the rear and a headphone socket on the front panel.

Bass and treble controls can be bypassed for a flat response, and 'loudness' compensation is also included. Pushbuttons are used for all signal selection, tape monitoring and speaker switching, with LED flags indicating the more important settings. Three gold plated phono sockets marked AV2 are located on the front panel and can be switched in and out by an adjacent switch. The mandatory 'CD straight' bypasses all but loudness. A 'pre-heat' switch keeps the tubes warmed up and ready for operation when the amplifier proper is off.

The insides are built to a fairly high standard but 13 separate printed circuit boards add a degree of clutter. A large transformer supplies power to the rectifier and smoothing capacitors mounted on the power amplifier circuit board. The circuitry is a mixture of valves, discrete transistors and ICs, with a relay protected output stage.

LAB REPORT

The power spectrogram shows some harmonic distortion but negligible supply breakthrough. The rated power figures were met with ease and 20.5dBW is available into 8ohms. 4ohm drive was reasonable but the 2ohm pulsed result was a little disappointing. However, this correlates with the very

low figures on the instantaneous peak current test, indicating some kind of protection circuitry operating.

Harmonic and intermodulation distortions were generally good on all inputs. The signal-to-noise ratios were adequate, and overload margins, though lower than some, were still fairly good. Stereo separation was adequate and volume/balance tracking good. The sensitivities are all very sensible, but the capacitive loading on the moving magnet cartridge input is a little high.

The line frequency response was flat up to 5kHz, but then started rolling off, being 1.1dB down by 20kHz due to the high capacitance on the 'aux'/CD input. The moving magnet RIAA response was flat above 100Hz, but showed slight bass aberration. The response on the moving-coil setting was very accurate in the midband, but with mild bass and treble rolloff.

SOUND QUALITY

This upmarket integrated model scored higher than the L100, but only by a small margin, rating 'good' overall. Interestingly, there was very little difference between the scores for the moving-coil, moving magnet and CD inputs.

Marginally greater strength and firmness in the upper bass was detected on moving magnet compared with the moving-coil cartridge inputs. The analogue disc sound was notably pleasant, with a lush midrange having good clarity. Low treble was fine and well detailed, but the high treble sounded 'lazy' and muted. Stereo depth was fairly good, programme dynamics quite well portrayed, and the images well focused. It could be said that the general character reflected the 'valve sound' stereotype.

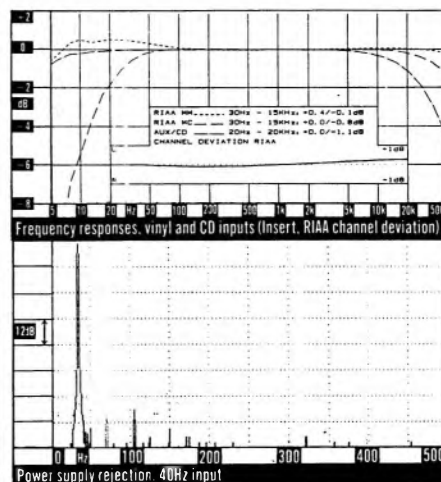
Things sharpened up a bit *via* CD. The bass was faster with more slam, but no improvement was noted in mid definition; if anything, the CD source showed tonal quality more clearly than analogue disc. The general impression was good, but ultimately this amplifier was not felt to be either particularly involving or communicative.

CONCLUSIONS

The ratings for this new 105 were higher than for its predecessor, reflecting an all round improvement. Conservatively protected, it did not like the lowest speaker impedances but sounded healthy enough on standard 8ohm models. Save for the protected output, the lab performance was substantially good and the frequency responses were quite accurate. As a quality product, the 105U is well worth considering, but lacks sufficient competitive edge for Recommendation.

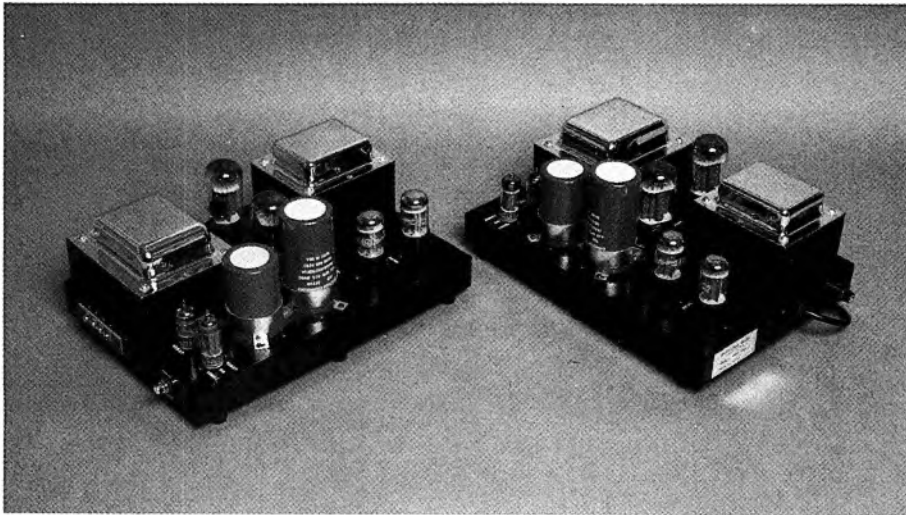
TEST RESULTS

Power output		Integrated amplifier	
Rated power into 8ohms, maker's spec		80W (=19dBW)	
Power output	20Hz	1kHz	20kHz
One channel, 8ohm load	20.7dBW	20.8dBW	20.5dBW
Both channels, 4ohm load	17.7dBW	18.1dBW	17.8dBW
One channel, 2ohms, pulsed	-dBW	16dBW	-dBW
Instantaneous peak current		+2.5A	-3.0A
Distortion			
Total harmonic distortion, at rated power, aux/CD in.	20Hz	1kHz	20kHz
	-75dB	-74dB	-57dB
Intermodulation, 19/20kHz, rated power, aux input			-80dB
Intermodulation, 19/20kHz, at 0dBW, disc (mm)			75dB
Intermodulation, 19/20kHz, at 0dBW, disc (mc)			-72dB
Noise			
Disc (mm) input (1HF, CCIR weighted)			-70dB
Disc (mc) input (1HF, CCIR weighted)			-64dB
Aux/CD input (1HF, CCIR weighted)			-70dB
Residual, unweighted (volume control at min)			-86dB
DC output offset		left 4mV, right 2mV	
DC offset, pre-amp		left n/a mV, right n/a mV	
Input overload	20Hz	1kHz	20kHz
Disc (mm) input (1HF)	28.7dB	26.4dB	25.0dB
Disc (mc) input (1HF)*	33.4dB	30.6dB	29.4dB
Aux/CD input (1HF)	>23dB	>23dB	>23dB
Stereo separation			
Disc input (mm)	65dB	63dB	42dB
Aux/CD input	69dB	63dB	42dB
Output impedance (damp)	0.16ohm	0.16ohm	0.25ohm
Channel balance, disc, at 1kHz			0.37dB
Volume/balance tracking			
Aux/CD input	0.07dB	0.61dB	0.52dB
Input data			
Disc (mm) input	socket type	sensitivity	loading
		0.153mV	46kohms 400pF
Disc (mc) input*		0.017mV	100ohms n/a nF
Aux/CD input		16.7mV	63kohms 800pF
Output, pre-amp (tape)			15.0V max, 0.6ohms
Disc equalisation error, 30Hz-15kHz			+0.0dB, -0.8dB
Size (width, height, depth)			44x15.0x35.0cm
Typical price inc VAT			£685
*See text			



QUICKSILVER MONOBLOKS

VITAL SYSTEMS, 38a MEADOW WAY, HARROW WEALD, MIDDLESEX HA3 7BW. TEL: (01) 863 8988.



We first tried this model back in 1986, since when it has undergone a number of minor changes in componentry and build, sufficient to justify re-test and re-evaluation. The original sample came in a special brassed finish, but the perforated top cover is now coated in a rather utilitarian (if less costly) crackle-finish black.

As monobloks go these are relatively compact, and can be conveniently (and ideally) located beside the loudspeakers. Mains input is *via* two-core cable, with the speaker outputs offering a choice of 8, 4 and 1 ohm settings (the latter intended for certain high sensitivity ribbon transducers). The audio input has a normal phono socket, but the loudspeaker outputs use rather crude screw terminals, retained by the designer on the grounds that they offer a short path to the connections within.

LAB REPORT

One interesting aspect of this design is the use of valve rectifiers, to provide superior isolation from mains interference and remain impervious to reverse input cycle ringing. Choke smoothing is used for the earlier amplifier stages. This push-pull ultra linear design with a high quality output transformer uses beam tetrode output tubes (type 8417), with 65mA of user-adjustable bias and operating in a comfortably enriched semi-class A mode. The circuit is a simple and direct, hard-wired with good quality polypropylene signal coupling capacitors.

Rated at 60W 8ohms, even our original sample managed rather more than this. This new sample provided still more power, reaching 18.2dBW on continuous tone, and 18.6dBW on music peaks, and demonstrating a good power bandwidth at a level close to 70W. The 4ohm delivery was very similar to the original result, with a true 60W into that load on the 8ohm tap and 75W when connected to the 4ohm tap.

Following our original review, an error was discovered in the peak current measuring technique when applied to transformer cou-

pled amplifiers, giving erroneously good results for the Quicksilver of +14, -13A. The corrected readings were a nonetheless quite healthy $\pm 14A$, and the latest sample gave $\pm 14A$ from the 4ohm tap - a good result in view of the output rating. Distortion at full power was very similar to the original results - not very impressive 1% at 1kHz, and 3% at 20Hz and 20kHz. The figures had improved to 1%, 20Hz, nearly 0.1% 1kHz and 0.3% at 20kHz by 0dBW - quite satisfactory, as were the high frequency intermodulation results of -56dB rated level, -60dB, 0dBW.

The output impedance is still on the high side, measuring around 1ohm over the whole frequency range and should be regarded as a minor tonal balance variable depending on the loudspeaker loading. Electrical noise levels were fine, while the 100k/45pF input is easy to drive, albeit requiring a maximum input of nearly 1.2V for full power. The power intermodulation test now shows good rejection of 50Hz related harmonics. The frequency response was commendably uniform in the audible range.

SOUND QUALITY

The Quicksilver set an exceptional standard and was highly rated on audition when first reviewed. Since then the market has moved on, but we still believe the current model offers a small improvement on the original. The current score is certainly in the 'good' class, but did fall short of some equivalently priced competition. Changing to the 4ohm tap (with 6ohm speakers) did lift the sound into the 'very good' category, but the available output was not particularly powerful at the price.

Judged by 1988 standards the bass now sounded a touch loose and underdamped on the 8ohm tap, though good detail was maintained. The highly musical and characteristically 'valve-like' midrange was maintained, with beautifully sweet strings and pleasing retrieval of subtle details. Once one of the most transparent sounding models in its class, now it appears somewhat comprom-

ised, lacking the full soundstage depth currently available.

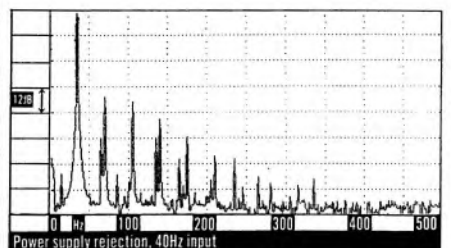
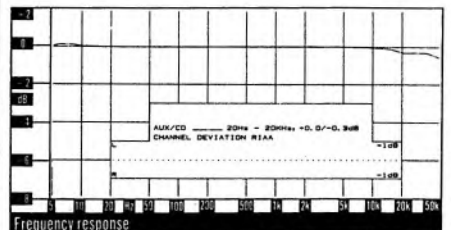
The treble still sounds good, if better balanced on the 4 than the 8ohm tap, while stereo focus and definition were also enhanced in this mode. This is the setting I would prefer to use, ideally with loudspeakers of adequately high sensitivity (87-90dB/W rating). It still clipped nicely, and goes louder than one might have expected.

CONCLUSIONS

The Quicksilver *Mono* is still a good amplifier but is beginning to pale a little in comparison with some of the more recent competition, appearing rather pricey. A good personal audition will decide matters, preferably undertaken with the proposed loudspeakers; it certainly works well with both kinds of Quad *Electrostatic*, for example. As this review was completed, the agents announced a price reduction of £300 to £1,495 a pair, in line with recent improvements in the US dollar exchange rate, which certainly helps enhance its value rating.

TEST RESULTS

Power output			
Rated power into 8ohms, maker's spec	60W (= 17.5dBW)		
Power output	20Hz	1kHz	20kHz
One channel, 8ohm load	18.0dBW	18.24dBW	17.6dBW
Both channels, 4ohm load	15.3dBW	15.1dBW	14.4dBW
One channel, 2ohms, pulsed	-dBW	15dBW	-dBW
Instantaneous peak current	+10A, -10A		
Distortion			
Total harmonic distortion, at rated power	20Hz	1kHz	20kHz
	-30.4dB	-40.9dB	-31.3dB
Intermodulation, 19/20kHz, rated power	-56.0dB		
Intermodulation, 19/20kHz, at 0dBW	-60dB		
DC output offset	left 0mV, right 0mV		
Output impedance (damp)	1.16ohm	1.08ohm	1.16ohm
Channel balance	0.1dB		
Input impedance	socket type	sensitivity	loading
Power amp		143mV	100kohms 45pF
Size (width, height, depth)	34.5 x 16.1 x 23.5cm		
Typical price inc VAT	£1495		



RADFORD SC25

WOODSIDE ELECTRONICS, KIMBERLEY ROAD, CLEVEDON, AVON BS21 6QJ. TEL: (0272) 877611.

RECOMMENDED



It is some years now since a Radford pre-amplifier was available, and this new model bears little resemblance to the company's earlier designs.

The *SC25 Renaissance* is a large and heavy device, with a logical control layout and generously sized operating facilities. Two independent rotaries cover source switching to the power amplifier and to tape recorder socketry. Inputs accommodate moving magnet disc, CD, tuner, auxiliary and tape. Two central gain controls (one for each channel) adjust balance and sensitivity while the master gain control (correctly labelled 'volume') is sensibly larger in diameter; all controls are calibrated for easy resetting.

The rear panel carries an array of top quality gold plated sockets, neatly arranged and well labelled. The mains input is a 3-pin IEC socket. Lifting the cover reveals a superb interior built to the high quality standards of traditional craftsmanship. Primarily a dual mono design, top quality components are used, including custom polypropylene capacitors.

The dual mono philosophy is even carried through to the heaters, separate regulators being used for each channel. The high tension supply begins with dual 350V 330µF capacitors, while each channel and each stage has its own simple Zener stabiliser, individually backed by 220µF reservoirs. The amplifier stages use four triodes each, with the leading section operated in cascade, all ECC83 except for the line output, where more current is required. The valve pins are specially treated to give good contact, and look rather different from their usual dull oxidised appearance. Single strand PTFE insulated wiring is used throughout, while simple vestigial printed circuits are fitted, mainly as rigid component carriers. The whole is powered by a generous on-board transformer.

LAB REPORT

The disc equalisation was pretty accurate, the slight shelf and cut at low frequencies

amounting to -0.6dB at 20Hz. All input responses were nicely tailored at the edges of the audible bandwidth. Close tolerancing is confirmed in the essentially perfect RIAA equalisation match between channels.

Total harmonic distortion was negligible at the IHF output level. However, the disc input did not take so kindly to the high frequency intermodulation test, generating 1% of difference signal - reflected also in the diminished (albeit still satisfactory) overload margin at 20kHz. Lots of headroom was available at mid and low frequencies.

Disc input noise was low, -71dB confirming the use of high quality valves in a noise-free circuit. Good figures were also recorded for stereo separation - well above average for valve equipment. Channel balance was excellent under all conditions, the master volume control balance remaining tight down to the test limit of -60dB.

The separate channel gain controls confer a wide range of input sensitivities and hence considerable versatility. A generous maximum output level of 17V is combined with an output potentiometer which changes output impedance according to volume setting, up to a maximum of 3kohms, helping towards the very good noise characteristics at low output settings.

SOUND QUALITY

A 'very good' rating was attained *via* the CD input. Stereo focus was very good and stage width and depth were well developed. The midrange had a natural 'valve like' tonality and both frequency extremes were nice and tidy, the treble in particular. The easy, relaxed character was slightly marred by a bass region described as a little 'soft', lacking in speed and drama.

The sound quality dropped back slightly *via* the moving magnet input, but was still well liked. The overall impression of good 'drive' and listener involvement remained, and the sound was distinguished by a general air of control and purpose. Just a hint of treble grain and sibilance was evident, and

then only on testing rock material. Essentially neutral, with decent bass, a musical midrange and solid coherent stereo, a mild loss of depth and transparency was also noted.

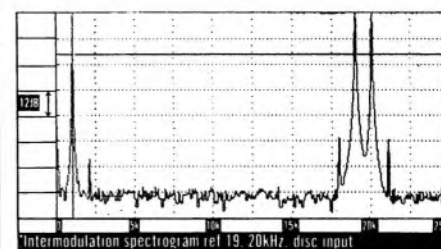
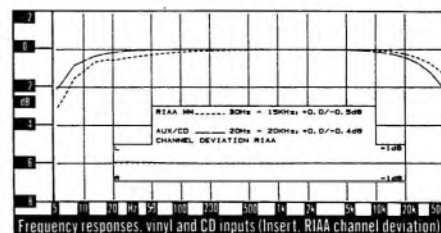
CONCLUSIONS

The *SC25* provided very good sound quality with an air of relaxed and confident authority, particularly *via* CD. It held no unwelcome surprises in store (a blessing in the light of the behaviour of some more 'tweaky' designs) and comes well specified, with exceptional build quality for the price and good finish as well. Bear in mind that moving-coil cartridges will need a head amplifier or transformer, but amongst valve pre-amps the new *SC25* constitutes good value for money, especially for those averse to hassle.

TEST RESULTS

Distortion			
Total harmonic distortion, at rated power	20Hz -78dB	1kHz -80dB	20kHz -70dB
Intermodulation, 19/20kHz, rated power, aux input	-72dB		
Intermodulation, 19/20kHz, at 0dBW, disc (mm)	-39.3dB		
Noise			
Disc (mm) input (IHF, CCIR weighted)	-71dB		
Aux/CD input (IHF, CCIR weighted)	-81dB		
Residual, unweighted (volume control at min)	-102dB		
DC offset, pre-amp	left 0mV, right 0mV		
Input overload	20Hz	1kHz	20kHz
Disc (mm) Input (IHF)	39.2dB	36.7dB	20dB
Aux/CD input (IHF)	>23dB	>23dB	>23dB
Stereo separation			
Disc input (mm)	82dB	76dB	50dB
Aux/CD input	92dB	76dB	50dB
Channel balance, disc, at 1kHz	0.14dB		
Volume/balance tracking	0dB	-20dB	-60dB
Aux/CD input	0.04dB	0.01dB	0.36dB
Input data			
Disc (mm) Input	socket type	sensitivity	loading
Aux/CD input	phono	0.25mV	41kohms 110pF
Output, pre-amp (tape)	phono	12.5mV	30kohms 230pF
Disc equalisation error, 30Hz-15kHz	17V max, 1-3kohms*		
Size (width, height, depth)	+0.0dB, -0.4dB		
Typical price inc VAT	43 x 9 x 30.5cm		
	£598		

*Volume dependent





FOUNDER MEMBER

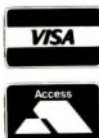
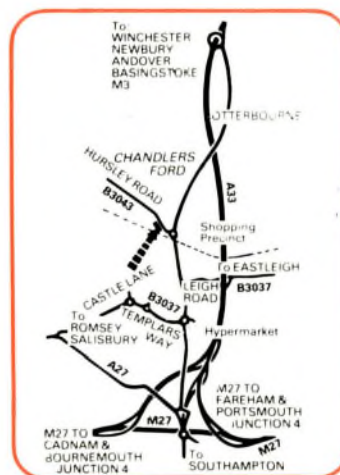
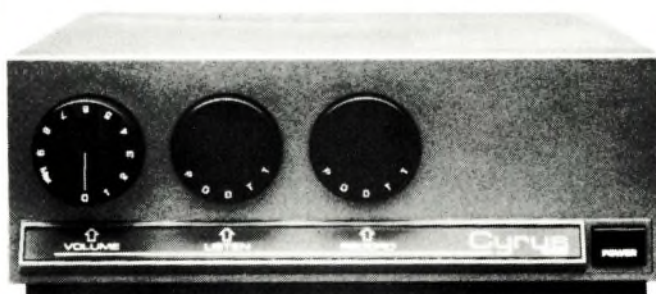
good dealer
good equipment
the foundation of a good music
system
from

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 -

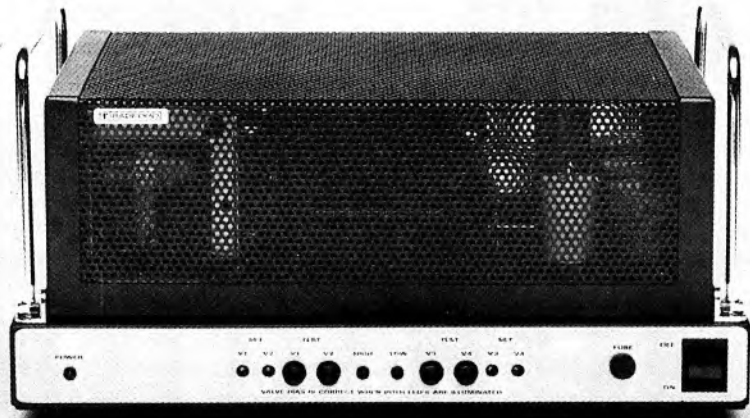


OPENING HOURS
TUES-SAT 10-6 THURS 10-8
CLOSED MONDAYS
(EXCEPT IN DECEMBER)

RADFORD MA75

WOODSIDE ELECTRONICS, KIMBERLEY ROAD, CLEVEDON, AVON BS21 6QJ. TEL: (0272) 877611.

RECOMMENDED



Radford designer John Widgery has been keeping busy during the last year or so. In addition to his *Renaissance* upgrade of the classic *STA25*, he has now released a pre-amplifier and a larger *MA75* power amplifier. Rated at 75W per channel it is a monoblok design built onto the (stereo) *STA25* chassis, using paralleled output valves to generate a higher output into a redesigned and uprated output transformer. One objective was to ensure sufficient output to drive a normal range of speaker loads; some valve models do not respond too enthusiastically when presented with speakers that have difficult impedance characteristics. Monoblok presentation also offers the opportunity to minimise speaker cable lengths by placing the power amplifiers close to each loudspeaker, using acceptably long interconnects back to the pre amp.

User adjustments include front panel biasing for the output valves, facilitated by a pair of LED indicators which should both be illuminated when the appropriate test buttons are pressed. Strongly built, the unit also sports the traditional Radford trim, including the attractive chrome side handles.

Internal build quality is first class, with neat wiring, good layout and safe wiring practice. The mains reservoir is massive, and the output stage uses four paralleled 6550 output tubes; they are not driven hard, so should offer long service life. A dual integrated circuit lies at the heart of the bias sensing and indicating circuitry. The single output transformer winding is optimised for 4 to 8ohm loadings.

LAB REPORT

The frequency response was perfectly flat in the audible range and with no irregularities beyond; -3dB points were better than 1Hz to nearly 120kHz! The output impedance was a respectably low 0.3ohms typical, and the input represents an easy load.

Rated at 75W, the *MA75* delivered a mid-band maximum of 19.25dB into 8ohms - close to 100W - and held up pretty well into 4ohms.

Output was well over 100W. Peak power into lower impedances was good for a valve model, and the *MA75* was certainly more load tolerant than most. Respectable power bandwidths were achieved, comparable with the best US designs.

Harmonic distortion was unexceptional at rated power. Clearly approaching saturation at 20Hz, it was fine at 1kHz and just satisfactory at 20kHz, where distortion measured -40.5dB. However, the distortion consisted of benign low order components, and rapidly improved at lower levels. High frequency intermodulation at rated level was a really good -70dB, improving to -78.6dB at 0dBW, while at the latter level harmonic distortion had fallen to -58dB 20Hz (c0.1%) -80dB at 1kHz (0.01%) and -76dB at 20kHz (0.05%) - an excellent result.

Naturally no channel separation results apply to monobloks, as in practice this is limited by the sources. A respectable $\pm 12.5A$ peak was available at the output, with no DC offset. Signal-to-noise ratios were fine, with low hum and sensitivity was quite high, requiring 1.14V (RMS) to achieve full power. At 2/3 rated power into 4ohms, the supply modulation test result was excellent, with no mains related components evident.

SOUND QUALITY

The *MA75* put in an impressive performance, clearly building on the foundation of the *STA25 Renaissance* but enjoying the additional advantages of greater headroom, shared output valves, a larger power supply and double mono construction. Sounding basically like a 25 in its overall neutrality and its relaxed musical character, the 75 spoke with great dynamic authority. The bass was firmer, clearer and more powerful, while the midband retained the essential sweetness alongside greater detail and clarity. Vocals were presented with very good presence and treble maintained fine neutral and unforced standards.

Classed as very good overall, the *MA75* was ranked a clear mark ahead of the *STA25*.

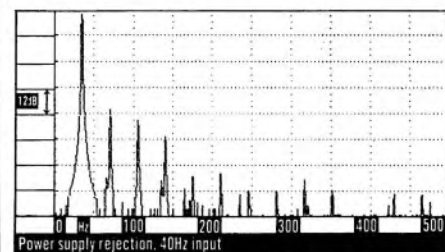
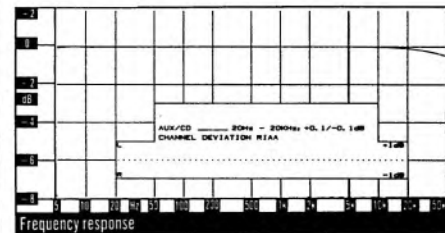
Stereo images were well focused, with impressive stage width and good depth. Driven hard it remained in control, achieving high sound levels without distress and maintaining its unflappability under conditions where some designs begin to sound a bit ragged. It also sounded pretty consistent using different loudspeakers.

CONCLUSIONS

This Radford heavyweight is a welcome newcomer to the *Renaissance* range. Far better than its remote *STA60* and *100* ancestors, it combines workhorse durability and fine build quality with high class sound, maintaining this standard over a wide range of loudness levels and loading conditions. It was musical yet provided a thoroughly modern neutrality with a fine stereo soundstage.

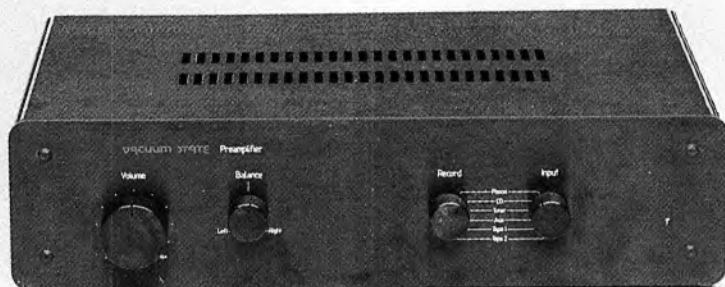
TEST RESULTS

Power output			
Rated power into 8ohms, maker's spec		75W (= 18.75dBW)	
Power output	20Hz	1kHz	20kHz
One channel, 8ohm load	17.6dBW	19.25dBW	18.7dBW
Both channels, 4ohm load	16.8dBW	17.65dBW	17.2dBW
One channel, 2ohms, pulsed	-dBW	15dBW	-dBW
Instantaneous peak current		+12.5A, -12.5A	
Distortion			
Total harmonic distortion,	20Hz	1kHz	20kHz
at rated power	-17.0dB	-56.3dB	-40.5dB
Intermodulation, 19/20kHz, rated power			-70dB
Intermodulation, 19/20kHz, at 0dBW			-78.6dB
Noise 'A' wtd	0dBW-95dB, full power		-112dB
DC output offset			left 0mV, right 0mV
Output impedance (damp)	0.29ohm	0.29ohm	0.38ohm
Channel balance			0.05dB
Input data			
Power amp	socket type	sensitivity	loading
Size (width, height, depth)		127mV	100kohms 265pF
Typical price inc VAT			42 x 23 x 25cm £776



VACUUM STATE FVP

TOWNSHEND INT. LTD., UNIT 2, NORTH WEYLANDS IND. EST., MOLESLEY RD., WALTON-ON-THAMES. TEL: (0932) 246850.



This simple, 'straight line' Australian pre-amplifier, is one of a wide range of products which also include an *RTM* pre-amp and these power amplifiers plus an integrated model based on valve/MOSFET hybrid circuitry, offering 250W per channel.

The £999 *FVP* (four valve pre-amplifier) is devoid of tone controls or filters and its inputs accommodate moving magnet cartridges and the following designated line inputs - CD (matched sensitivity), tuner, 'aux' and two tape recorders. Separate independent controls are provided for 'record out' and 'listen'. Two main inputs and outputs are provided, and all signal socketry is RCA phono, with the analogue disc input finished in gold plate.

The external finish is satin black aluminium. There is no 'on' indicator light; indeed the on/off switch has been relegated to the rear panel and is only intended for occasional use. Generally speaking this pre-amp is intended to be kept continuously powered, and VSE have sufficient faith in the life of the valves to provide a three year warranty; in fact five or six years is a typical life for valves used in this manner. We note from the instructions that optimum performance will not be achieved until the unit has been run in for a day or so, and that if started from cold, some mild loss in fidelity will be apparent.

The circuitry uses a classic, non-inverting, double-triode feedback gain stage, with a single *ECC83* valve for each channel and both disc and line stages, accounting for the 'four' in the title.

A high quality solid state regulator is used for the heaters and for the single high voltage line including polypropylene film capacitors and AB film potentiometers. Cleverly integrated, the back panel is a double sided printed circuit carrying the socketry plus the necessary input selector switches.

LAB REPORT

Some doubts exist concerning load and cable driving ability, since an *ECC83* doesn't pack a great deal of punch, and furthermore the

output capacitor is rather small. This was noted when measuring frequency response, with a 20kohm power amp loading, showing a droopy bass; the more extended responses were taken with the usual 100kohm loading. It would be worth checking the input impedance partnering of power amplifiers before committing to purchase. Likewise, the fine distortion and intermodulation results were also obtained with high impedance loading, and some impairment may occur with lower values, such as the 20kohm input impedance of some solid state power amplifiers.

On 100kohm load, the RIAA equalisation showed a mild treble lift of around 0.8dB relative to the bass. The line response was pretty flat and slightly tailored at the band edges, measuring -0.8dB at 18Hz and 22kHz. A near perfect equalisation channel match was achieved. Harmonic and intermodulation distortions were quite negligible, while good signal-to-noise ratios and ample input overload margins were measured. Stereo separation was good at low and mid frequencies but had deteriorated to a weak 32dB by 20kHz. Channel balance was fine at normal levels, but the error reached nearly 4dB at low volume settings. The input and output characteristics were fine, noting the need for high impedance loadings at the output.

SOUND QUALITY

Driven *via* the line input into 50kohm amplifier loading, the *FVP* acquitted itself very well. The sound was highly informative with very good definition throughout the frequency range despite a small audible deficiency in low bass power and weight. It sounded uncomplicated - open and articulate, with a tidy, controlled effect. The treble in particular sounded finely detailed and lacked significant grain or edge, while the midrange was pleasantly neutral.

Stereo images had plenty of scale, were wide and well focused with very good depth. There was a relaxed transparency about the sound, and musical dynamics were well pre-

sented.

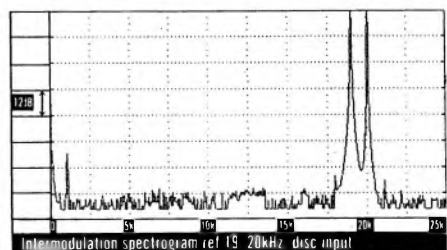
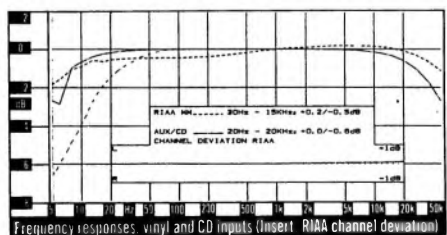
The general standard held up using the moving magnet disc input, but there was a mild shortfall in focus, more noticeably so in the treble. Orchestral music came over well, but the more energetic treble of modern rock material showed moderate sibilance and 'spitchiness'.

CONCLUSIONS

This promising and well-built moving magnet pre-amplifier offers genuine performance with an appealing simplicity and musical transparency. Bearing in mind the probable need for a step-up device of some kind, the prospective purchasers should judge the analogue disc input for himself; the test result was still good even with our muted qualification. Note also the need for a high impedance power amplifier input if the bass response and dynamics are not to suffer. Nevertheless, the high standard of sound quality assures recommendation.

TEST RESULTS

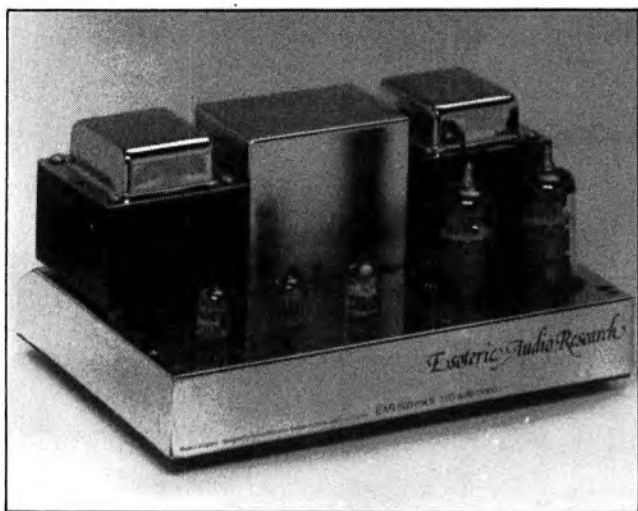
Distortion			
Total harmonic distortion, at rated power	20Hz	1kHz	20kHz
	-74dB	-76dB	-71dB
Intermodulation, 19/20kHz, rated power, aux input	-92dB		
Intermodulation, 19/20kHz, at 0dBW, disc (mm)	-66dB		
Noise			
Disc (mm) input (IHF, CCIR weighted)	-68dB		
Aux/CD input (IHF, CCIR weighted)	-72dB		
Residual, unweighted (volume control at min)	-72dB		
DC offset, pre-amp	left 0mV, right 0mV		
Input overload	20Hz	1kHz	20kHz
Disc (mm) input (IHF)	47.6dB	44.5dB	32dB
Aux/CD input (IHF)	>23dB	>23dB	>23dB
Stereo separation			
Disc input (mm)	76dB	56dB	32dB
Aux/CD input	96dB	64dB	38dB
Channel balance, disc, at 1kHz	0.64dB		
Volume/balance tracking			
Aux/CD input	0.18dB	1.47dB	3.72dB
Input data			
	socket type	sensitivity	loading
Disc (mm) input		1.7mV	47kohms 30pF
Aux/CD input		56mV	157kohms 50pF
Output, pre-amp (tape)		36.6V max. 0.18kohms	
Disc equalisation error, 30Hz-15kHz		+0.2dB, -0.5dB	
Size (width, height, depth)		37 x 8.9 x 28cm	
Typical price inc VAT		£999	



**The Highphonic
MCA series**
For the very best in Moving Coil
cartridges, in very limited supply.
See cartridges section in this
magazine.

**High End Audio Devices
Unit 11, Stukeley Meadows
Industrial Estate,
Huntingdon,
Cambs PE18 6ED**

10 YEARS ON.... AND STILL UNRIVALLED



THE 509 MK II

©Esoteric Audio Research; since the 1970s, a name associated worldwide with audio amplifiers of the very highest fidelity. EAR is the brainchild of Tim de Paravicini, whose innovative design techniques and exhaustive research have borne fruit not only in the EAR products themselves, but also in his custom design work for a number of the most highly regarded amplifier manufacturers and the creation of some unique contributions to the professional recording world.

EAR amplifiers are unequalled in the degree to which they deliver a pure rendition of the signal fed into them, free from artefacts that colour and distort the sound in lesser products.

For the discerning audiophile in high fidelity and professional audio, EAR has become a byword for quality in audio signal processing, with pre-amplifiers, power amplifiers, specialized equalizers and signal conditioners all leading their respective field. Compare EAR products with their competitors and with live sound, and you will hear why.

©Experience the audible difference:-

Esoteric Audio Research Ltd

Unit 11, Stukeley Meadows
Industrial Estate,
Huntingdon, Cambs PE18 6ED
Telephone: 0480 53791

©The word Esoteric is a registered trade mark of
Esoteric Audio Research Ltd.



VALVE AMPLIFIERS: CONCLUSIONS, BEST BUYS AND RECOMMENDATIONS

*Martin Colloms runs through the
best of the valve amplifiers
from current and past reviews.*

This mixed batch of valve and valve-hybrid designs all more or less achieved Recommended status, their fundamental design providing consistent listenability, with pure and easy midrange and low aural fatigue. Alongside a generally competent, allround performance, this is a key factor in high fidelity, and one that counts for much with purchasers of valve gear.

Taking the pre-amplifiers first, the *Croft Super Micro* is still a bargain at £250, notwithstanding the precaution concerning gain matching for the line section. At £500 another Croft, the *Super Micro A*, shares the same difficulties but the midrange is truly exceptional, sufficiently so for another strong recommendation. At a similar price level the £598 *Radford SC25 Renaissance* is a superbly built and highly competent design – and with no matching problems.

Moving up the price ladder, the £799 *Conrad Johnson PV7* is a perfect example of US craftsmanship at a reasonable price, particularly if build, versatility and finish matter more than absolute sound quality. The £999 *Vacuum State FVP* makes an impressive *Choice* debut, with very good sound quality, but noting the need for a high power amplifier input impedance to develop a flat and extended bass response.

The neat little *Counterpoint SA-7* from previous issues should also be recalled; the mm input overloads easily, but it can also partner some of the healthier m-c cartridges without an intervening head amplifier. Subject to unchecked recent revisions, the *VTL pre-amps* are also worth mentioning, having achieved good value ratings in past reviews.

The *Conrad Johnson PV5* (2,010) is a fine middle grade product, somewhat handicapped

by the lack of a true moving-coil cartridge input. The *Beard CA506* (£995) should also be noted – a particularly versatile model with inbuilt step-up m-c transformers, and one which has been recently upgraded (but not yet checked by us).

However, the key pre-amplifier is the new £1,700 *Audio Research SP9*, a hybrid which sets high standards in all departments and has a decidedly effective moving-coil input. At still greater cost there is the mm only *Conrad Johnson Premiere Three* (£3,775), but the leading valve pre-amp is undoubtedly the recently revised *Audio Research SP11 II* (£5,250), a product which currently dominates valve and solid state territory at anywhere near the price.

POWER AMPLIFIERS

Moving onto power amplifiers, there are quite a number of worthy examples, including the various *Croft Series 4* models (£650-£999), the *Beard P35* (£695, recently revised), the *Radford STA25 Renaissance* (£897) the *Grant G60 AMS* (£948) and the *VTL monobloks* (£1,000). These offer from 35 to 50 watts, yet generally sound as loud as many 100W solid state designs.

Above £1,000 we have the impressive new *Radford Renaissance MA75* monobloks (£776), the *Counterpoint SA1211* (£1,250) (a load tolerant hybrid), the *Beard M70* (£1,595, recently revised) the *Quicksilver Mono* (£1,500) and the *Conrad Johnson MV50* (£1,795).

Above £2,000 the heavy brigade consists of the *Audio Research M100* monobloks (£2,850 each), and the *Conrad Johnson* have *Premiere Four* (£3,900). Other examples may also be on the market, but we have not had the opportunity to audition or test them for *Choice*.



SEVENOAKS HI-FI & VIDEO

This advertisement is valid until at least 31st March 1988. All branches close Wednesday except Guildford and Brighton.

The suggested systems priced below all include the popular Dual CS503 turntable, but alternative turntables and CD players are available at extra cost. Please see OPTIONS list below for further details.

FREE

Cartridge supplied with these systems.
Leads provided with these systems.
Carriage for mail order customer
all systems in excess of
£200 (UK mainland only).

SUGGESTED SYSTEMS

SPEAKERS
All system prices include the Dual CS503

AMPS

Royal R820A	274.95	M/Short MS10 II Goodmans Main II	284.95	W/cable Diamond III M/Short MS15 II A/Research AR88X Kef C10 Mission 7011	299.95	Celestion DL4 II B&W DM100 imp JW P1 Hebrook Point 5 Rohlf RL850	314.95	Mazanta LD20 A/Research AR188X Mission 100LE Rad 8020 M/Short MS250 II	314.95	B&W DM110 imp M/Audio R252V Tannoy Mercury II JW R72	339.95	Hebrook 1881 A/Research AR228X Mission 707 Celestion DL4 II	349.95	M/Audio K32 Mission 737R B&W DM220 imp	399.95
Royal R820B/C	319.95	Nad 3320E	279.95	Nad 3130	299.95	AR A04	314.95	QED A240SA II	324.95	Yamaha A4300	329.95	Audiobak 8000A	334.95	Yamaha M4000	339.95
Nad 3320E	269.95	Nad 3340	299.95	AR A04	314.95	QED A240SA II	324.95	Yamaha A4300	329.95	Audiobak 8000A	334.95	Yamaha M4000	339.95	Nad 3220PE	349.95
Nad 3130	259.95	AR A04	299.95	QED A240SA II	319.95	Yamaha A4300	329.95	Audiobak 8000A	334.95	Yamaha M4000	339.95	Nad 3220PE	349.95	Marantz PM45	354.95
Nad 3240	299.95	QED A240SA II	299.95	Yamaha A4300	319.95	Audiobak 8000A	329.95	Yamaha M4000	339.95	Nad 3220PE	349.95	Marantz PM45	354.95	Kenwood KA550	354.95
AR A04	279.95	Yamaha A4300	299.95	Audiobak 8000A	319.95	Yamaha M4000	329.95	Nad 3220PE	349.95	Marantz PM45	354.95	Kenwood KA550	354.95	Denon PM4250	354.95
QED A240SA II	299.95	Audiobak 8000A	299.95	Yamaha M4000	319.95	Nad 3220PE	349.95	Marantz PM45	354.95	Kenwood KA550	354.95	Denon PM4250	354.95	Cambridge P40	354.95

OPTIONS

The following Compact Disc Players/Turntables may be ordered instead of the Dual CS503 in the above systems.

CDs

- AR CD4
- Denon DC0300
- Denon DC0300
- Denon DC0300/2
- Denon DC03700
- Marantz CD15
- Marantz CD24
- Mission CD27SE
- Mission CD2700
- Nad 520
- Philips CD371

TURNTABLES

- add £60 Yamaha CD1700
- add £80 Royal R820B/C
- add £120 Royal R820B/C
- add £150 Dual CS503-J
- add £190 AR CB 101
- add £234 Nad 5120
- add £60 Rotel R820
- add £60 Resolux black inc. arm
- add £100 Marlin inc. arm (w)
- add £160 Systemdek inc. arm
- add £60
- add £40 Aniston 'O' Deck
- add £30 Sensus SR22 MkV
- add £20 Thorens TD 166
- deduct £30
- add £30
- add £195
- add £80

SAVE

Massive savings when you buy a suggested system — each component has been highly acclaimed by the UK Hi-Fi press and as a package offers unbeatable value for money.

AUDITION THE SUPERB RANGE AT SEVENOAKS HI-FI

MISSION 701
£109.95

MISSION 700LE
£139.95

MISSION 707
£179.95

MISSION 737
£249.95

MISSION 710
£399.95

FREE TARGET STANDS

100% money back guarantee
100% satisfaction guarantee
100% service guarantee



CR-3E CASSETTE DECK

PHOTO: LIAM WOON

Head to Head

 Nakamichi

NAKAMICHI B & W UK LTD

MARLBOROUGH ROAD LANCING WEST SUSSEX BN15 8TR TELEPHONE (0903) 750750

CHOOSING AND USING . . . HI-FI FURNITURE

For the first time, Choice examines this increasingly important factor in system optimisation. We don't pretend to have all the answers concerning the subtle interactions of specific vinyl turntables and their supports yet, but Paul Miller has come up with plenty of food for thought and some interesting conclusions besides. Next month he'll be investigating loudspeaker stands.

It seems but a short time ago that equipment was strung haphazardly along shelves, albeit with a little greater attention sometimes paid to that domestic seismograph the turntable. Still the vast majority of users remain sceptical – as they have the right to until demonstrated differently. But the subjective experience brings instant conversion – go and try it for yourself.

There are a wide variety of different support systems, all of which will give different degrees of improvement according to specific circumstances, with the turntable the main beneficiary. The mechanisms of interaction between a particular turntable and its support platform are not yet fully understood, and certainly play a part in the overall result. Our tests therefore concentrate on the mechanical isolation afforded by the platform against the environment, which is rather more susceptible to analysis. But the final arbiter should always be the subjective sound quality of the complete combination in situ.

TECH TALK

Most people are well aware of the term 'acoustic feedback', a phrase used to describe a condition where the amplified output of a turntable is returned to the source *via* mechanical or acoustical coupling to a loudspeaker – either airborne or structurally-borne.

If we consider a single tone, replayed from a record and subsequently emitted from a nearby speaker, it is easy to imagine how the player or part thereof could become mechanically excited and then resonate at this same replay frequency. The output from the cartridge increases, so the output from the speaker increases thereby transmitting even more energy back to the turntable. A vicious circle no doubt, but one that can easily be broken by *isolating* the turntable from this extraneous energy, if only to the point where the fast spiral of feedback is just beyond precipitation.

Now to some facts. So long as

the turntable is sited at a reasonable distance from the loudspeakers, the severe impedance mismatch that exists between air and wood or metal will ensure that very little *through-air* coupling can occur. In practice, much the larger percentage of energy that reaches the turntable is *structurally-borne*. This situation condition has recently become aggravated by the use of spikes to couple loudspeakers rigidly to the floor; broad-band energy of potentially high amplitude is then transmitted from speaker to stand to floor and thence to the turntable.

This is particularly the case with suspended wooden floors, which often exhibit primary resonances of their own up to 100Hz or so. Concrete floors may suffer various high Q resonances too, unless supported underneath by either brick or earth which constitutes a very effective form of damping. Another factor that cannot be ignored is the input of subsonic energy from nearby roads (which can attain significant amplitude), in addition to the effects of physical movement in the room itself, *eg* football shock.

Assuming that the turntable is not sitting directly on the floor, its support (either a rack or piece of furniture) will influence the range and amplitude of frequencies actually reaching the underside of the deck. Heavy structures, such as record-laden cabinets and sideboards will tend to store more energy just as their primary resonances will be very low in frequency – usually rocking-type oscillations. Non-suspended record players will then be directly affected by football and road noise, while complex intermodulation may result with the suspension resonance of 'bouncy' decks – low rate wow may well be obvious on critical program.

Such heavyweight supports are now frowned upon and a rash of lighter, more rigid equipment tables are available for system 'tuning'. Most adopt an open-frame construction, using square section tubular steel

members welded together in a proprietary fashion. A comparably flexible wooden top board is located with the minimum contact (often with inverted spikes), providing a large surface area on which to place the record deck. There are many variations on this basic theme of course.

It is important to appreciate that much of a turntable's subjective character is determined by the *materials* and the mechanical relationships between those materials actually used in the construction of the deck. Simplistic banter concerning high or low mass designs is just so much eyewash; what is important are the materials and mechanical interfaces that constitute that mass and how they react to the input of unwanted broad-band noise. Even so this is only one factor, albeit a critical one, that affects the subjective performance of the record player as a whole.

I mention this for a very important reason. Each deck has a vibrational fingerprint – a succession of resonances and associated harmonics that are specific to the combination of materials used in its construction. Therefore, each and every deck will react in a different fashion to the input of broad-band noise; noise from the outside world which has already been modified by the mechanical characteristics of the turntable support itself. Coincident resonances in both support and turntable are most likely to influence the subjective evaluation of the deck – this has been proved by experiment.

Most metal-framed equipment tables were seen to resonate initially in the 50-100Hz region, equivalent to a slight movement or shudder. Harmonics (mostly even-order) were then apparent in the 400Hz, 600Hz and 1.2kHz bands, each at a progressively lower amplitude and defining the resonant characteristic of that particular frame. Just as a musical instrument's succession of peculiar harmonics lend it 'character' or 'timbral detail', so

the metal 'ringing' is caused by high-order overtones of the primary low frequency resonance. Of course, the use of a wooden top-plate and subsequent mass-loading by the deck itself further influences the range and amplitude of frequencies reaching the deck.

One final point concerns the application of these supports with CD-players and amplifiers (particularly valve products). There is strong evidence to suggest that vibration may introduce subtle changes in the performance of solid-state equipment, though not necessarily through microphony, implying that experimentation with isolation outside of the turntable domain may well be of some benefit. This is a highly complex topic in itself, deserving comprehensive coverage at a later date.

THEORY INTO PRACTICE

In order to emulate the transmission of mechanical noise through the floor and into the equipment table, a false wooden floor was constructed that could be vibrated over the 5Hz-2kHz range. Each equipment support was pre-loaded with a 4kg weight and the output of the frame/top board measured at various points with an accelerometer.

The vibrational response of the floor was relatively even up to 400Hz (artefacts in this structure measured at -50dB), whereupon the output of mechanical energy fell by a constant 20dB/octave. A 'wall' of broadly similar construction was employed for the evaluation of equipment shelves. Representing the peak output near the centre of each support, the vibration spectra have a linear frequency scale while the y axis is calibrated in 10dB steps, offset by -10dB relative to the input amplitude.

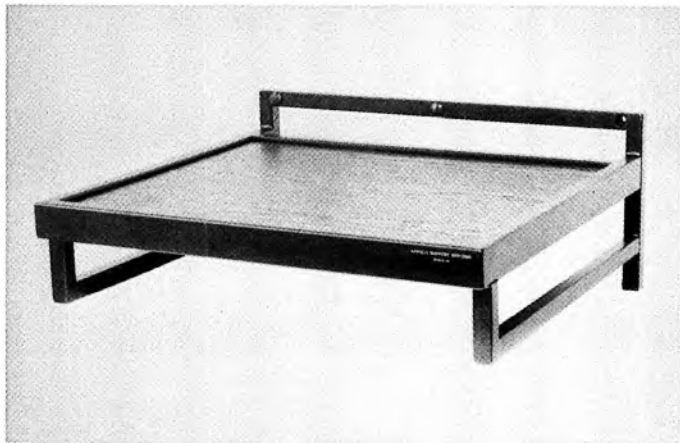
For auditioning purposes, three decks were employed: pink Triangle *P'OO/SME V*, Townshend *Rock/Excalibur*, Michell *Gyrodek II/SME V*. CD-players included the Tandberg *3015A*, Denon *DCD-1700* and Nakamichi *OMS 1E*.

APPOLO CT2 WALL SHELF

UNIT 2, PRINCES END IND. EST., NICHOLLS RD.,

BATMANS HILL, TIPTON, W. MIDS DY4 9LG.

TEL: 021 520 5070.



Resembling the top structure of their equipment table, Appolo's £38 CT2 shelf has recently been updated with the removal of two back mounting plates. The present frame is now rigidly fixed to the wall via a series of five mounting holes, three along the top and one at each end of the rear frame. Set at right angles, this inverted-U rear section is composed of 18mm square-section tubing and is finished in a black powder coating of adequate quality.

An 18mm x 37mm rectangular-section frame constitutes the bulk of this shelf, and four corner braces are welded into position to facilitate spikes in much the same way as with the table. These inverted spikes may be adjusted so that the dual-coloured board is lying exactly level – this type of system trades ease of use for a slight reduction in mechanical integrity. Further bracing is provided by two additional 18mm struts that are welded onto the underside of the main frame, though as these are bent into an L-shape they offer less reinforcement than a diagonal strut would, for instance.

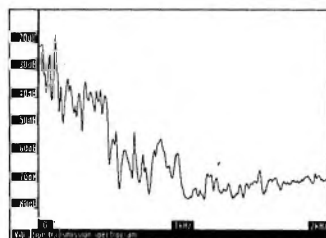
Due to the reduction in weight and increase in rigidity over the AT7 table, the primary frame resonance was deferred to 100Hz (-19dB). On this occasion, the slight differences in construction did not aggravate the secondary 400Hz modes; in fact the wooden board reduced this close (40Hz spacing) cluster to a reasonable -39dB. Conversely, as the input of energy is at 90° to that of a

table, the transmission waves lie in the plane of the top-board thereby reducing the inherent attenuation at higher frequencies. Witness the low-Q tertiary cluster at 800-900Hz (-55dB). The reduction of higher frequency 'ringing' harmonics was complete above 1kHz.

Subjectively, this shelf fared slightly better than the AT7 table, although there was still a faint upper bass bloom when used with the non-suspended deck (Rock). Transient attack was improved over mounting the deck on an ordinary wooden shelf, just as a general tidying-up of the mid-band was also observed. Overall then, the CT2 proved a more successful product for Appolo, but the competition remains fierce.

GENERAL DATA

Topboard Area	455 x 380mm
Overall depth	200mm
Shelf Spikes	Adjustable
Finish	Fair
Value	Good
Price	£38



APPOLO AT1 TABLE

UNIT 2, PRINCES END IND. EST., NICHOLLS RD.,

BATMANS HILL, TIPTON, W. MIDS DY4 9LG.

TEL: 021 520 5070.



Subscribing to the open frame philosophy, the £50 Appolo AT7 may be readily distinguished by a rectangular section shelf support across each corner of the top frame, these being drilled and tapped to accept inverted spikes which are themselves locked into place from below. The quality of the welds could have been improved, while the spikes themselves were difficult to screw into place, often ending up at an angle to the perpendicular – not a good start.

Veneered in black ash vinyl one side and teak vinyl on the other, the 12mm board uses stick-on metal discs made of a soft and readily pierced alloy to locate onto the upturned spikes. Four vertical steel legs are welded to the top frame and these are reinforced some 120mm from the floor by a further square brace composed of 18mm tubing. This also supports a laminated chipboard base, without recourse to spikes.

Heavy adjustable spikes ensure a stable floor placement, although these were very difficult to screw into place and may be slightly too thick for some carpets.

The main frame resonance occurred at a low 40Hz (-14dB) due to the top-heavy construction, with related peaks at 120Hz (-27dB) and at 480Hz, 560Hz, 640Hz, 720Hz (-62dB) – the latter series are harmonically related, being adequately suppres-

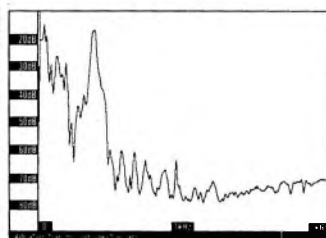
sed (-30dB) by the wooden top plate. Most serious, however, was the reinforcement at 395Hz (-16dB) which represents a major design flaw and one that was most certainly audible.

On test there was a definite increase in vocal sibilance, especially with male vocals. Compared to the Target table, for instance, the overall tonal balance was lighter while stereo images were less secure. Some instability and loss of focus was noted with the Gyrodek, as the secondary frame resonance (395Hz) coincided with flexure of the turntable's perspex base. Subtle, low level information was confused as the lower midrange in particular exhibited a softened and diffuse 'air'.

Unfortunately, Appolo's brute force construction has backfired with their inappropriate choice and dimensions of the wooden top board. Further research and development could redress this situation, however.

GENERAL DATA

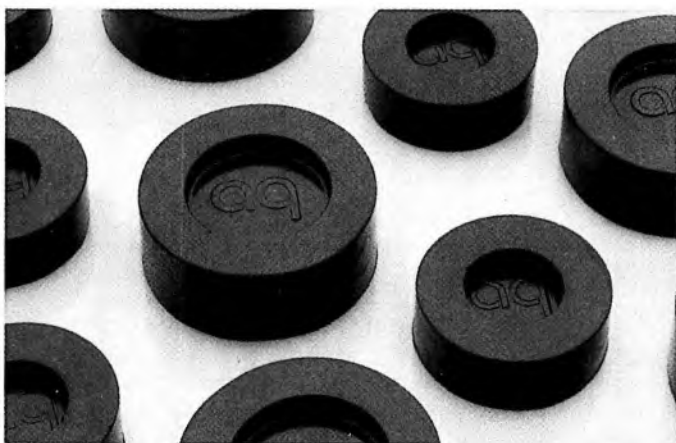
Topboard Area	455 x 380mm
Height	463mm
Carpet Spikes	Adjustable
Finish	Fair
Value	Fair
Price	£50



AUDIOQUEST SORBOTHANE FEET

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

RECOMMENDED



Imported from the US by Arcam (A&R Cambridge), these interesting £10 black blobs from the varied AudioQuest product range may be placed under any piece of audio equipment to afford a degree of mechanical isolation. Fashioned from cylinders of an elastomeric polymer called Sorbothane, this material (derived from sorbo-rubber) seems remarkably adept at converting low frequency vibrations into thermal energy (heat).

Used under suspended-subchassis turntables, these spongy feet will produce a quasi-4th-order series-coupled system (as viewed by the pick-up cartridge). Complex intermodulation products (beats) may result from the sympathetic subsonic resonances in both the Sorbothane and turntable suspension, seriously undermining the subjective low frequency performance of the deck. In fact, this very phenomenon was observed with both PT and Gyrodek turntables: a slight bass boom and loss of stereo focus was immediately apparent, while pitch instability was audible from a recording of solo piano. Instrumental muddling became increasingly problematic with more complex musical passages.

However, quite the reverse effect was obtained with the solid Rock turntable which benefited from some additional isolation. Treble detail was sweetened and the resolution of central depth information was sharpened-up. Measured directly, these feet gave up to 30dB of attenuation at

frequencies up to 500Hz; beyond 700Hz efficacy was impaired and the dynamic compliance of the polymer rendered it essentially 'solid' by 1kHz.

The published spectrum indicates the effect three of these feet had on the RATA *Torlyte* platform. The reduction in spurious output above 1.2kHz is obvious. However, the limited 15dB attenuation up to 600Hz results from the close proximity (10mm) and therefore acoustic coupling of the two parallel diaphragms; that is, the *Torlyte* platform and vibrating wooden 'floor'. As the Sorbothane was effectively by-passed to some extent here, its true merit has been partially obscured.

Most exciting, however, is the application of these feet with CD-players and amplifiers, the former often sounding sweeter and less grainy. AudioQuest's Sorbothane feet are definitely worth experimenting with.

GENERAL DATA

Overall Diameter	65mm
Uncompressed height	25mm
Finish	Good
Value	Good
Price	£10 each (min. 3 reqd.)



CORNFLAKE TCS5 TABLE

THE CORNFLAKE SHOP, 37 WINDMILL ST.,

LONDON W1P 1HH. TEL: (01) 631 0472.

RECOMMENDED



In an attempt to reduce the *amplitude* of any inherent structural resonances, the £50 Cornflake Table has been constructed from comparatively short tubular steel members. Four circular-section uprights of 18mm diameter are terminated in fixed spikes, those at the base being somewhat longer and sharper than those that support the top-plate. These uprights are themselves linked with a series of 12mm diameter tubes that form the upper and lower 'halves' of the table. All the tubing is coated with a high-quality nylon finish, providing a modicum of damping for the higher frequency surface waves. It also looks rather nice!

The Cornflake's top-plate is denser and stiffer than the usual chipboard surfaces, being fashioned from a sheet of medite. This plate then rests on four points that lie directly above the points of contact with the floor. A series of four recesses have been drilled out of the underside of each corner, leaving a slight 'bump' in the middle of each for the location of the upturned table spikes.

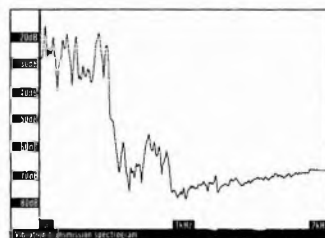
Structurally, the use of a medite top-plate is reflected in an additional and relatively high-Q resonance at 460Hz (-24dB), which narrowly missed a coincident reinforcement with the secondary frame mode at 400Hz (-19dB). Further up in frequency, the tertiary resonances associated with the thinner cross-members have not been attenuated as much as they might had a more flexible board

been employed; this harmonic series across 760Hz, 800Hz, 840Hz and 900Hz is suppressed by -55dB. The principle frame resonance was located in the 180Hz region (-21dB); those peaks at lower frequencies appear to be related to the bass board moving very slightly.

Subjectively, this table offered little hindrance to the recreation of an open and lucid soundstage, displaying a firm, stable and transparent midband, allowing vocals to 'breathe' naturally. One particular characteristic concerns a very slight moderation of the frequency extremes - the lowest notes seemingly curtailed just as the extreme treble often appeared a little reserved. This has the effect of bringing forward and consequently highlighting the favourable aspects of the midband. This table would seem to help ameliorate unwanted brightness, while the relaxed and unfatiguing sound represents a definite plus point.

GENERAL DATA

Topboard Area	430 x 330mm
Overall Height	290mm
Spikes	Fixed
Finish	Very Good
Value	Good
Price	£50



FOR SYSTEMS GREAT AND SMALL

SONY



*Dealer Awards
1987*

REGIONAL
WINNER

*Steve
Boxshall*
AUDIO

A MEMBER OF BADA

41 VICTORIA ROAD, CAMBRIDGE : (0223) 68305

audio
INSIGHT

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

Cold hands, warm heart
HOT SEAT



KRELL

★

Come and join us at our Absolute Sounds musical evening on
Monday 28th March 1988 at 8.30 p.m. at
The Stanneylands Hotel, Stanneylands Road, Wilmslow.

For your own hot seat contact Aston Audio for a free entry ticket
and receive details of a special promotion on all
Absolute Sounds high-end products.

★

APOGEE · KRELL · KRELL REFERENCE · MAGNEPLANAR
MICRO-SEIKI etc.



THE HI-FI CONSULTANTS

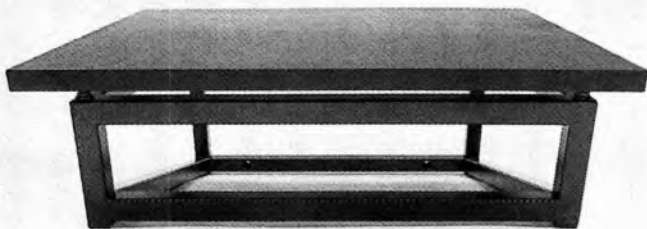
Aston Audio 4 West Street Alderley Edge Cheshire SK9 7EG Tel: 0625 582704
Open: Tues-Fri 10am-6pm Sat 9am-5pm. Export specialists.



CORNFLAKE TCS6 SHELF

THE CORNFLAKE SHOP, 37 WINDMILL ST.,

LONDON W1P 1HH. TEL: (01) 631 0472.



Cornflake's £50 wall shelf is constructed out of 18mm square-section steel tubing in the manner of most other shelves – obviously, the circular tubing used in the table would be a little difficult for wall fixing. Supported by a 200mm x 384mm rear frame, the horizontal tubing is welded in place at the very top and reinforced underneath by a squat frame that is itself linked to the lower part of the wall-mounting bracket. The overall structure is very rigid, especially in terms of rotational modes, being fixed to the wall *via* four spaced mounting holes and a set of huge bolts and rawlplugs.

Threaded steel inserts have been mounted on the top horizontal frame to facilitate the adjustment and final locking of four supporting spikes. These are positioned over the same area as those fixed spikes used on the table, for Cornflake employ the same medite top-plate to carry the desired piece of equipment. It is important to ensure that both the frame and spike lock-nuts are tightened up with considerable force; an adjustable spanner will definitely come in handy for this purpose.

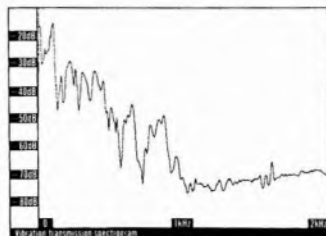
Vibration analysis reveals the main frame mode at a usefully high 110Hz (-15dB), although the rejection of higher, even-order modes was once more restricted by the rigid medite top-plate; note the harmonic cluster at 800Hz (-50dB). Unusually, even some of the extended frame 'ringing' harmonics managed to 'break through' the medite shelf,

and these are visible as high-Q breaks at 1.6kHz (-65dB).

Subjectively, this shelf fared rather better with suspended-subchassis turntables than with the solid types such as the Logic *CI* and Townshend *Rock*. In contrast to its floor table brother, the shelf sounded notably brighter with these latter turntables, though the bass did seem slightly more extended. In common with most of the wall supports there was certainly an improvement in the rendition of sharp, percussive detail over siting on an ordinary wooden shelf, but this increased clarity in some areas was traded for a slight coarsening in the critical midband. Not suitable for all products, the Cornflake *TCS6* is certainly worth considering.

GENERAL DATA

Topboard Area	430 x 330mm
Overall Depth	230mm
Spikes	Adjustable
Finish	Good
Value	Fair
Price	£50



DELTEC ISOLATION BASE

DELTEC LTD., 16 CLAUDE RD., CARDIFF CF2 3PZ.

TEL: (0222) 482818.

RECOMMENDED



The manufacturers of the unique *DPA100S* and *50S* power amplifiers have come up with this £135 heavyweight isolation platform, complete with spring suspension! Originally conceived due to the company's appreciation of the effects of vibration on solid-state electronics, the *Isolation Base* can support any hi-fi component *except* sprung-subchassis turntables. (In most cases, introducing the additional compliance under spring-decoupled turntables will result in a 4th-order series-coupled mechanical system that may become unstable at subsonic frequencies, thereby introducing subjective pitch instability and other ills.)

The platform itself is very simple, using a chamfered and polished slab of Italian slate, drilled on the underside to accept four hefty chrome-plated linear steel springs. These springs locate onto a wooden base, but could conceivably be mounted on any desired surface, including an established turntable table.

Subject to the vibration test, the true mettle of this product was revealed, offering some 45dB attenuation at frequencies up to 600Hz. The complex resonant structure at this low level is partly due to artifacts in the vibration rig itself, while also being derived from harmonics of the slate 'ringing' – note the complex resonances at 200Hz and 300Hz (-52dB), and extended harmonics at 610Hz (-65dB), 710Hz (-72dB) and 810Hz (-75dB). Frequencies above 1kHz are totally reflected by the slab,

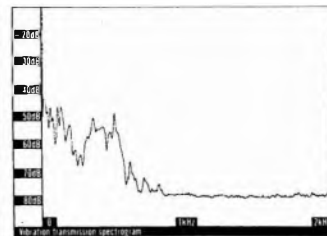
aided by the mistermination of the steel/stone interface.

Used with valve products, including the Beard *M70* monoblok power amplifiers, the Deltec Isolation Platform provided considerable improvement in transparency, clarity and detail resolution – cutting down on the euphonic 'fuzziness' of the valve *modus operandum*. Valve pre-amplifiers should also benefit from similar isolation. Furthermore, certain CD-players benefitted in terms of bass weight, definition and stereo depth, with a smoothing-out of the last vestiges of treble grain from a couple of cheaper models.

The price of this platform precludes a Best Buy rating, but its subjective and measured performance can only warrant the healthiest of Recommendations for appropriate applications.

GENERAL DATA

Topboard Area	505 x 400mm
Total Weight	10kg
Spikes	No
Finish	Good (pre-production)
Value	Fair
Price	£135



The best systems in BIRMINGHAM

DISCOUNT SYSTEMS

DUAL 505/2, ROTEL RA820, AR8BX, or DL4 or 701I 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, ARGAM 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 CD650.....	POA
CAMBRIDGE CD2.....	POA	PHILIPS CD960.....	POA
DENON DCD 300.....	POA	PHILIPS EM2000 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
Solihull
West Midlands B92 8JL

Sales: 021 742 0254
Service: 021 742 0248

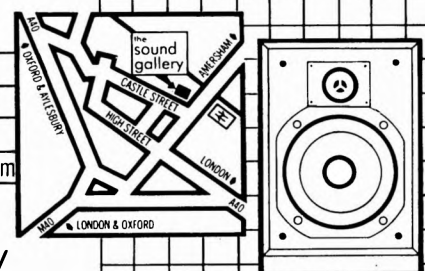
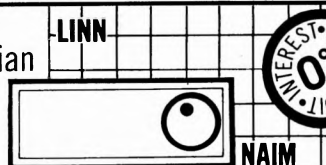
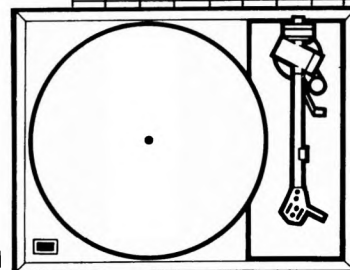
Open from:
TUES to SAT
10.00 — 6.00 pm
DEMONSTRATIONS
BY APPOINTMENT
PLEASE

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



- 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

Precision Audio Consultants

INTRODUCING TO YOU



ELITE ROCK



ROKSAN XERXES

WITH BURMEISTER AND PROAC LOUDSPEAKERS AND ALSO THE MIGHTY PROAC ALONG WITH OTHER TOP-END EQUIPMENT

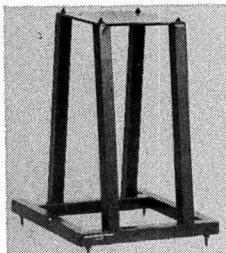
Nationwide delivery and installations
Home demonstrations arranged
Tel: (0472) 698015
for appointments

APPOLO

 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



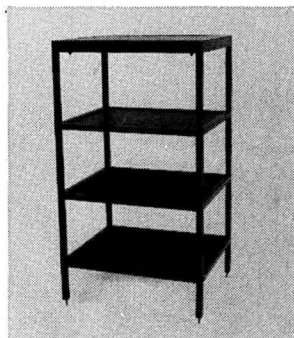
APPOLO STANDS

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 _____

RATA MODEL A STAND

RATA, EDGE BANK HOUSE, SKELSMERGH,

CUMBRIA LA8 9AS. TEL: (053 983) 247.

RECOMMENDED



This well-known, expensive (at £125) and very unusual looking table is constructed from a light-weight material called Torlyte, which has been fabricated into a torsion box. Three broad limbs terminate in very sharp, adjustable alloy spikes, while the top surfaces are capped off with three slim wooden discs. The limbs themselves are joined at a common centre by plastic nuts and bolts that link them to a short wooden cylinder. There is no flat equipment platform as such, but the discs may be rotated slightly to accommodate the feet of the turntable (which may have to be modified from four feet to three).

RATA claim that this method of construction avoids the high-Q resonances inherent in all metal frame tables, but as these tests show, any such resonances are effectively curtailed by misterrmination at the interface with the usual wooden table tops. What is clear, however, is that any resonances in this Torlyte structure are less protracted, as the low mass is less able to store energy than heavier metal tables.

The vibration test showed a multitude of broad-band resonances, the clearest harmonic series' being at 400Hz/520Hz/640Hz (-37dB) and at 775Hz/885Hz/995Hz (-50dB). These are primary and secondary Torlyte *panel* modes which are clearly related in harmonic structure. Positioning on each of the three compliant discs will also prove critical – these 'flap' at 620Hz.

On test, the RATA *Model A* stand set the standard for others to follow, helping the PT and *Gyrodek* turntables sound particularly smooth and spacious – at their best in fact. Delicate timbral detail was revealed without smearing and in a typically unforced manner. The pluck of a guitar string, for instance, seemed to appear in front of the speakers but not *snap* from them in an aggressive fashion.

Acoustic space was generously re-created, and most musical passages benefitted from a gentle fluid character that seemed entirely natural. The recent price increase keeps this specialised table out of Best Buy contention, but confident Recommendation is certainly in order.

GENERAL DATA

Total Height	460mm
Total Width	465mm
Total Depth	385mm
Spikes	Adjustable
Finish	Very Good
Value	Good
Price	£125



RATA AMPLAT

RATA, EDGE BANK HOUSE, SKELSMERGH,

CUMBRIA LA8 9AS. TEL: (053 983) 247.



Utilising the lightweight and rigid construction afforded by RATA's Torlyte material, this simple slat is designed for use on non-specialist furniture to provide some mechanical filtering, especially at low frequencies. The Torlyte skeleton is composed of criss-crossed thin wooden strips, bound at the periphery with a thicker wooden 'picture frame' and sealed top and bottom with two sheets of plywood. Three very sharp, stainless steel spikes are then screwed into position around the underside edge of the platform to provide stability with minimum contact area. If the *Amplat* is to be used on the floor, say for the support of a power amplifier, then slightly larger spikes are available to ensure that the carpet is correctly pierced.

On the vibration rig, this base did help attenuate the lowest frequency signals, though some shifting was apparent at 140Hz (-16dB) and the main bending mode occurred at 215Hz - seen as a double resonance at -14dB; the harmonic series is clearly revealed at 330Hz (-15dB), 410Hz (-25dB) and 490Hz (-20dB). The lightweight construction ensured that these resonances were short-lived, but the overall rigidity resulted in little attenuation above 1kHz - quite unlike the effect of a compliant table-top, for instance.

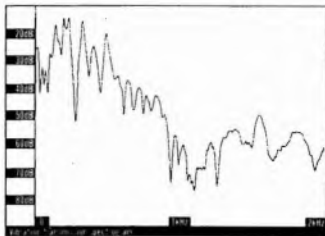
Used with a PT turntable and supported by a Target 772 table, the *Amplat* seemed to improve bass definition slightly, while the leading edges of instruments

were also honed into shape, sounding faster, sharper and generally more articulate. The midband opened up somewhat, inviting comparison with the very positive effects noted with RATA's Torlyte table. Reinforcing the subtle improvements noted in the low bass end, the upper treble revealed subtle timbral detail associated with the upper midband, particularly the wind instruments.

In many applications the Target 772/*Amplat* will prove a worthwhile and less costly alternative to the RATA *Model A* table. Nevertheless, although the *Amplat* base did bring about some subtle overall improvements, it still seems expensive for the material content.

GENERAL DATA

Topboard Area	445 x 350mm
Overall Height	30-40mm
Spikes	Removable
Finish	Very Good
Value	Fair
Price	£40.25

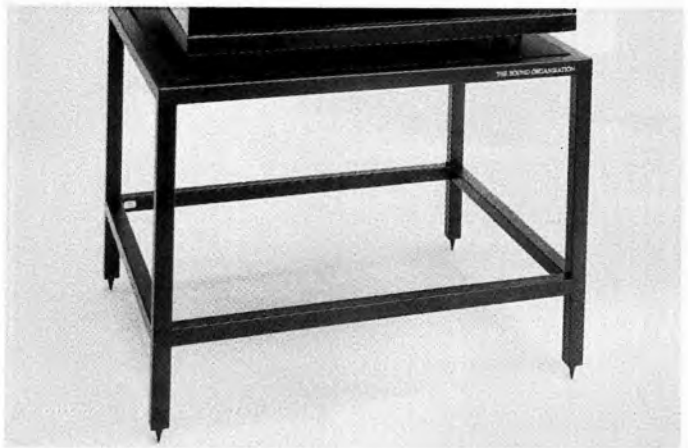


SOUND ORGANISATION TABLE

THE SOUND ORGANISATION, 1 CATHEDRAL ST.,

LONDON SE1. TEL: (01) 403 2255, 403 3088.

BEST BUY



The original, and some might still say the best specialist turntable table, when London dealer The Sound Organisation first introduced their equipment table some years ago, they could surely not have predicted the avalanche of designs that were to follow from other sources.

This £55 black metal frame table in many senses represents the blueprint from which all others are derived. Using 18mm square-section tubing, carefully welded together and terminated with fixed carpet-piercing spikes, the design is simplicity itself. Sound Org's topboard is cut from a relatively thin sheet of chipboard, and is both light and flexible - quite unlike the medite tops employed on other tables. Four right-angled brackets are welded a short way out from each corner and these are filed to a small point to ensure minimal - but stable - contact with the board.

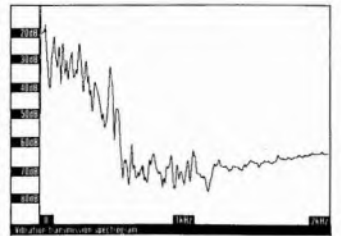
This light board seems to offer little initial damping to high-Q resonances from the main structure. Nevertheless, although the region up to 600Hz is filled with a multitude of fine peaks, the board has provided broadband attenuation of at least -22dB, which is more than any of the other metal-framed tables. The fundamental frame resonance occurs at 90Hz (-22dB), with related peaks visible at 270Hz (-23dB) and 470Hz (-33dB). The board itself was responsible for peaks at 480Hz (-37dB) and 560Hz (-48dB). The gaggle of peaks between 600Hz and 1.1kHz are suppressed ringing harmonics.

This table was widely compatible with turntables from all walks of life, providing a more rigid and stable platform than either heavy furniture or those top-heavy racks that used to be a prominent feature of complete hi-fi systems. There is a notable improvement in the stability of delicate stereo images, while more complex and demanding works were reproduced with extra instrumental separation and less high frequency 'grain'. Stereo images were both tightly focused and highly tactile, aiding the perception of rhythmic detail.

Overall, this table still offers more than enough competition to keep its rivals at bay. In our test group, only the RATA table improved significantly upon its performance, and that particular creation is over twice the price.

GENERAL DATA

Topboard Area	450 x 350mm
Overall Height	370mm
Spikes	Fixed
Finish	Very Good
Value	Very Good
Price	£55



RICHER Sounds 2

A BETTER DEAL IN ESOTERIC HI-FI.

To a legion of hi-fi separates buyers Richer Sounds are unbeatable in the U.K.

Stunning prices are only half the story. There's also a standard of service and expertise that's rarely found in discount stores.

To follow it's success, we felt we could also improve on existing "esoteric" hi-fi dealers' service.

They often intimidate a customer because of his/her lack of knowledge. Yet they're generally too small to offer a large range of equipment or the back-up a buyer of top quality equipment deserves.

We feel we can offer discerning customers a better deal. A package combining our eye for value for money with excellent service. It should be second to none.

WHAT DO WE OFFER?

1. An excellent range of top quality, hand picked products
2. Specialist, sympathetic sales staff to guide you through the maze of purchasing top quality hi-fi
3. Proper demonstration facilities - as much time as you require and single speaker demo facilities for a true audition
4. Optional free delivery and installation with purchases over £500, within a 10 mile radius
5. A full 2 Year Guarantee on all purchases for extra assurance
6. Free Mail Order (via Birmingham) UK mainland

As part of the Richer Group we'll be taking advantage of special end-of-line offers and bulk purchases of top quality hi-fi.

We aim to provide both the best value in the market AND our package of service before and after the sale

This month we've some great offers on Tannoy's superb Tresham amplifier range - and special savings on Marantz, Teac, Kenwood, That's Tape, Ortofon and Rotel CD players. Also we are a Revox Gold Dealer.

Our TDK and That's Tape prices are, as far as we know, the lowest in the UK; and we stock a wide range of CD albums including a selection at just £3.99

And there's more arriving daily!

Richer Sounds 2. Independent specialist audio centres.

NOW OPEN AT:

12 Smallbrook Queensway, Birmingham B21 64J 0664

Open 10-6pm Mon-Fri, 10-5pm Sats.

6 London Bridge Walk, London SE1 01 403 1988

Open 10-5pm Mon-Weds, 10-7pm Thurs/Fri, 10-5pm

Sats. or whatever hours you require

Please bring your favourite records/CDs. Refreshments provided.

Access, Visa & Part Ex welcome. Systems from £300 to £3000.

AKAI AIWA

audio-technica

JVC KENWOOD

ONKYO HITACHI

SHURE ortofon

FRISTON

KEF

DENON

Dual

JBL

PIONEER

TDK TEAC

Goodmans

hafler

harman

Helius

acoustic

LUXMAN REVOX

MONITOR AUDIO

marantz

ROTEL

Nakamichi

TANNOY THORENS

Sansui

SENNHEISER SONY

Technics That's

TRIO

WHARFEDALE

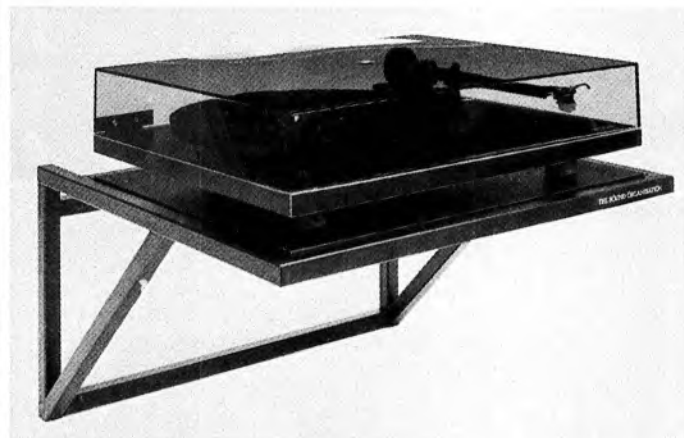
YAMAHA

SOUND ORGANISATION WALL STAND

THE SOUND ORGANISATION, 1 CATHEDRAL ST.,

LONDON SE1. TEL: (01) 403 2255, 403 3088.

BEST BUY



Devised as an alternative to Sound Org's famous turntable table, like all shelves, the £40 *Wall Stand* represents an ideal second-choice for those enthusiasts plagued by young children or excitable pets. It bears obvious similarities to the SO table, and is built from the same 19mm square-section tubular steel. The back frame is drilled with four holes to ensure a rigid mate with the wall, while the horizontal supporting frame is welded to its top. Two reinforcing diagonal struts are welded halfway down the underside of the top frame and at the base of the perpendicular rear frame.

Again paralleling the table, the same four topboard supports are welded into position under the main horizontal framework. The principle bugbear with this design is that there are no user-adjustable spikes with which to level the top plate. SO claim that this is in the interests of maximum rigidity, which is true enough, but great care needs to be taken when fixing the bracket to the wall if the resultant shelf is to be anywhere near level.

Subject to the vibration test, the *Wall Stand* resonated quite strongly at 60Hz (-8dB), though the subsequent harmonics were smoothly curtailed by the deliberate mistermination of the chipboard platform. Similarly, the low-Q main board resonances were isolated at 220Hz (-27dB) and 520Hz (-35dB). However, in common with some of the other shelves, as energy is applied in the plane of the board

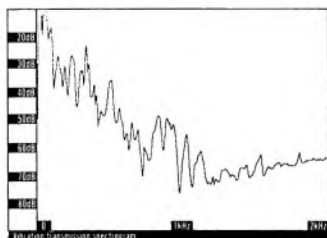
the attenuation between 800Hz and 1kHz is less than that obtained with the corresponding tables. Note the strong ringing harmonics at 820Hz, 940Hz and 1060Hz (-52dB).

Up with the best in the sound quality stakes, the *Wall Stand* allowed suspended subchassis turntables to convey fine transient attack while enhancing the feeling of high frequency 'air' and general openness. The sense of tactile solidity not only cleaned-up the bottom-end but also helped transient notes (eg piano) stop and start convincingly.

All things considered, the *Wall Stand* deserves a Best Buy rating - good value and good sound rarely go hand in hand so convincingly.

GENERAL DATA

Topboard Area	450 x 350mm
Overall Height	275mm
Spikes	Fixed
Finish	Very Good
Value	Excellent
Price	£40

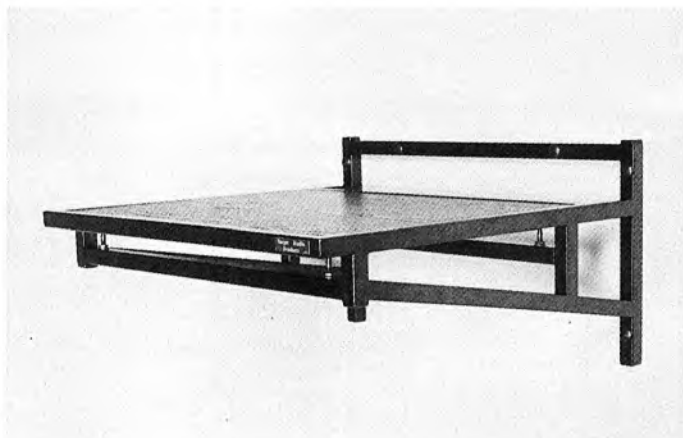


TARGET TT1 SHELF

TARGET, UNIT 10A BRITANNIA EST., LEAGRAVE RD.,

LUTON, BEDS LU3 1RJ. TEL: (0582) 424755.

BEST BUY



Following the trend adopted by most manufacturers, the construction of the £39 Target shelf is quite obviously derived from their own *TT2* table. The rear mounting frame consists of an angular inverted 'U' with a total of six holes to provide a really solid fix with the wall. A vinyl-covered chipboard top lies flush with the main horizontal frame, supported by four upturned spikes in the manner of the *TT2* table. The lockable spikes are themselves located on a rigid subframe which further reinforces the structure.

Soft plastic end-caps have been inserted at any point where the end of a piece of tubing is exposed; the same goes for the unsightly holes in the frame which are necessary for adequate fixing. Target's complex but rigid construction increases the weight of the structure over competing models.

The main resonance was deferred to a high 95Hz, though the mass of the frame restricted attenuation to only -9dB. Above this frequency the frame and topboard appear to do a marvellous job in rejecting unwanted noise. The secondary and tertiary clusters are seen at 360Hz (-41dB) and 910Hz (-52dB) respectively; like the other wall-mount shelves, suppression of this latter mode is worse than in the equivalent table structure. More unusual perhaps was the protracted high-order harmonic series observed above 1.4kHz; however, being below -60dB these are unlikely to exert any

subjective influence.

Fortunately this proved to be the case, the *TT1* delivering a coherent and solid bass performance matched only by the fluidity and apparent 'ease' of the mid-band. Unpleasant, compressive colorations were held to a minimum, although there was a hint of treble insecurity with raucous instruments such as a jazz trumpet. With suspended decks, including the PT, the *TT1* shelf fell just behind the standard set by Sound Org's frame; by contrast, solid decks (including the *Rock*) fared rather better on the *TT1*. Coincident resonances are undoubtedly the root cause.

In general terms, Target's *TT1* scaffold offers the potentially good sound quality with built-in versatility; a Best Buy rating seems most appropriate.

GENERAL DATA

Topboard Area	465 x 355mm
Overall Height	260mm
Spikes	Adjustable
Finish	Excellent
Value	Excellent
Price	£46.50



What the press say . . .

The piece was crammed. It was rush-hour. We had to sidle in, feet shuffling, breath held in, head back to avoid butting the taller assistants on the chin, bottom forward in case we activated a quartz synthesiser tuner or nudged a semi-automatic, belt-drive turntable. In other words, there was someone else in the shop.

Richer Sounds claims to have won the coveted award of "Untidest Hi-Fi Shop of the Year, 1982/3" and looks like walking away with the prize for the foreseeable future. "There's the up-market type of shop," states the brochure, "where you'll get personal service, a smart environment, demonstrations, installation and so on." Richer Sounds is not one of these. For example, "The nearest we get to installation is to make sure you get an instruction book." (The truck, incidentally, is to take it outside, where there is room to open it.) Its address is not even in the A-Z, which does have the result of keeping people away, thus providing what passes for elbow room

on its premises.

One of the reasons for the premises being crammed with up to single figures, is that the **Punch Consumer Bureau's Technical Adviser** spends his spare time browsing among the silicon chips. Since he is 152, he is youthful enough to keep up with prices in the audio field; he assures us that the Richer Sounds compact disc player is £150 cheaper than the cheapest normal retail price and he also assures us that he still can't afford it.

What he can afford is much of the rest of the stock, which is highly economical - just above back-of-a-lorry sums - because it is last year's model, or small order returns, or bankrupt stock, or simply part of a very bulky bulk purchase. El Cheapo here does not mean a stony silence after a couple of months' use.

"If you only listen to Radio Moscow," they advise, "there's no point in buying a hi-fi tuner, just a simple shortwave radio."

'Punch Magazine'

'New Hi-Fi Sound Magazine'

In an effort to encounter the predominant influence of Hi-Fi Markets, a group of independent dealers decided to form a limited company, AVID, in order to pool resources and compete for special offers and end-of-line dealers Julian Richer, of Richer Sounds in London Bridge, was a member of AVID in the early days. He is now a very powerful independent and competes with AVID for deals.

Over the next few months, AVID will show that they have a united arm by presenting a concerted advertising campaign aided by the in-house graphic department. Although there is some overlap between AVID, EACA and Hi-Fi Markets dealers, there's plenty of infighting.

Adding spice to the debate is the presence of Richer Sounds. Julian Richer has expanded the store phenomenally in its short life. It's now on target for a £2 to £3 million annual turnover. One thing you could never accuse Julian of is pretentiousness. The tiny shop is littered with boxes piled up to the ceiling.

What Richer Sounds specialises in are exceptionally low prices on end-of-line products. They also sell equipment that has been returned after appraisal to mail-order companies like Freemans. What happens is that the equipment is passed back to the manufacturers who store it in the warehouses once it has been checked by the service departments. Julian has really cornered the market in this kind of equipment.

Everything on sale at Richer Sounds is priced and clearly marked to indicate if it is end-of-line, mail-order return, or secondhand (Julian started business by advertising secondhand gear through Exchange & Mart) Two service

engineers are employed full-time to deal with customers' problems. And if customers can't wait for their equipment to be repaired, should something go wrong within the statutory one-year period, they should be able to bend Julian's arm into giving them a temporary replacement.

Aggressive marketing has helped Richer Sounds expand dramatically in a very short space of time. He has published a price list which shows every special price, except from those from specialist manufacturers who want to preserve their loyal mainstream dealers. After all, it wouldn't do to have other dealers know how much of a discount someone like Julian Richer is getting.

The monthly price list carries cartoons of the staff and tongue-in-cheek biogs, viz Jez is the haggard wreck of a human being who would like to be an ageing rock star - he started by becoming a physical ruin, is waiting for a full labotomy.

As the staff are motivated (ie they get a slice of the cake), they tend to stay at the store, unlike some specialist stores where turnover is very quick. I heard a story from one manufacturer who said that a leading chain-store requested training for their staff three months after the company had conducted a course. On mentioning this fact, it transpired that all the staff had left within that period!

On one recent price list, Richer Sounds published a coupon offering to refund travel expenses as long as the buyer spent a certain amount of money and could show that he had taken the cheapest route to the shop. (It is told that someone came all the way from Birmingham and tried to claim. Does anyone know the outcome?)

With patchy trading in so many stores, it's good to see someone putting the fun back into buying hi-fi. There's a lot of hypocrisy in every industry. Hi-fi has its share, and it's particularly well illustrated

by the attitude towards Richer Sounds and AVID.

Both operations provide a valuable service to the industry. Imagine you are a big hi-fi manufacturer trying to flog a quartz-locked direct-drive turntable for £130. You're stuck with 2,500 boxes in the warehouse with next season's shipment on its way from Japan. Your regular, franchised dealers don't want the old models. What happens? Julian Richer buys them at a knock-down price and sells it on with an adequate margin at a retail price of less than £50. I challenge anyone to say that that was not a good buy at the price.

One thing you could never accuse Julian Richer of is pretentiousness

As things stand, AVID are inviting trouble by selling quality hi-fi at knock-down prices. The only basis on which the industry has operated over the last few years has been that high-quality equipment has a high dealer mark-up in order to encourage him to give the time and effort required for demonstrating and setting up. By buying special-offer deals on systems comprised of products that have been consistently recommended by the magazines, you could run the risk of not receiving that necessary service.

With Richer Sounds, you know you won't receive this type of service. So you shouldn't mind when you don't get it. The specialist dealers will say that whatever you buy will need proper setting up and installation. If you believe this - as we do - then you've no alternative but to shop at an expert specialist. But don't expect the huge price reductions, end-of-line deals, or mail-order return deals that the likes of Richer Sounds can supply.

You can see how he makes a business. The Japanese, wanting to get rid of a lot of old stock, will sell it to Julian at an outrageously low price - a saving that Julian dutifully passes onto you the punter. You are, of course, buying what is essentially last year's hi-fi because, by the time that the stuff appears in Julian's shops, the new Japanese ranges are well established. However, you can get some amazing bargains.

In fact, Julian does sell 'new' hi-fi too. The Dual CS505 MkII is on sale in the shops and so are KEF speakers - both have been bought from the companies at reasonable trade rates. It's just that Julian manages to sell so many of them that the price keeps low - the Dual sells for £84.90, Julian isn't allowed to print that price in his ads because conventional Dual dealers would get upset - they would complain that he is unfairly undercutting their business. As a result of that price appearing in this article I will upset Dual and the dealers too.

That's the thing about Julian. His business has the knack of upsetting people. He trundles his cart down the street yelling 'bring out the dead' and they do. But the companies that sell to him will not admit how much they sell to him and how much it costs him. Every company you speak to about Julian's operation comes up with the answer 'Of course we don't do that much business with him - we sell all that we bring in from Japan'. On the other hand, a stroll through Julian's storage facility in London Bridge brings the message home - pallets and pallets of stuff from the companies that most strenuously deny doing a lot of business with Julian.

The result of all this undercover dealings do however, result in bargains for you and, after the initial successes in London the Richer operation is now expanding. So, Richer bargains can now be bought all over the country.

Good service is one of Julian's watchwords. Look after the customer, say Richer Sounds, and he'll come back. Next time he comes back he'll spend more and bring his friend with him. His friend will have told his friend about Richer Sounds. And so it goes on. All in all Richer Sounds is centred around giving you a good deal.

WHAT HI-FI OCT '85

Julian Richer's jam-packed and unpretentious little shop exploits the Japanese electronics industry's planned obsolescence strategy to more or less everyone's benefit. Ranges change every 12 months, but it's generally more of a styling face-lift than a radical change in technology. So you can buy last year's - or the year before's - model without it being much different in performance terms. Richer Sounds have been tremendously successful in snapping up these end-of-line stocks and selling them off at really low prices. (They also handle mail-order catalogue approval returns; these are checked and guaranteed, though you might ask yourself why they were returned.) get these elsewhere first. But they have their own repairs department (and electronics whizz kids might take advantage of the cheap as-found faulty gear they sell).

Richer's no nonsense pile-it-high sell-it-cheap approach is not for you. Their price list and guide are free.

'City Limits Magazine'



LONDON - 2 London Bridge Walk, SE1. 01 403 1201 / 4710 OPEN 10-7pm MON-FRI & 10-5pm SAT
 BIRMINGHAM - 10 / 12 Smallbrook Queensway. 021 643 1516
 BRISTOL - 20 Cotham Hill. 0272 734397
 CARDIFF - 5 Central Square. 0222 383311
 EDINBURGH - 1b Chambers St. 031 226 3544
 GLASGOW - 24 Gordon Str. 041 221 9147 All stores (excl. London) OPEN 10-6pm MON-FRI & 10-5pm SAT
 LEEDS - 55 The Headrow. 0532 455717
 LIVERPOOL - 69B Church Str. 051 708 7484
 STOCKPORT - 4 Wellington St. 061 480 1700
 YORK - 6 Feasegate. 0904 645535



NOW READ ABOUT BUYING HI-FI IN THE REAL WORLD

If you're new to this whole dreadful hi-fi business and you'd like some pretty impartial advice, Richer Sounds produces, absolutely free an amusing 8 page Hi-fi buying guide. Lavishly filled with incredible information and hand crafted in luxurious two-colour, this exciting audio epic (now wearing a smart new look) is a must for anyone with more sense than money.

Cut out coupon & put in an envelope addressed to: **Freepost, Richer Sounds, London SE1 4BR** (no stamp needed)

Name

Address

Post Code

BEST BUY

TARGET TT2 EQUIPMENT TABLE

TARGET, UNIT 10A BRITANNIA EST., LEAGRAVE RD.,
LUTON, BEDS LU3 1RJ. TEL: (0582) 424755.



The £47 TT2 appears to be a rather complex turntable table at first glance, though closer inspection reveals a number of ingenious design features. The main exoskeleton is a straightforward enough 19mm square-section steel tubing, finished in a fine black epoxy. Adjustable spikes lock into the feet to facilitate levelling and provide a stable basic structure. This is reinforced near the bass with a horizontal square frame; small welded inserts at each corner allow a second, lower shelf to be accommodated.

This is repeated near the top of the table where a slightly smaller welded rectangular brace lies parallel to the top horizontal frame. Threaded steel inserts permanently bonded to the longest sides of this horizontal frame allow four very sharp spikes to be adjusted and locked into position. Metal discs stuck onto the underside of the vinyl-covered platform make rigid coupling with these upturned spikes.

The effectiveness of this braced and staggered construction, together with the offset topboard spikes, is reflected in an excellent vibrational analysis with smooth attenuation of resonances with increasing frequency. The main frame mode at 60Hz (-16dB) is somewhat complicated by the unorthodox construction; another high-Q frame resonance is seen at 200Hz (-22dB) while the topboard causes little interference with a further, lower-Q mode at 390Hz (-34dB). As with the SO table,

some higher-order ringing harmonics are also visible: 730Hz, 900Hz and 1010Hz being the most notable.

Subjectively, the TT2 benefited from a very smooth bass character, exhibiting only the merest hint of diffuseness. It was not quite as open or relaxed as the expensive RATA, for instance, but the tight and sharply defined midrange still presented all the musical information in a solid and uncoloured fashion.

To summarise, the TT2 offers super value for money at under \$50, featuring a high standard of metalwork, finish and sound quality.

GENERAL DATA

Topboard Area	465 x 355mm
Overall Height	520mm
Spikes	Adjustable
Finish	Very Good
Value	Excellent
Price	£47.50



RECOMMENDED

TOWNSHEND SUSPENSION BASE

TOWNSHEND INT., UNIT 2 NORTH WEYLANDS IND. EST.,
MOLESEY RD., WALTON-ON-THAMES KT12 3PL.
TEL: (0923) 246850.



Responding to the demand for greater isolation for their *Rock* turntable, Townshend International have recently developed a heavyweight isolation platform. Assessed in pre-production form, the base is constructed around a solid steel carcass that is damped internally with a layer of carpet before being loaded with gypsum and resin. Topside, the base is finished in a glossy black enamel, while the grubbier underside plays host to three isolating 'springs'. In fact these 'springs' take the form of copper bellows, one-third filled with silicone fluid and into which are fitted special paddles, affording a low-pass mechanical filter with progressive attenuation at higher frequencies.

Ultimately, final production models will incorporate adjustable feet which will be necessary to ensure that the platform is as level as possible - our one was most certainly not. This base seemed a little unstable dynamically, and a 2-3Hz resonant frequency was as much a 'wobble' or yaw as a true vertical oscillation. However, the vibration test demonstrated attenuation and hence isolation which was only topped by the costly Deltec suspension base.

A broad and complex resonant structure was recorded, with some of the irregularities undoubtedly due to the vibrating platform itself. The main peaks at 100Hz (-36dB) and 410Hz (-42dB) appear to be derived from pockets of air trapped underneath the steel frame,

caught between the metal and gypsum. Input above 1kHz was effectively suppressed.

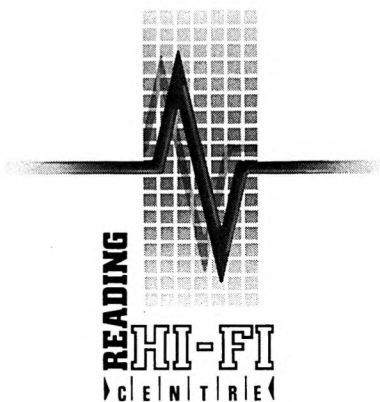
Used with turntables already equipped with their own suspension, the ensuing quasi-4th-order series-coupled system results in low frequency instability, though not to the extent experienced with the Sorbothane blobs for instance. More important, however, the base did improve the deck it was designed to partner, allowing the *Rock* a greater sense of freedom and midband transparency. Furthermore, CD-players, amplifiers and valve products in particular will all benefit from additional isolation; this was confirmed in subsequent listening tests, though the end results were not quite as clear-cut as with the Deltec base.

This isolation platform not only improves the quality of the *Rock* turntable, but also that of ancillary equipment. With improved aesthetics, production models should merit Recommendation.

GENERAL DATA

Topboard Area	430 x 360mm
Overall Weight	7.5kg
Spikes	None
Finish	Fair
Value	Fair
Price	£145





**LET YOUR DEALER GUIDE
LET YOUR EARS DECIDE**

LET YOUR
DEALER GUIDE

LET YOUR
EARS DECIDE

READING HI-FI CENTRE

EDA

THE INFORMATION
SOUND ADVISOR

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. ◀



HI-FI FURNITURE: CONCLUSIONS, BEST BUYS AND RECOMMENDATIONS

Paul Miller concludes with summaries of the best of the supports under review.

This test programme provides new evidence for the conjecture that a turntable's supporting structure (*ie* table or shelf) will modify the amplitude and frequency of the noise eventually reaching that deck. Naturally, it is only when a thorough vibrational analysis on the decks themselves has been undertaken that the two may be cross-referenced. But for the time being it is sufficient to appreciate that the lighter and more rigid tables are likely to afford subjectively more pleasing results than will an over-laden cabinet, for example.

Regardless of the support structure chosen, it is very important to ensure that adjustable spikes are firmly tightened up with a spanner.

Tables used on a concrete floor will be perfectly secure, but those spiked into wooden floorboards may still wobble slightly. This problem may be easily overcome by screwing cross-head bolts into the boards, thereby allowing the downward-facing spikes to locate on the firm heads. This also provides a levelling method for those tables with fixed spikes, like the popular Sound Organisation model.

Adjusting the precise siting of the turntable on the topboard will provide additional 'fine tuning'. Experimenting with different table-tops may also reap rewards; those fashioned from aerolam often give entirely different subjective results to those cut from sheets of chipboard, medite or ply.

Slowly but surely we are beginning to understand and successfully manipulate these subtler aspects of analogue replay, keeping the ageing vinyl disc format fully competitive with the more recent arrivals. More importantly perhaps, the use of a proprietary support would seem to be a prerequisite for maximum fidelity. Many of these shelves and tables represent profound and very cost-effective system upgrades.

BEST BUYS

The following products below a (somewhat arbitrary) £70 price

ceiling offer outstanding value for money and are also versatile in application.

Target TT1 Shelf (£38.75)

This rigidly braced shelf offers both good sound quality and material value for money.

Sound Organisation Wall Stand (£40)

The first of its ilk and still amongst the best, this simple framework represents a vast improvement over standard furniture shelves.

Target TT2 Table (£46.50)

Standing up to the best in most areas, the TT2's only real foible concerns a slight loss in bass 'slam'.

Sound Organisation Table (£55)

A deceptively simple structure that just happens to be engineered in a very thoughtful, and ultimately successful, manner.

RECOMMENDATIONS

The following may be more specialist in application, more expensive, or less versatile, but deliver sufficient sonic goods to be well worth seeking out.

AudioQuest Sorbothane Feet (£10 each)

Great fun to play with, these extra-marital aids also improve the sound quality of most solid-state and valve electronics, but not subchassis turntables.

Cornflake TCS5 Table (£50)

A little too close to the ground for comfort, perhaps, but this novel and stylish little table is certainly worth seeking out.

Deltec Suspension Base (£135)

Designed for all CD-players, amplifiers and separates, but not suspended-subchassis turntables, the isolation is second to none.

RATA Model A Stand (£125)

The recent price rise does little to diminish enthusiasm for this reference quality support.

Townshend Suspension Base (£145)

Designed to complement the Townshend *Rock* turntable, this platform will bring subjective improvement to a wide range of electronics as well as 'solid' (non-subchassis) turntables.

(Assessed in pre-production form.)

Bill Hutchinson

HI-FI, AUDIO & C.D. Centre

* Sales * Service *

ROTEL KENWOOD

marantz Technics

CRISTON Dual **KFF** AIWA

DENON **TANNOY** JVC

Mordaunt-Short **AR** PIONEER

YAMAHA **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!**




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 

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, Nytech, 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, Monitor, Rotel, Pink Triangle, JBL, J.A. Michell, Exposure. 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.

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 Stortford, 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

AUDIO COUNSEL, 12 Shaw Road, Oldham. (061) 633 2602. Linn, Naim, Rega, A&R Cambridge, EPos, Mantra, Inca Tech, Denon, Monitor Audio, Heybrook. Dem facilities, appointment required. Open Tues-Sat 10-5.30. Thurs till 7pm. Free installation, credit facilities. Up to £1,000. Credit cards: Access, Visa, Credit Charge.

CLEARSTONE 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 BBY 1BE. (0200) 26563. Mission, Audio Innovations, Rogers, Quinn, 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, Spondor, 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, Magneplanar, 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

CLEARTONE 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 9.30-6. 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 2323/3519. 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. (0865) 65951. A&R, Denon, Linn, Mission, NAD, Rotel, Yamaha. Also 256, Banbury Rd, Summertown. BADA MEMBER

ASTIRY AUDIO LTD, 3 Market Place, Wallingford (0491) 39305/34349. A.R. 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

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 (0475) 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 AR, 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 (0232) 31326. 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, Tanney, 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)

BCWERS 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 9-5.30, 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 Clive St. (Off Park Lane) Sunderland. (Sunderland) 5672087. Aiwa, Bose.

SELECTED DEALER DIRECTORY

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) 33222. 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, Mordaunt-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, Mordaunt-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.

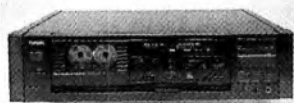
GLAMORGAN

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 

BEST BUYS IN CHESHIRE



MARANTZ SD55



YAMAHA KX200



DENON DRM24



DENON M07



AIWA ADWX 909



MARANTZ SD35

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

SWIFT OF WILMSLOW
ST. ANNS PARADE
PARSONAGE GREEN
WILMSLOW
0625-526213

- FREE INSTALLATION
- 2 YEAR GUARANTEE ON ALL HI-FI
- FREE EASY PARKING OUTSIDE
- PLUS A COMPREHENSIVE RANGE OF TV & VIDEO EQUIPMENT

THE SPECIALISTS

Rayleigh Hi-Fi

44a High Street

Rayleigh

Tel: 0268-779762
747571

216 Moulsham Street, On-the-Parkway

Chelmsford

Tel: 0245-265245

CHOOSE YOUR HIGH QUALITY SYSTEM



REGA PLANAR 3 TURNTABLE	£188.00
LINN K9 CARTRIDGE	£64.90
CREEK CAS 4040 AMPLIFIER	£145.00
ROYD CONISTON R SPEAKERS	£149.00
TOTAL	£546.90

NO DEPOSIT FINANCE - 36 MONTHS @ £21.13 (4.88 PER WEEK)
 OPTIONAL EXTRAS:
 CREEK CAS 3140 TUNER £149.00
 DENON DRM-07 CASSETTE £139.90



LINN SONDEK LP12 TURNTABLE	£471.00
LINN ITTOK LV2 TONEARM	£399.00
LINN TROIKA CARTRIDGE	£625.00
NAIM NAC 32-5 PRE-AMP	£425.00
NAIM HI-CAP POWER SUPPLY	£391.00
NAIM NAP 250 POWER AMP	£966.00
NAIM SBL LOUDSPEAKERS (PR.)	£1099.00
TOTAL	£4376.00



LINN AXIS TURNTABLE	£313.00
WITH BASIK PLUS ARM & CART	£258.00
NAIM NAIT AMPLIFIER	£272.00
LINN KAN LOUDSPEAKERS	
TOTAL	£843.00

NO DEPOSIT FINANCE - 36 MONTHS @ £32.55 (7.52 PER WEEK)

HIGH QUALITY HI-FI FROM:--

A&R * AUDIOLAB * BEYER * BLQ * CREEK *
 CYRUS * CELESTION * DENON * DNM * DUAL *
 EPOS * GALE * GRACE * HEYBROOK *
 INCA TECH * ION SYSTEMS * KOETSU *
 LINN PRODUCTS * MANTRA * MISSION *
 MONITOR AUDIO * MORDAUNT SHORT *
 MUSICAL FIDELITY * NAD * NAIM AUDIO *
 NAKAMICHI * ONKYO * QED * QUAD * REGA *
 REVOX * REVOLVER * ROGERS * ROTEL *
 ROYD * SUPEX * SYSTEMDEK * YAMAHA *

★ **SPECIAL OFFER** ★ BRING IN (OR JUST MENTION)
 THIS ADVERTISEMENT FOR **FREE** SPEAKER
 STANDS, PLUS **FREE** SPEAKER LEADS AND
 PLUGS FOR ABOVE SYSTEMS

OR

0 % FINANCE AVAILABLE FOR LIMITED PERIOD ONLY
 DETAILS ON REQUEST

★ **NEW ARRIVALS** ★
 ROKSAN TURNTABLES
 NEW MISSION CYRUS RANGE
 AND MISSION MECHANIC TONEARM,
 NEW NAKAMICHI RANGE

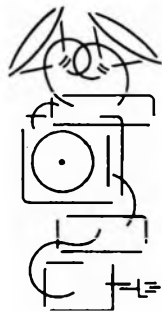
Visit either of our superb showrooms and discuss your
 requirements with our enthusiastic and knowledgeable staff
 who will be pleased to tailor a system to suit **YOU**

3 YEARS PARTS AND LABOUR GUARANTEE ON HI-FI SYSTEMS

LICENSED CREDIT BROKER - FULL FINANCE FACILITIES AVAILABLE - DETAILS ON REQUEST - APR 26.5%

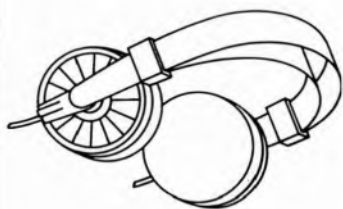


THE SPECIALISTS



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

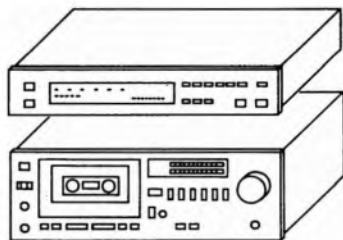
The key advantage of separates is

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.

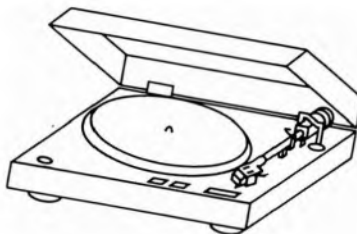
There will always be controversy over the relative qualities of LP, CD and cassette, with earnest protagonists often trying to advance their prejudices by rubbishing rivals. LP is still the choice for ultimate sound quality – particularly for those prepared to



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 musiccassette.

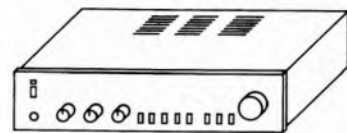
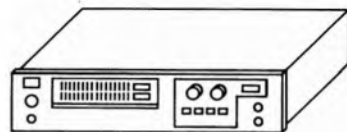
Cassette has never really challenged vinyl's potentially superior quality, but it is a multiple role format, offering 'go anywhere' flexibility, a uniquely useful recording capability, plus a broad catalogue of pre-recorded musiccassette material. Although there are several potential rivals for recording 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.

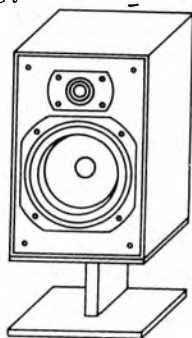


A MATTER OF PRECEDENCE

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.

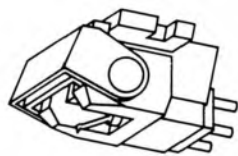
MAXIMISING POTENTIALS

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

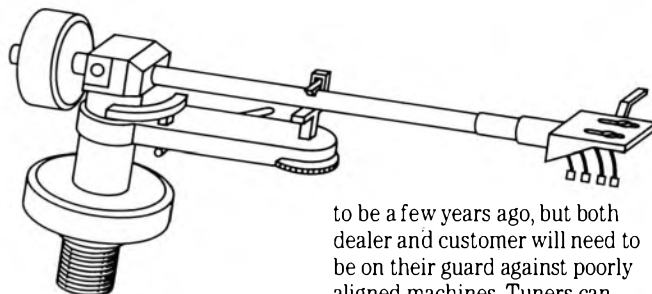
placed wall-hanging, say above a fireplace, can work wonders in removing an unpleasant 'flutter echo' effect, while a decent carpet is almost mandatory. 'Live' rooms are usually those that are sparsely furnished with hard wall coverings, so the overall live/dead acoustic balance can often be modified 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,



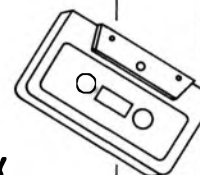
and hard plastic studs may be the only satisfactory solution

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.

THE MIDLANDS DENON CASSETTE CENTRE

BEST BUY . . . DRM24HX

**RECOMMENDED . . . DRM07
DRM12HX**

Come and judge for yourself at

ACTIVE AUDIO IN DERBY

Demonstrations a Pleasure
Full Range Available

Largest Range of Quality Cassette Decks
in the Midlands:-

Aiwa, Denon, Yamaha, Pioneer, Onkyo,
Rotel, Marantz, Revox, Kenwood, Nad, Nakamichi, Proton, Sansui etc.

DRM07
Full-logic Control Stereo Cassette
Deck

- Full-logic control transport
- Tape bias fine adjustment
- Dolby B & C noise reduction system



DR-M12HX
Computer Controlled Silent
Mechanism, Cassette Deck

- Computer controlled silent mechanism
- Dolby HX PRO system
- Dolby B & C noise reduction system
- Manual bias adjustment control



DR-M24HX
Stereo Cassette Deck

- 3-head system with SF combination heads
- Dolby HX Pro Headroom extension
- Dolby B/C noise reduction
- Manual bias adjustment
- MPX filter switch



ACTIVE AUDIO LTD

12 OSMASTON RD, THE SPOT,
DERBY 380385

THE STEREO STORE

16 OSMASTON RD, THE SPOT,
DERBY 385185

ASHTON AUDIO

DUNSTABLE'S HI FI SPECIALIST
— 0582 608003 —

Selected stock includes:

Nakamichi	Thorens
Quad	Inkatech
Cambridge	Ariston
Nad	Rotel

Open Mon-Sat 9 – 5.30 p.m.

No. 6 High Street South, Dunstable,
Bedfordshire LU6 3HA

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	Milltek	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

DIRECTORY

TURNTABLES & TONEARMS

The schizophrenic split between consumer electronics and 'real hi-fi' is most obvious amongst turntables. The former are supplied simply as a means of playing vinyl in a system context. Cheaply manufactured in the Far East, these are complete players with a variety of automatic facilities, sometimes tied into system remote control. But engineering compromises severely limit sound quality: cartridge choice may be P-mount restricted and such machines are rarely stocked by specialist hi-fi dealers these days.

Specialist turntables offer big sound quality

improvements, but lack so-called convenience features (that practised users often find irksome). Such turntables at the cheaper end of the market (sub-£350) tend to be supplied with matching tonearm, and often include a 'starter' cartridge. Still better quality is found at higher prices amongst the separate motor units and tonearms. Careful partnering and set-up is essential for these individual components, but 'naturally sympathetic' combinations do exist, and the good dealer can help.

Listed separately as integrated players and as turntable motor units and tonearms, our **sound**

quality rating is based on results achieved using a high quality system – but in point of fact the turntable is usually the limiting factor soundwise in any system. **Lab performance** summarises the speed stability, vibration generation and environmental isolation of turntables, along with the friction, alignment and adjustment of tonearms. The tonearm's physical characteristics also define a range of mechanically compatible cartridges (see cartridge listings).

INTEGRATED TURNTABLES

NAME PRICE	LAB SOUND	COMMENTS	FEATURES ARM EFF. MASS	VALUE	BACK ISSUE FULL REVIEW
Acoustic Research EB101 £220	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-100S-MCS £695/£359	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 Q-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 Q/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/Coil
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 PD290 £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/£330 (Arm)	Good+ Good+	Fitted with a Rega RB250 arm variant and AT95C cartridge the Mantra fared very well indeed with a fine midrange and good focus	Subchassis, 12g, manual	BB	48/Coil
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	B3	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 £199	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 £199	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 58

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 quo is a certain lack of pace, energy 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		48
Mitchell 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
Mitchell 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 TOD £539	Very Good Very Good	A substantial improvement on its predecessor, the TOD's new outboard power supply and motor gave a neutral sound with fine depth and detail	Electronic, subchassis	R	48/Coll
Roksan Xerxes £595	Excellent Excellent	This unique design cuts a swathe through the conventions of turntable design, providing superb resolution and stereo. Setting up is critical, and for experts only	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		48
Systemdek IV £448	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 IIIIS £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 'stave' 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).

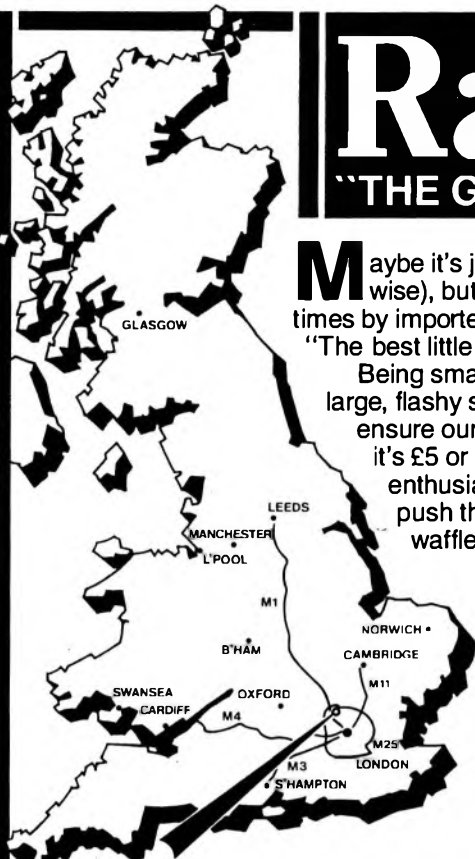
NAME PRICE	LAB SOUND	COMMENTS	ARM AMP MATCHING	VALUE	BACK ISSUE FULL REVIEW
A&R C77 £20	Average + Average +	A sensible moving magnet package with good bounce at a competitive price	6-16g Normal	BB	48
A&R P77Mg £47.50	Average + Average +	Cautiously recommended, the P77Mg was preferred to its cheaper partner 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 MC5 £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 Choral £799	Good Very Good	Looking like a piece of NASA gadgetry the Choral's transparent treble delicacy was without equal. A serious audiophile choice	4-10g Low n/p	R	48/Coil
Clear Audio Gamma £285	Average Average +	Brimming over with enthusiasm, the unusual-looking Gamma's 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 58

Radlett Audio

"THE GREATEST LITTLE SHOP IN THE COUNTRY"

CONSULTANTS



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

Radlett Audio Consultants
 141 Watling Street, Radlett, Herts.

☎ 09276-6497



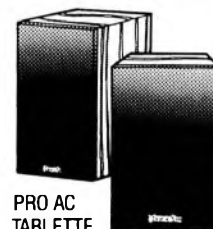
LINN LP 12



AUDIO RESEARCH D70



KOETSU RED



PRO AC
 TABLETTE

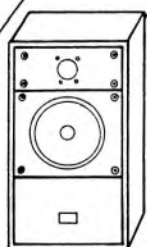
The Audio File

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
- Inca Tech
- Linn
- Mantra
- Misslon
- Monitor Audio
- Naim
- Nakamichi
- Phillips CD
- QED
- Quad
- Rega
- Roksan
- Rotel
- Ruark
- SME
- Tannoy
- Thorens
- Wharfedale
- Yamaha

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

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 Prädikat, the Delta sounds like neither! Nevertheless, it delivers the goods	6-17g Low	R	54
Clear Audio Prädikat £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		Coll
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 11LZ 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/Coll
Koetsu Red £825	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/Coll
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/Coll
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/Coll
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/Coll
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		Coll
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/Coll
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/Coll
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

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, bounciness 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	5-17g 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 pulite	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/Coll
Ortofon MC30 Super £270	Very Good Good+	Beautifully engineered and well-balanced, it was slightly criticised as bland, though some may appreciate the lack of rough edges	5-14g Low		Coll
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 "inobtrusively"	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/Coll
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/Coll
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/Coll

TO ORDER BACK ISSUES OF HI-FI CHOICE SEE PAGE 58

HI-FI CHOICE

Readership Survey Part One

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.

YOUR HI-FI SYSTEM

1. 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

2. Where did you purchase your system?

- Department store
- High Street chain
- Discount warehouse
- Specialist hi-fi dealer
- Second hand

3. How long is it since you last bought some hi-fi equipment?

- 1-2 years
- 2-3 years
- 3-5 years
- Over 5 years

4. 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

5. Which items do you intend to update this year?

- Turntable
- Arm
- Cartridge
- Amplifier
- CD Player
- Cassette Deck
- Tuner
- Loudspeakers
- Stands

Cables

6. Which kind of music do you listen to most frequently?

- Classical
- Rock
- Jazz/funk
- Pop
- Country
- Soul
- Reggae
- Folk
- MOR/Light

THE MAGAZINE

7. Do you purchase *Choice* specifically to buy equipment? Yes No

If yes, how much do you intend to spend?

Up to £

8. How do you rate *Hi-Fi Choice*?

- Excellent
- Very Good
- Good
- Average
- Poor
- Very Poor

9. How do you acquire *Hi-Fi Choice*?

- Delivered by a newsagents
- Bought in a newsagents
- On subscription
- Borrow from a friend

10. How many copies did you buy in the last year?

- 1-3
- 4-6
- 7-9
- 10-12
- Only this one

11. Do you think *Choice* is good value for money? Yes No

12. How many people read your copy

13. Which other magazines do you read on a regular basis?

- What Hi-Fi
- Hi-Fi News
- New Hi-Fi Sound
- Hi-Fi Answers
- Hi-Fi Review
- Gramophone
- Which CD
- CD Review
- Time Out
- The Face

Other (please specify)

Daily Newspaper (please specify)

Sunday Newspaper (please specify)

ABOUT YOU

14. What age are you?

- Under 18
- 18-24
- 25-34
- 35-44
- 45-54
- Over 55

15. What is your annual income?

- Under £5,000
- £5,001-£7,499
- £7,500-£9,999
- £10,000-£12,499
- £12,500-£15,499
- £15,000-£19,999
- £20,000-£25,499
- Over £25,000

16. Which of the following best describes your occupation?

- Self-employed
- Student
- Retired
- Unemployed
- Professional
- Managerial/Senior technical
- Technical/Clerical

17. Which area do you live in?

- London
- South East
- South West
- East Anglia
- West Midlands
- East Midlands
- North West
- Wales
- Yorkshire
- Scotland
- Ireland
- Abroad

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

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
Albarr 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	This
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 PV7 £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		This
Conrad Johnson MV50 £1795	Good+ Good+	Coupled with the PV5, this CJ power amp performed well on audition	50W	R	Coil
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	Coil
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		Coil
Conrad Johnson Premier Four £3900	Good+ Very Good	Ambience was the Four's forte – this power amp proved exceptionally revealing of instrumental locations	100W		Coil
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	Coil
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	Coil
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	Coil
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	This
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	This

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	This
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, 1cne., 4-channel surround		56
Deltec DPA 100S £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 G60AMS £948 pr	Good Very Good	This neat and compact 60W valve monoblok gave good sound on the 8ohm tap, better still on 4ohms. The midrange was particularly natural	60W monoblocks 41 8ohms	R	This
Haffer DH120 kit form £295	Fair	We didn't build one, see below	£0W		44
Haffer DH120 assembled £360	Very Good Fair	Sound quality results were decent enough, but this power amp won't set the world on fire at this price	60W		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		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 007 £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 Claymore £345	Good+ Good+	Limited facilities but a strong, clear, well-focused sound results in auspicious <i>Choice</i> debut for this relatively young company	50W MM/MC 3 line inputs straight line	R	56
JVC 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-550 £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 hdph 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 Linn's) 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	£0W		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 £685	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		This
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 Prior	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	RR	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	RR	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	RR	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	RR	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
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

TO ORDER BACK ISSUES OF HI-FI CHOICE SEE PAGE 58

DIRECTORY

AMPLIFIERS

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
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/PA7E £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-040 £359	Good Good	This promising newcomer from a brand new company sounded pretty good and should improve as production settles	45W MM/MC, 4 line inputs, straight line	R	56
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		This
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	This
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	This
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 RA820A 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 RA870BX £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

DIRECTORY

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	This
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 hph 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 sieve 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 £160	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 fizz, 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/Coll
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 "bally" 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 LM1 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" midrange	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	Coll
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

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	Coll
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	86dB/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
Infinity Reference Standard IIB £3850	Average+ Good+	Sonically easy to live with, these had areas of truly great performance, but were complicated by many controls	160 x 57 x 30cm free space on low stands	90dB/W 25Hz	R	46/Coll
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 £1330	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	Coll
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 90Hz		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	Coll II
Magneplanar SMGa £637	Average- Average	Tonally 'rich', in the right room it proved a satisfactory musical experience	122 x 48 x 4.5cm on floor clear of wall	85dB/W 56Hz		46
Magneplanar MGIIla £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	64 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		53
Mordaunt Short MS100 £179	Average+ Average+	A 'mie 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 58



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 R8870BX 100W and R8890 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*

25 HEATHFIELD, STACEY BUSHES, MILTON KEYNES MK12 6HR. TEL: (0908) 317707

AND

SOUNDSTYL

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 well 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	86.5dB/W 51Hz	R	46
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 Fair/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 £170	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 £320	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 £420	Very Good Good +	Conceding little to the SP1, this 30 litre model displayed good tonal balance with a highly articulate midrange, only slightly marred at frequency extremes	50 x 25 x 30cm free space, stands	87dB/W 45Hz	R	46/Coil
Spendor SP1 £640	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/Coil
Spendor SA3 Passive £1320	— Good +	Same as Spendor SA3 active	85 x 38 x 46cm low	89dB/W 32Hz	R	46
Spendor SA3 Active £2308	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 right 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 pockets and rooms	Huge, flat against rear wall, away from corners	96dB/W (manuf.)	R	Coil
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 £130	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 panels 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

CD PLAYERS

This new 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. Fewer 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 Average +	Stylish but basic player, based on Philips 14-bit 4 x oversampling with respectable sound tweaks and remote control	Remote Control, headphones	R	51
ADC DCD-250X £230	Good + Average	Well made and engineered, and above 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	R	53
Aiwa DX-500 £179	Average – Average –	Adequate build quality and reasonable features, but this unit did not do very well in the lab and was sonically a disappointing experience	No remote control or headphone socket, but scan, skip, search etc		53
Akai CD-A70 £299	Average Average	A full feature 16 bit 2 x oversampling remote control player with fine presentation and finish and a pleasantly laid back sound quality	Full width rapid access, keypad programming, remote control		51
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 and scan	R	Coil
Denon OCD 300 £210	Average + Average +	Unspectacular all round competence with remote control can't be bad at the price	Skip, remote control, headphones	BB	51
Denon DCD 1700 £650	Good + 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	51
Denon DCD-3300 £1200	Good + + 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

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



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 LOUDSPEAKERS

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® hi-fi

25 HEATHFIELD, STACEY BUSHES, MILTON KEYNES MK12 6HR. TEL. (0908) 317707

AND

SOUNDSTYLING

DIRECTORY

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Goodmans GCD-500S £160	Average— Average—	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 Average—	With a mixed subjective performance this well built player failed to make the grade in its price class	Skip and scan, programmable	R	51
Hitachi DA-7000 £180	Good Average	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	BB	53
Hitachi DA007 £300	Average Average	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
JVC XL-V1100 £659	Average+ Average+	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+ Average	A good all-round package, just deserving recommendation, but comparable sound quality can be found more cheaply elsewhere	Headphones, remote control, (manual override)	R	51
Luxman D-100 £449	Average Average—	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 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+ 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 CD65 £250	Average+ Good	Comfortably above average sound quality, this best selling model still represents good value for money	Search and programme, manual control	BB	51
Marantz CD75 £300	Good+ Good++	It delivers a sound quality that can rival machines twice the price even though it may lack some luxury touches	Remote control, search, programmable	BB	51/Coll
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	51
Mission PCM7000 £600	Good 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-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	R	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
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	53
Philips CD960 £700	Good++ 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 PD-6050 £230	Good Average+	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	BB	53
Pioneer PD-M70 £399	Average Average	A remarkable catalogue of features justify the price. Soundwise it rated just above 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/Coll
Sanyo CP17 £200	Average— Average—	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
Sharp DX-R700H £249	Average— Average—	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+ Average+	Ergonomically well thought out with full function remote control, but not really scoring sonically considering its price	Remote control (full function inc volume)		51
Sonographe SD1 (by CJ) £799	Good Very Good	Distinctive with oak end-cheeks, using Philips based 14 bit x 4 oversampling, Conrad Johnson electronics make this a musically rewarding player	Full search programme and timing	R	51/Coll
Sony CDP-M20 £179	Average+ Average	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 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-310 £250	Average++ Average	Fine build, facilities and healthy enough sound quality – recommended, but look around the range	Remote control (+ usual)	R	51
Sony CDP-M50 £269	Good+ Average+	Fine build quality, good technical performance and extravagant features make this a very competitive package	Shuffle, skip, search, remote headphones	R	53
Sony CDP 710 £299	Good+ Good++	One of the outstanding contenders in our 1987 edition. The build was cool, the sound was hot	Remote control, 20 digit direct entry keypad, etc	BB	51
Sony D100 £300	Average Average—	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 Average+	Exceptional build quality and presentation plus respectably good sound quality merits the "R", but some of its kin were preferred	Remote control, 20 digit keypad, track access, programming	R	51
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
Technics SL-P111 £179	Good Average	An above 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	BB	51
Technics SL-P220 £229	Average++ Average	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	53
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+ Average+	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-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 pretty good	Headphones, remote control, search dial cueing, etc		51

TO ORDER BACK ISSUES OF HI-FI CHOICE SEE PAGE 58

DIRECTORY

CD PLAYERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
Yamaha CD-X5 £180	Average + Average	Good build quality, respectable lab performance, and decent enough sound delivery for your money	Skip, scan, manual only, etc	R	51
Yamaha CDX-900 £450	Good Average +	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 + Average +	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

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		This
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		This
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	This
Akai CX-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 Dolby	Dolby B, C, HX Pro, track local features	BB	This
Akai CX-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
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	This
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 T0202BL £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		This
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, lossy side of neutral	Dolby B, C, HX Pro, bias adjust, 3 Head		This
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	This
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		This
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	This
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	This
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	This

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

DIRECTORY

CASSETTE DECKS

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
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 music cassette 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		This
Onkyo TA 2130 £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		This
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		This
Pioneer CT-880 £130	Average + Average	Fair sound quality, veers in direction of maximising information, not sophisticated. But output varies with tape-to-head contact and speed stability is iffy	Track search, Dolby B & C		This
Pioneer CT-1380WR £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	This
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 unrelenting harshness and an almost total lack of detail	Dolby B & C		This
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		This
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 150 £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-W250 £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		This
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		This
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	This
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-K700ES £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		This
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		This
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	This
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		This
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	This
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		This
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		This
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	This

TO ORDER BACK ISSUES OF HI-FI CHOICE SEE PAGE 58

DIRECTORY

CASSETTE DECKS

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
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		This
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

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. (Pssst... 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 CB!	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, Schottz 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-R30L £110	Good+ Good	Fine sounding budget audiophile material, no frills, no fuss	Manual dial analogue FM, MW, LW	BB	55
Rotel RT-R50L £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. Alas the AM sounded as if it was coming "down a long lurry 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-1400 £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

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
Arwa 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
Arwa 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 £380	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 £550	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
Sanyo W36 £550	Average Average	For a change, this outfit comes with excellent loudspeakers and CD player. The main weakness seems to be the amplifier but the turntable was OK, if not fab!	Two H/phone, 5 band graphic, twin deck cass	BB	Systems
Sharp SA-CD800H £800	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 'iffy' 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 (cass poor)	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

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

DIRECTORY

CD MIDI SYSTEMS

NAME PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	BACK ISSUE FULL REVIEW
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

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 Electrostatic £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		
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 light 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

DIRECTORY

HEADPHONES

NAME PRICE	SOUND COMFORT	COMMENTS	TYPE	VALUE	BACK ISSUE FULL REVIEW
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
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, variable speed	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, i.e. 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 RCD02 £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 unenthralling 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 £400	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

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



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 = 10⁻¹¹ 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 musicassette 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.

POWER AMPLIFIER: 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



Appointed stockists of A&R Cambridge, Denon Castle, Celestion, Creek Audio, Goldring, Kef, Linn, Mordaunt-Short, Naim, Quad, Rega, Rogers, SME, Nakamichi, Ackroyd, Tannoy

40 Little London, Chichester, W. Sussex

Telephone 0243 776402

(Closed all day Monday)



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

THE AUDIO SHOP

HI-FI SPECIALISTS

Appointed stockist of:-

Tannoy • Mordaunt Short • Castle • Royd • Infinity • B&W Goodmans • Dual • Logic • QED • Revolver • Ion Systems (Nytech) • Nagaoka • Audio Technica • Goldring • Rata Ortofon • Philips CD • 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, DERBY

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, ADVANCE, B&W, BLO, BOSE, BEYER, CASTLE, CELESTION, CAMBRIDGE, DENON, DUAL, ELITE, HARMON KARDON, HEYBROOK, INCA TECH, INFINITY, KEF, KENWOOD, LUXMAN, MARANTZ, MONITOR AUDIO, MICHELL, MORDAUNT-SHORT, MUSICAL FIDELITY, MYST, NAD, NAKAMICHI, NAGAOKA, PIONEER, PHILIPS (CD), PINK TRIANGLE, QED, QUAD, REVOLVER, ROTEL, SPENDOR, SHURE, SONDEX, STAX, SENNHEISER, TANNOY, TARGET, THORENS, VDH, WHARFEDALE, YAMAHA. (Century Club dealer).

ONLY HI-FI SPECIALIST IN THE HEATHROW AREA, LATE NIGHT THURSDAY. HI-FI MARKETS MEMBER. MAIL AND TELEPHONE ORDERS. INSTANT CREDIT UP TO £1,000. 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
- Spondor
- Tanfoy
- 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

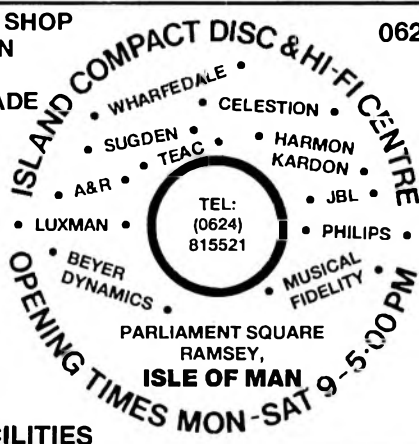
ALBANY HOUSE,
 HURST STREET,
 BIRMINGHAM B5 4BJ
 Telephone: 021-622 2323

YAMAHA

HI-FI MARKETS
 The place where people care about hi-fi

DOUGLASS 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, Spondor, Monitor Audio, Rotel, Ariston, Revolver, Technics etc.

**2 Edward St, Grimsby,
 Humberside**
0472-51391

Analog Audio

(HI-FI SPECIALISTS)

*Special offer on Yamaha Midis
 Save up to £180 on the M99 System
 Come in and hear this top class system.*

Also stockists of:

AR, DENON, DUAL, HARMAN KARDON, KENWOOD, LUXMAN, MARANTZ, MORDAUNT-SHORT, NAD, ONKYO, PIONEER, PROTON, ROTEL, SANSUI & YAMAHA.

FULL DEMONSTRATION FACILITIES AVAILABLE

849 HIGH RD., LONDON N12. 01-445 3267



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
ALPHASON NAGAOKA AUDIO TECHNICA ROGERS INVA
ARISTON MANTRA AUDIO INNOVATIONS
REVOX MYST
QED QUAD CRIMSON
MUSICAL FIDELITY GRADO
MARANTZ TARGET ORTOFON
ZETA CASTLE JOHN BOWERS THORENS

LIVERPOOL'S ONLY TOP TAPE DEALER

TUESDAY - SATURDAY
9.30 till 5.00

WE DO REPAIRS

BETTER HI-FI

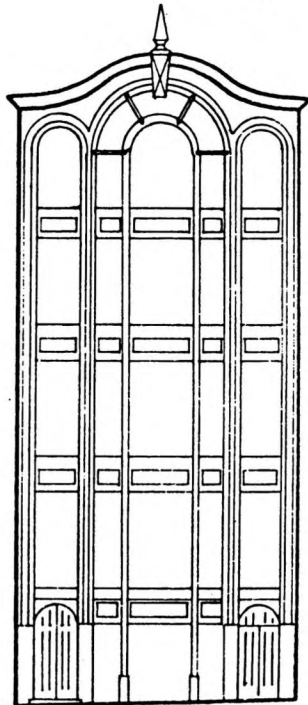
The Essence of Music

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**

Sound us out.

Let me begin this month's dissertation by clarifying a point of confusion that has arisen amongst some readers due to our address. Both Alan Abbott and myself are dedicated music and audio enthusiasts. We aim to bring a quality of advice and service to the customer that is quite often unavailable in the high street shops. We have many years in the audio business both as customers and salesman on which to base our advice and well remember what it is like to be bombarded by the confusing and often conflicting advice of magazines and hi-fi sales people.

Both of us pursue other occupations and we pride ourselves on the fact that we are not under pressure to sell to the customers simply to earn a living. Here in our quiet, rural surroundings you will have the opportunity to audition a wide range of equipment in a relaxed and unhurried home atmosphere. No one will try and speed a sale along just to get at the next customer. When you arrive you are the ONLY customer and therefore deserving of our fullest attention. Take as long as you like, we would rather you came back two or three times before making your choice rather than let you leave with the vague feeling you may have made a mistake.

At the time of writing we are the only UK dealers to have the full range of Spica Speakers in stock from the giant killing TC 50 and the bi wired TC 50 SE to the mighty Angelus. (At last a truly outstanding speaker of sensible domestic proportions). We are the first dealers to stock these fine transducers and within days of their arrival have already sold the first pair. Demand is going to be big, why not book your home demonstration with us now, or alternatively pay us a visit (by appointment only). We can offer the finest demonstration facilities available with completely honest and unbiased advice. (If we cannot fulfil your requirements then we are happy to suggest others who can).

Some recent additions to our range are the legendary Albarray Monoblock power amplifiers, the YBA pre and power combination. And let's not forget the magnificent LFD pre amplifier and Air 2:11 valve amplifier, the latter Alan's reference power amplifier against which all others are judged.

For those who must have their cake and eat it, we have a full SAE system comprising CD player, tape, pre amplifier, power amplifier and tuner. Together they offer superb sound quality and harmonious aesthetics. The pre-amplifier is of special note demanding serious consideration as an audiophile unit in its own right. This unit will shake your faith in the minimalist approach to pre amplifier design! Priced at only £795. SAE could easily ask twice the price judged on sound quality alone, and comes highly recommended by the American audio magazine The Stereophile.

Kind regards,
BRIAN VOCE

Our range of fine products include:
ALBARRAY, YBA, AIR, LFD, KISEKI, VECTEUR, STAD,
AUDIOSTATIC, BEARD, DECCA, ODYSSEY, JECKLIN, SPICA,
GLANZ, PAWEL, NUANCE, OMEGA POINT, AUDIO
INNOVATIONS, AUDIO NOTE, GRYTHON, MILLTEK, ODYSSEY
CARTRIDGES, ODYSSEY ARMS, PHONO AMPLIFIER,
PLENTITUDE, QUICKSILVER, SOUTHER, SNELL, VOYD.

NATIONWIDE HOME DEMONSTRATION SERVICE

**Abbott
Audio**

THE FARM HOUSE, HOLLY MOUNT,
KNEESALL, NEWARK, NOTTS. NG22 0AD.
TEL. (0623) 862268

MAKE THE RIGHT CONNECTION

HEYBROOK

COME AND HEAR THE COMPLETE RANGE OF HEYBROOK HI-FI PRODUCTS INCLUDING THE NEW POINT FIVE SPEAKERS ALL ON PERMANENT DEMONSTRATION AT **MURRAYS HI-FI**

MURRAYS HI-FI

- 19 MIDDLE HILLGATE
STOCKPORT
CHESHIRE
SKI 3AY
- NAIM
 - CREEK
 - CHORD COMPANY
 - A&R CAMBRIDGE
 - MONITOR AUDIO
 - REVOX
 - MANTRA
 - HEYBROOK
 - MARANTZ
 - SYSTEMDEK
 - AKROYD
 - YAMAHA
 - ARISTON
 - ROGERS
 - ROTEL
 - NAKAMICHI
 - MORDAUNT SHORT
 - DENON
 - DUAL
 - TARGET
 - AUDIO TECHNICA
 - R-A-T-A
 - INCA TECH
 - PHILIPS
 - QED

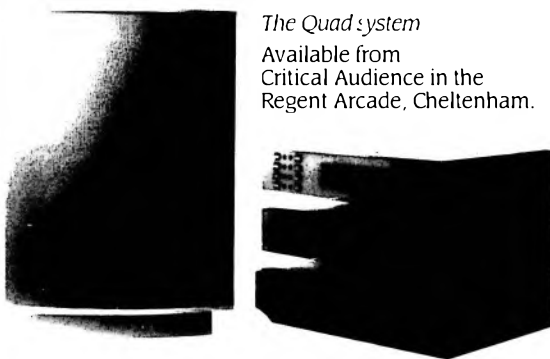
Whole range on permanent demonstration

061 429 7666

QUAD

QUAD

FOR THE CLOSEST APPROACH TO THE ORIGINAL SOUND



The Quad system
Available from
Critical Audience in the
Regent Arcade, Cheltenham.

You are welcome
to make an appointment for a free home demonstration

CRITICAL
audience



Regent Arcade, Cheltenham. Telephone: (0242) 578757.

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.

63 GEORGE STREET, EDINBURGH
TEL: 031-225-8854

Mon-Sat 9.30-6. Evenings by appointment.

REVIEW PRODUCT INDEX

CASSETTE DECKS

AIWA AD-F360	39
AIWA AD-WX707	40
AIWA AD-WX909	41
AKAI GX-52	42
AKAI GX-6	43
DENON DR-M07	45
DENON DR-M12HX	46
DENON DR-M24HX	47
HITACHI D-003	48
KENWOOD KX550HX	49
LUXMAN K-112	50
MARANTZ SD-35	51
MARANTZ SD-55	53
NAKAMICHI CR-1E	54
NAKAMICHI CR-2E	55
NAKAMICHI CR-3E	56
NAKAMICHI CR-4E	57
NIKKO D-80II	59
PHILIPS FC566	60
PHILIPS FC567	61
PIONEER CT880	63
PIONEER CT-1380WR	63
PROTON AD-200	65
PROTON AD-300	66

SONY TCFX150	67
SONY TC-W250	69
SONY TC-R303	70
SONY TCR503ES	71
TANDBERG 3014A	73
TEAC V200	74
TEAC R515	75
TEAC V970X	76
TECHNICS RS-B305	77
TECHNICS RS-B505	79
TECHNICS RS-B605	80
TECHNICS RS-B905	81
YAMAHA KX-200	82
YAMAHA KX-300	83
YAMAHA KX-500	84
YAMAHA KX-800	85

VALVE AMPLIFIERS

AUDIO RESEARCH SP9	95
CONRAD JOHNSON PV7	96
CROFT SUPER MICRO/SMA	97
CROFT 4/4S/4SA	99
GRANT 60	100
LUXMAN LV105u	101

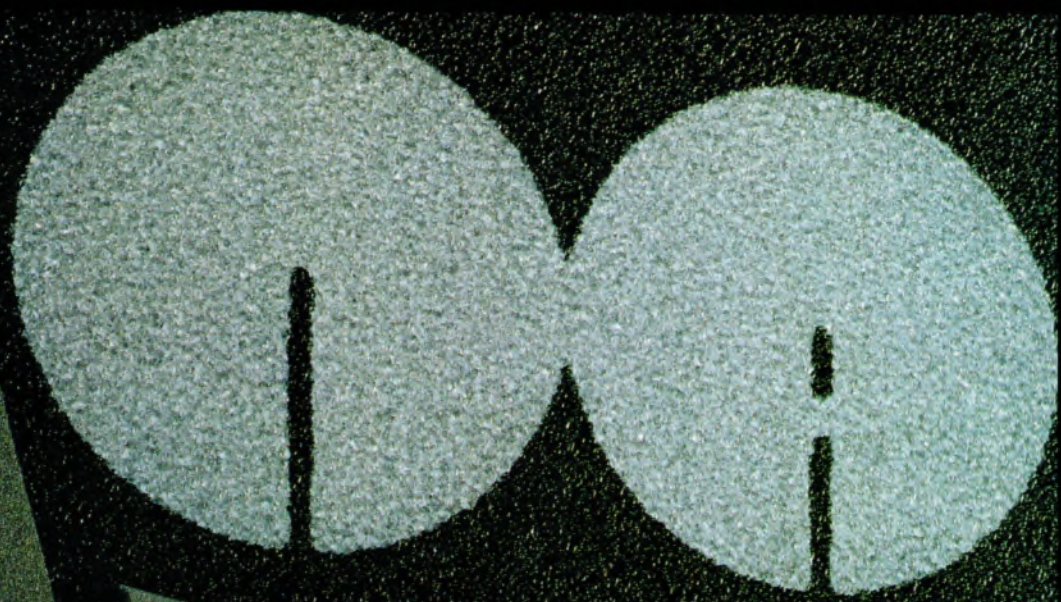
QUICKSILVER MONOBLOKS	102
RADFORD SC25	103
RADFORD MA75	105
VACUUM STATE LOGIC	106

HI-FI FURNITURE

APPOLO CT2	112
APPOLO AT1	112
AUDIOQUEST SORBOTHANE FEET	113
CORNFLAKE TCS5	113
CORNFLAKE TCS6	115
DELTEC ISOLATION PLATFORM	115
RATA AMPLAT	117
RATA MODEL A	118
SOUND ORGANISATION TABLE	118
SOUND ORGANISATION WALL STAND	120
TARGET TT1	120
TARGET TT2	122
TOWNSHEND SUB BASE	122

ADVERTISERS INDEX

ABBOTT AUDIO	158	CRITICAL AUDIENCE	159	READING HI-FI	123
ACTIVE AUDIO	130	DENON	08C	RICHER SOUNDS	119/121
ALTERNATIVE AUDIO	116	DOUG BRADY HI-FI	44	ROGERS SWISSTONE	44
APPOLO SPEAKER STANDS	117	ESOTETIC AUDIO RESEARCH LTD	107	ROTEL	144/146
ARISTON	6	HAMPSHIRE AUDIO	104	SEVENOAKS	108/109
ASHTON AUDIO	130	HEYBROOK	52	SONY UK	72
ASTON AUDIO	114	INCATECH	14	SOUND ADVICE	91
AT LABS	36/37	IN HI-FI	159	SOUND GALLERY	116
AUDIO FILE	134	MAXELL	32	SOUND TEC (ADC)	22
AUDIO INSIGHT	114	MEMOREX	1	STEVE BOXSHALL	114
AUDIOKITS	123	MURRAY HI-FI	159	STANDENS	91
AUDIO TECHNICA	62	NAIM AUDIO	110	SUBJECTIVE AUDIO	78
BILL HUTCHINSON	123	NAKAMICHI	68	SUSSEX AUDIO	98
BRENTWOODS	130	ORIGIN LIVE	68	SWIFTS OF WILMSLOW	126
CAMBRIDGE HI-FI	68	PAUL ROBERTS	116	TECHNICS	4/5
THE CORNFLAKE SHOP	34	PRECISION AUDIO	92	WEST MIDLANDS AUDIO	134
COVENT GARDEN RECORDS	86	RATA	134	WOODSIDE ELECTRONICS	98
CREEK AUDIO	62	RADLETT AUDIO	127	YAMAHA	25
		RAYLEIGH HI-FI			



A NAIM
FOR BEAUTIFUL MUSIC

naim audio SOUTHAMPTON RD, SALISBURY, ENGLAND SP1 2LN. TEL (0722) 332266

DENON PCM AUDIO TECHNOLOGY COMPACT DISC PLAYER DCD-200

compact disc
DIGITAL AUDIO

DIGITAL

POWER

MAJOR DATA

1910
US\$139.5 million
US\$309.7 million

MAJOR PRODUCTS

Audio, Video Products:

Compact discs, Records, Hi-fi components (Amps, Tuners, Receivers, Turntables, CD players, Tape decks, Speakers, Car audio, Cartridges), Karaoke sets, System audio components, Portable audio systems, Video software, Music tapes, Broadcasting audio equipment, CD cartridge players, Multiple CD players.

Magnetic Media

Audio tapes, Tapes for personal computers, Floppy disks, Video tapes, DAT tapes.

Others:

Electronic Pianos, CD-ROM drives, PCM editing systems

Denon Audio, Video, and
Magnetic Media Division
Operations Division
1-1-1, Nishi-Shinjuku, TOKYO
Mitsuda Plant,
Mitsuda, TOKYO

LESS KNOBS NO KNOCKERS

Many hi-fi manufacturers attempt to dazzle you with flashing lights and superfluous knobs.

Denon hi-fi is designed to dazzle you with purity of sound reproduction alone.

As one of Japan's oldest and most respected hi-fi manufacturers with over 70 years' professional sound recording experience, Denon take sound reproduction seriously.

And so do the critics. Which is why you'd have difficulty finding any knocking Denon's commitment to quality.

For sound that sounds as beautiful as the original and a clean, innovative design, choose from Denon's advanced technology CD players, cassette decks, tuners and amplifiers.

Doesn't Denon sound good already?

**For your FREE colour catalogue write to:
Hayden Laboratories Limited, FREEPOST,
Chalfont St. Peter, Bucks SL9 9BS. Or phone:
(0753) 888447**

DENON

pure performance!