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

HI-FI CHOICE

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

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Back issues of the magazine are also available, please refer to page 35 for full details

THE GET OUT CLAUSE

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

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Menu

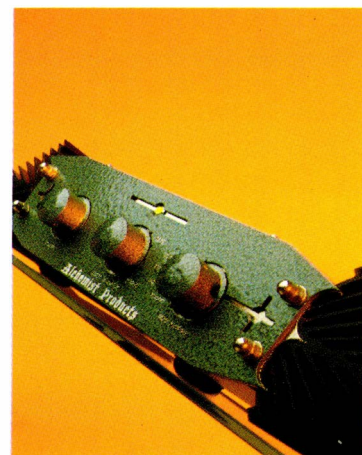
I'm definitely weird. There I was the other night, squinting myopically at a tiny lump of crystallized carbon, hardly big enough to see, looking forward to playing my first record for several months. Prior to this I had been going through the sort of arcane ritual that I thought only took place at the more upmarket public schools.

The object of several hours attention had been an SME *Model 20* turntable, complete with SME *V* arm. In the preceding two hours I had been checking its speed, measuring the gap in the suspension, adjusting the overhang of the cartridge, setting the VTA, fiddling with the tracking force, calibrating the anti-skate and finally setting up a damping device at the side of the arm. All this just to get the thing to play its first record.

As if indulging in all this palaver was not enough, I actually quite enjoyed it. In fact, I would go further. It was really good fun. Admittedly the SME is so beautifully built that you are positively drawn to spend ages extracting the last possible degree of performance. A well illustrated instruction manual helps a lot, and you somehow get the feeling that with such a fine example of the engineer's art it would be insulting to the manufacturer not to go through the entire set-up procedure step by step, taking as much care as SME has to ensure that everything is running perfectly.

The only problem, and I freely admit that it is a problem, is the sound quality. Quite frankly it's too good. For a month or so prior to the arrival of the SME the Benham household had finally taken the plunge and gone all digital; a pair of Philips digital speakers received the relevant ones and zeros from a CD transport and a DCC machine. Surely a system for the Nineties and enough to banish those fragile vinyl anachronisms to the shed for ever? In a word - not. That's not to knock the digital system, which is actually very good indeed and superb value for money. It's just that a top-flight turntable is still more musically involving than an equivalently priced CD player. As I write that last line I can here voices raised across the country, asking when that Luddite is finally going to face the fact that vinyl is obsolete and CD rules the roost. Well rule the roost it may do, but after rummaging through my record collection, retrieving dog eared albums from the shed, and discovering discs I'd forgotten that I owned, I have to admit that I find playing records an immensely emotionally satisfying experience and am very happy to have a two source system up and running again. I told you I was weird.

Andy Benham



Cover photograph by
Chris Richardson.

HI-FI CHOICE

ISSUE 116 MARCH 1993



Craftsman Ted Jordan is a pioneer of metal loudspeaker cone technology.

The Front End

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This month, in addition to what's new and what's happening in hi-fi, we review the sights and sounds of the 1993 Las Vegas Consumer Electronics Show.

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Below: The heart of this month's *Aspirations* system is the delectable Audio Note *Ongaku*.





Above: Some of the hopefuls in our panel test of 20 of the latest amps.

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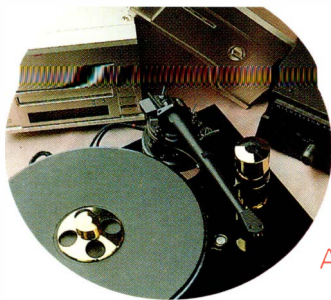
It may not be the *Yellow Pages*, but our classified ads are a fine way to sell or exchange your second-hand hi-fi equipment.

128 PERSONAL MESSAGES

This month, Paul Messenger looks at the latest tuning devices from Japan and also discusses inherent problems concerning the centre dialogue channel in AV systems.



Left: One of the three Sony MZ-1 personal MiniDisc recorders you can win this month.



Mission revolutionises Cyrus range

Mission has launched a new Cyrus range of electronics and loudspeakers, designed to replace the entire existing Cyrus portfolio.

Central to the new range are the £1,899 **Discmaster** CD transport and **Dacmaster** D/A convertor. The top loading **Discmaster** uses a Philips **CDM9-Pro** assembly, with balanced, coaxial and optical digital outputs. In addition, the transport clock is locked to the **Dacmaster** by means of a dedicated communications link. All the new electronics have the added bonus of a **Cyruslink** communications bus, allowing full remote control. The **Dacmaster** is fitted with four switchable inputs: two coaxial, one balanced and one optical. Based on multi-bit technology, it has no less than 16 isolated power supplies, to minimise interference between the digital and analogue domains. Both parts of the CD player, together with the new **Cyrus III** integrated amplifier,



Mission's latest Cyrus **Discmaster** transport and **Dacmaster** convertor.

can be upgraded by adding the £299 **PSX-R** power supply. This 300VA power supply will automatically match its output to suit each component and replaces the existing **PSX**.

The new £499 **Cyrus III** will be the only amplifier from the Mission stable until later in the year, although the existing **Cyrus 1** and **2** will not be discontinued immediately. The new 50W amplifier has four line inputs, one tape and a MM/MC vinyl disc input and is claimed

to deliver up to 30 Amps peak current. Also replacing an existing model, the new £399 **Cyrus FM Tuner** has 50 presets but also uses a large rotary tuning control that allows fine tuning.

Finally a smaller speaker is launched to complement the **753**. Similarly styled, the stand mounted two-way £299751 uses a single 130mm bass driver with a 25mm composite dome tweeter. Sensitivity is high, at a claimed 89dB and the 25mm thick MDF enclosure is finished in real wood veneer.

Mission Group, Centralforce Ltd, Huntingdon, Cambs PE18 6ED. Tel: 0480 451 777.

Spendor Speakers Sold

Loudspeaker manufacturer Spendor has been acquired by Soundtracs PLC. In a friendly and mutually beneficial arrangement the Surbiton based manufacturer of audio mixing desks has agreed to buy all of the issued shares.

The 16 strong workforce in Hailsham will continue to produce Spendor speakers for both studio and domestic markets and will act independently of Soundtracs, although Soundtracs MD, Todd Wells, is to become Spendor's Chairman and Chief Executive. The change will at least give Dorothy Hughes (widow of co-founder Spencer) the long awaited opportunity to retire, while son and managing director Derek Hughes will continue to run things for at least the next two years.

Spendor Audio systems Ltd, Unit 12, Station Road Ind. Estate, Hailsham, Sussex BN27 2ER. Tel: 0323 843 474.

Awards all round

The first ever International Classical Music Awards were launched in fine style at the Symphony Hall in Birmingham Friday 8th January. Sponsorship came from the world of hi-fi through Kenwood with Sennheiser an associate patron.

The event was televised by the BBC and broadcast on Radio 2. Many famous names from classical music stepped forward to be rewarded for their outstanding talents. Performances were given by award winners Evelyn Glennie, the Monteverdi Choir — founded by John Eliot Gardiner — the Alban Berg Quartet, and the pianist Andras Schiff. It was perhaps slightly disappointing that Placido Domingo, who collected three awards for male singer of the year, single event of the year (the internationally televised production of *Tosca*) and recording of the year (Richard Strauss' *Die Frau Ohne Schatten* with the Vienna Philharmonic conducted by Sir Georg Solti), was unable to treat the audience to a tune or two. That, however, would have been the icing on an already rich cake.

Accuphase's heavyweight

Japanese high-end manufacturer Accuphase has introduced a new two-box CD player, aimed at setting new standards in CD reproduction. The £5,099 **DP-90** CD transport weighs a healthy 22.7kg and features standard coaxial electrical and Toslink optical outputs, together with higher quality balanced electrical and AT&T optical outputs. It also features a tiny RF amplifier built into the laser unit to overcome interference, and a separate balanced drive circuit for the transport mechanism that is said to eliminate fluctuations in the driving current.

The £7,499 **DC-91** convertor is no lightweight either at 25.2kg. Combining the two comes to £263 per kilogram, making the

price a little heavy as well. It has no less than 16 selected 20-bit converters per channel, that are claimed to improve low level linearity. The DAC has thirteen digital inputs, two digital outputs and three digital recording terminals, to connect the **DC-91** to a digital recording format. As it uses a 24-bit output signal processing chip and the CD signal is only 16-bit, it is claimed that the volume level can

be reduced by eight bits (-48dB) in the digital domain without sonic degradation.

MPI Electronic (UK) Ltd, Wood Lane, Manchester M31 4BP. Tel: (061) 777 8522

At £263 per kilo you don't get many **DP-90/DC-90s** to the pound!



Metal free cable from the van den Hul stable — it's *The First!*

Although new high-end interconnects appear with monotonous regularity, few have caused as much of a stir as van den Hul's metal free *The First* interconnect.

Priced at £169.99 for a stereo metre, *The First* is a coaxial cable using 12,000 strands of individually insulated Linear Structured Carbon in the central conductor, with 38,000 strands of LSC making up the braiding. This is then wrapped in a halogen free Hulliflex jacket. Although there have been cables with carbon fibre braids, *The First* is the only cable to date to feature carbon fibre throughout.

Soon to follow *The First* is the creatively named *The Second*, which features balanced construction, with two identical conductors made from 45,000 strands of LSC. The price of *The Second* has yet to be decided. It is not possible to produce an entirely metal-free loudspeaker cable as yet, so van den Hul is recommending its top of the range *The*



Using carbon as a conductor *The First* sets a new precedent for cable design.

Revelation (£900/5m pair) which combines LSC with metal conductors as the state of the art in loudspeaker cables.

Teac UK Ltd, 5 Marlin House, The Croxley Centre, Watford, Herts, WD1 8YA. Tel: (0923) 819 630

Roksan reaffirms digital future

Roksan Engineering PLC, manufacturers of the *Xerxes* turntable and *ROK* electronics, has transferred its business to sister company Roksan Digital Ltd. The engineering company is still a going concern, but is no longer the centre of the Roksan group's interests.

Assets were transferred between the two companies to aid development of Roksan's digital electronics range. As the electronics side became more prevalent, it was felt that there was no need to run two companies and the specialist staff were moved from Roksan's Welsh factory to its new headquarters in West Drayton. Although Roksan is investing heavily in digital electronics, the future of turntable manufacture is assured, for the next few years, at least.

Roksan Digital Ltd, Stockley Close, Stockley Road, West Drayton, UB7 9BB. Tel: (0895) 436384

Show Report - WCES Las Vegas



The winter CES (consumer electronics show) is held in early January in the capital of American excess, Las Vegas, as suitable a venue as any for a show that is by European standards an overwhelming affair. Spread over at least three large hotels and a convention centre the show takes in all aspects of consumer electronics from microwave ovens to adult videos with a bit of hi-fi thrown in for

good measure. Well perhaps more than a bit. There were in fact myriads of mid to high-end companies that have never had any exposure over here, which made the task of finding new and relevant products all the more difficult. However, working on the basis of what's new to me is probably new to you, I gathered literature on the more interesting stuff that turned up on my travels down the Vegas corridors, and

ended up with a sack load.

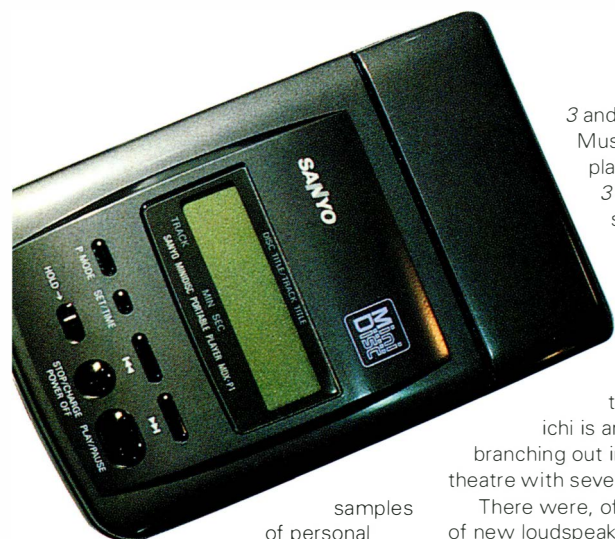
Though most of the more interesting, and expensive, equipment was in the smaller rooms of the Sahara hotel, there were plenty of newsworthy components from major companies elsewhere.

Possibly the most exciting British product at the show was the new Cyrus range from Mission — so important in fact that we've given it a space of its

own in *Update*. Suffice to say that it's pretty hot stuff.

Most of the Japanese majors had some form of digital tape or disc recorder on show, Pioneer had prototype MD and DCC domestic machines, Aiwa showed a clone of the portable Sony MD recorder and an expensive looking full size DCC prototype. Denon (MD), Panasonic (*RQ-DP7* - DCC) and Philips (*DCC-130*) had early

SHOW REPORT- WCES LAS VEGAS



3 and as many MusicBank CD players — *MB-1* to *3* — only one single disc machine (the *CD-4*) was shown, so I wonder when *CD-1* to *3* will turn up. Nakamichi is another brand

branching out into home theatre with several *A/V* amps.

There were, of course, plenty of new loudspeakers to be found but among the more interesting mainstream models was a three strong range from Harman Kardon. These feature polycarbonate tweeters and a nice styling bulge but are otherwise remarkably hype free. I also heard that for the first time H/K will be producing a British built range of budget loudspeakers, there will be three models priced between £150 and £300 featuring large 34mm woofers. From the same company comes a handful of *Signature* series power amps with an accompanying preamp/tuner. Also on the speaker front

samples of personal players, and in a surprise move Sanyo came out with a very neat little MD personal (*MDX-P1*) billed as being the world's smallest. It's certainly a lot smaller than anything that's in current production. Sanyo also introduced a three disc in-car MD head unit incorporating controls for a separate CD changer as well as a tuner. Sister company Fisher balanced up the equation with a domestic DCC recorder that bore a strong resemblance to existing Philips/Marantz models. The overall impression I got is that nobody knows which (if either) format is going to succeed in the long term so manufacturers are having a go at both systems to familiarise themselves with the technology.

The other buzzword at the show was THX, with companies displaying home theatre sound systems run under the supervision of filmmaker Lucasfilms. Both B&W and KEF were demonstrating new multi speaker set ups alongside several American companies. B&W in its Rock Solid Sounds guise also had a smaller version of the standard *Solid* loudspeaker called the *Solid Team*, with the novelty that a pair can be connected base to base to form an oblong centre channel for surround sound applications.

Pioneer introduced its entry to the new breed of multi-role home entertainment consoles (for want of a better word). *LaserActive* is an LD/CD player which can be connected to a variety of control packs and used with Sega CDs, CD-ROM and karaoke discs.

Nakamichi has replaced its existing base ranges of CD players, cassette decks and amps with more conservatively styled and more substantial looking models. There are three new cassette decks; *DR-1* through *DR-*

Jamo showed a rather attractive pair of designs from a new *07* range, the floorstanding *507* and *707* featuring internal woofers and radiused side panels.

So much for the affordable stuff. I didn't go all the way to Las Vegas just to look at run of the mill audio kit; what I wanted was some weird, wonderful and above all expensive high-end stuff. And there was plenty of it, especially loudspeakers and amps with not as much emphasis on front ends as one might have expected. There were a few digital goodies to be found, however. Audio Alchemy's range seems to have expanded faster than most, and a complete new CD player is being sold as a package with the *DDE* DAC for around \$700 over there. There's also a new *DDS II* front loading transport, a neat and reasonably priced power amplifier called *Overture* and a joint venture with Snell which will result in both Snell oriented DSP units and versions that can be used with any speaker.

Very prototypical was a new full width player from Onix and a matching tuner that's virtually in production. Ready for shipping from Vimak was a fully featured

(six different types of digital output, CDM9 Pro mechanism) transport — the *DT-1000* to go with the MkII versions of the company's DAC and preamp/DAC that have been so well received. Another digital specialist, EAD, introduced a \$2,000 transport and DAC combo (*T-1000/DSP-1000*) that use AT&T glass optical interconnection and feature EAD's proprietary AccuLinear analogue chips.

Tube amp specialist Cary was showing off its CAD-DAC, an expensive, shiny, 12 tube affair that also functions as a preamp. More affordable is a new \$1,500 pre/power set up called *SLP-30/SLA-30* that looks quite conventional for a tube amp.

Back with digits, PS Audio launched the *Lambda* transport, a \$1,700 chunky steel affair featuring serious power supplies and a glass optical path from the laser. PS Audio also launched a 200W power amp called the *Delta* stereo amplifier, featuring what PS calls a high speed low TIM design.

A new name to me, Musical Design showed an interesting player based on Pioneer's Stable Platter mechanism and Legato Link conversion technology, and is to my knowledge the first specialist company to use these. The player is called *CD One* and costs \$1,495.

Along with its new MD personal, Denon showed the first finished samples of its \$6,000 *DP-X* transport and \$8,000 *DA-X* convertor, a very stylish pair of components being produced in limited numbers.

Vegas was not short on weird and wonderful amplifiers either. Several companies seemed to be vying for the title of largest tube amp makers in world, among them Atmosphere whose OTL *MA-2* uses 26 tubes and puts out 200W, Wavestream Kinetics whose *V8* 200W inverted 'V' shaped beauties cost the earth. But the winner was Tube Research Labs whose 1,215lb *Golden Triode Reference 800* (96 tubes, four chassis, 800W) costs \$45,000.

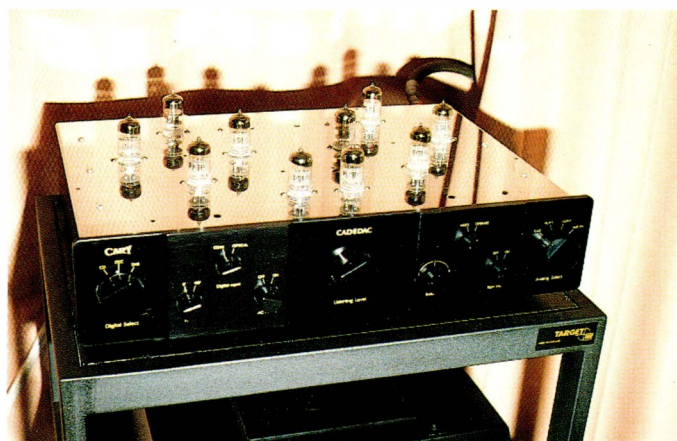
But it wasn't all excess. Threshold's 'affordable' brand, Forte, showed a non remote *F45* version of the *F44* preamp, a



Above: A pair of *Solid Teams* in centre channel configuration and below, a luxury DCC prototype from Aiwa.

purist design with balanced inputs and outputs that retails for \$1,250, as well as the \$1,590 *FT-1* five channel audiophile home theatre amp (3x125W, 2x55W) Threshold itself launched the \$5,250 *T2* fully balanced preamp, which features balanced operation right through the amp and remote control operation that allows very clean fascia design.

Makers of the world's most expensive passive preamp First Sound introduced the Presence Audio *Line Stage 1* (\$1,750), a dual mono tube preamp for those who cannot make the most of



passive designs. Preamp makers Convergent Audio Technology showed a prototype of the *JL1* power amp, a 125W pentode equipped heavyweight with a matching \$12,000 pricetag. And Conrad-Johnson introduced an *SE* version of its *Evolution 20* preamp with updated internal components, making it the equivalent of a *Premier Ten* with a phono stage. C-J also launched the chunky *Premier Eleven* power amp, an ultralinear design with a pair of 6550s putting out 70W per channel.

Audio Note had a couple of new British products alongside a pair of esoteric looking *AN-J* speakers that the Japanese wing of the company had been tweaking up. The *AN-P1* is a neat little 12W power amp that will cost £695 and the *DAC 3* is the company's top of the range convertor, using valves in the analogue stages of course. Canadian 'designer component' specialist Sonic Frontiers showed its first integrated tube amp the *SFC-1*, a line only 50W design of characteristic solid build and appearance.

Ex-pat VTL's range has grown to frightening proportions, and

Top: Cary's *CAD-DAC*, above: Audio Alchemy's *DDS II* transport and right: *Tri-Torr 5.0* omni directional loudspeakers — I said they were unusual.

now includes a complete pro range with microphones and a catalogue of software alongside more tube amplification than you can shake a stick at.

Speaker manufacturer Genesis has branched out into amplification with a very meaty looking fully remote control integrated power amp called the *Stealth B-200*. This 200W dual mono beast has a passive signal switching section, a full selection of balanced/unbalanced socketry and LED displays on the front panel. The company also showed some new speakers that look more



conventional than its existing designs, but the *Genre I and II* feature cylindrical construction inside a rectangular cabinet.

Winner of the most extreme speaker award this year has to go to Xenoco Inc for its *Tri-Torr* omni directional constructions. Employing sonar technology developed by the oil industry the speakers incorporate pairs of drive units attached to alloy 'bowls' that fire onto acrylic reflectors. Despite their 'unusual' appearance the *Tri-Torrs* sounded remarkably good.

More conventional are two

ranges of domestic speakers from pro specialist Westlake Audio. The *Concert Series* consists of four models and starts at \$1,750 and the pro derived *BBSM VNF Series* consists of six models starting at \$2,180.

Oracle is breaking out of the turntable world and getting into loudspeakers with a five strong range of relatively insubstantial but expensive models. Prices start at \$1,895 and the top *Helicon* model (\$9,995), features a ribbon tweeter.

American Power and Light Inc was showing a design called the *Alix* that is literally off the wall, a brand new type of planar speaker which the designer describes as a first order transmission line. It looks like a framed piece of silk and can be mounted in or on the wall.

Hales introduced two new models, the *System One Reference* (\$16,000) and *System Three* (\$2,000), the former is even more substantial than its existing acclaimed designs and both have a distinctive modular appearance.

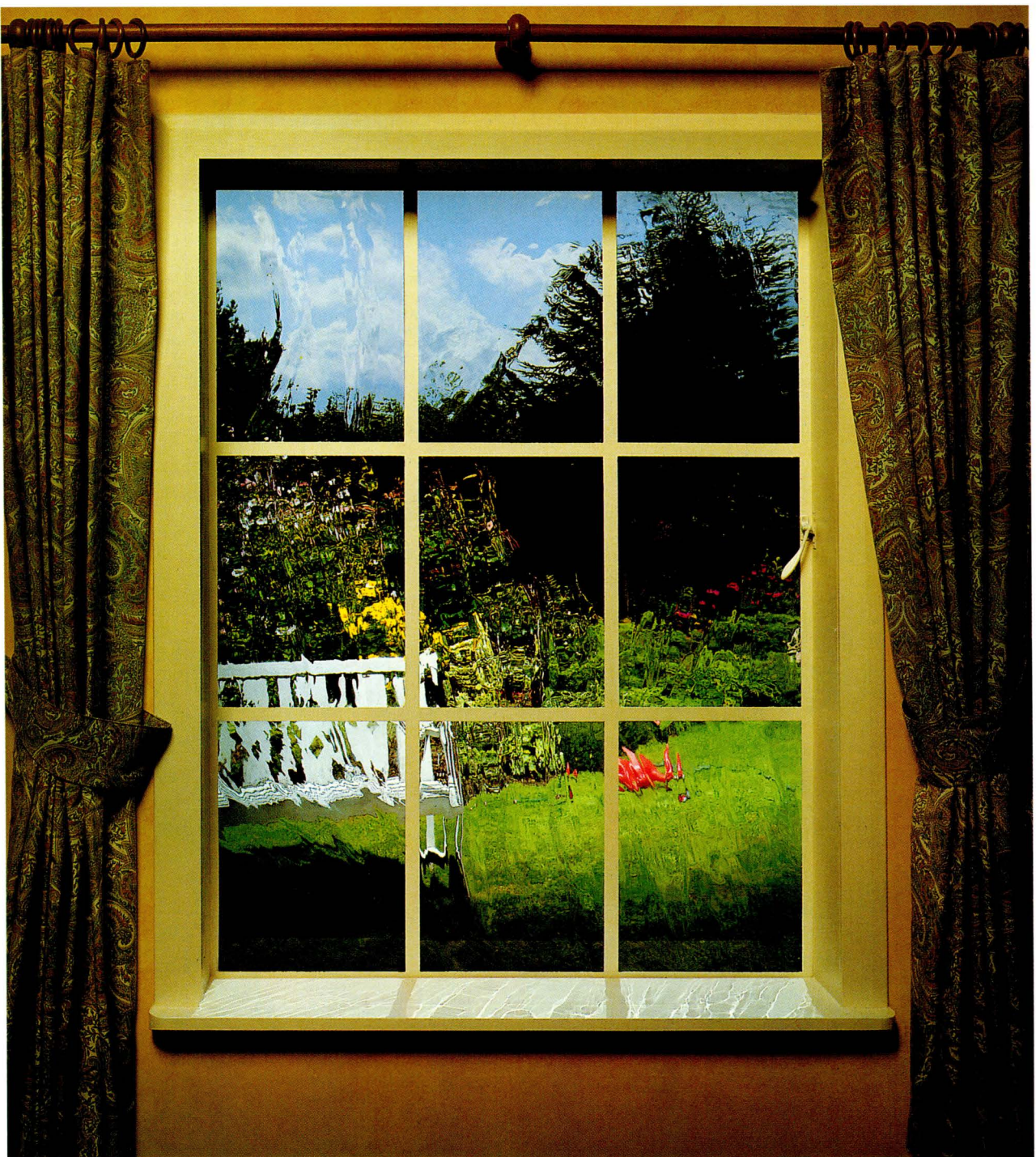
Martin Logan previewed two new electrostatic hybrid designs intended for serious home theatre applications. One is a tall slim wall mount (\$2,500 - \$3,000) and the other a horizontal centre channel (\$1,500) designed to sit below screen level.

Some of the more inspiring sounds I heard at the show were being made by Ken Mavrick with his all analogue system using a pair of very tall composite stone ribbon speakers and a subwoofer the size of a large fridge. The former basks in the name *Nonspeaker Ribbon Reference One* (\$14,000) though whether the system would have made the same impression without Cardas' *Painless LP* is another matter.

Arguably the most interesting thing at the show, however, was Pacific Microsonic's HDCC or High Definition Compatible Digital. An encoding/decoding system that Reference Recordings has taken on board and used on its two latest releases. The first of these, *Testament*, was being used around the show with considerable success. The system can be used with existing players to good effect but should prove quite dramatic when HDCC decoders are fitted as an option on DACs. Word has it that Spectral will be first on the block with such a device.



Look familiar? Fisher's DCC machine is another clone of the Philips *DCC-900*.



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Choice Sessions

by Alan Sircom and Jason Kennedy

A high-end bargain

Built like a brick outhouse and almost affordable, but does the new Teac CD sound as strong as it looks?

Learning from its top players, Teac is attempting to lower the price for entry into the CD player big league with its new top class £770 VRDS-10.

Teac's sister brand Tascam is well respected among recording engineers for its bullet-proof tape machines. Teac has tried to transfer this reputation over to the domestic market with some success, and there is a strong Tascam flavour to the VRDS-10, with its sturdy build and three glowing front pushbuttons.

There is also a strong similarity between the VRDS-10 and the earlier high-end Teac CD player, the £2,000 X1. Both have the central loading VRDS (vibration-free rigid disc clamping system) transport mechanism, both are roughly the same size and weight, and both have a rather annoying lack of controls on the front panel. Put the two side by side, however, and the differences are very clear. Cosmetically the VRDS-10 lacks the champagne fascia of its bigger brother and there are major internal differences too.

Top of the range

The new player sports twin DAC-7 bit-stream D/A convertors instead of the 20-bit ones fitted to the X1, and also lacks the X1's balanced output, being fitted with conventional gold plated phono plugs for analogue output, plus Toslink optical and coaxial electrical digital outputs.

It is impressively well made, leaving almost all other CD players at the price cowering in corners. The aluminium front panel, for example, is the sort of gauge that they make Land Rovers out of; the beast simply does not flex under strain, it merely sits atop the equipment table, looking mean and purposeful, like some kind of hi-fi assassin.

All this superb build is going to be about as useful as a chocolate fireguard if it sounds like a Land Rover as well. Unfortunately for the competition, but happily for the rest of us, the sonics live up to the build quality, putting the 10 in the class normally reserved for players several times more expensive. In its own price range, I cannot think of another that can better it, in either build or sound. The adjective solid applies equally to both the

sound and the finish, as this is no lightweight sounding player.

It is widely held that low-bit players have less bass depth and weight than their multi-bit peers. Whether it is due to the twin D/A convertors, or the brick outhouse build quality throughout is academic, but the 10 has tight, clean and deep bass aplenty. This may lack the downright tidyness of a Linn Karik/Numerik combination, or the authority of a Naim CDS, but this is almost like criticising a Ford Granada for not being a Mercedes 500.

Yet in many ways the Teac does offer Mercedes performance for Ford money. Above all, it shares a fundamentally musical nature with the finest players. Admittedly this musicality is slightly diluted when compared directly against the trailblazers, yet it is never less than exciting and enjoyable. Curiously, although the 10 can have a hard-edged presentation at times, it is seldom abrasive, even with the 'hardest' discs.

Musical integrity

Compact Disc is often criticised for being rather cold and emotionless; not so with the Teac VRDS-10. I am loathe to use a phrase from the bible of pseudology, but this player has a sense of musical integrity that is frequently missing from the digital format. This integrity is not dependent on musical style or recording; it deals well

with discs that have a heavy lento air, like Gorecki's *3rd Symphony*, which can sound too depressing and dirge-like on some well-known 'musical' CD players.

The main area this Teac is found lacking in is a sense of space and air in well recorded performances. Stereo imagery is still detailed and clearly defined, but it lacks some of that 'wispy' lightness often sought in hi-fi, but it is no better or worse than a Naim or Micromega in this respect.

Tacking on a really good outboard D/A convertor, like the Sugden SDA-1 and its betters, shows just how good the 10's transport is, but also how much more can actually be wrung from the disc. Use a lesser DAC, however, and the differences are small enough not to justify the extra expense, and in several cases the on-board DAC outperforms the aftermarket model.

Speaking personally, the Teac VRDS-10 player would be my first choice for a sub-£2,000 player. The next player on my list costs several hundred pounds more, and the difference between the two is comparatively small. The VRDS mechanism makes an excellent platform for adding a separate high-end D/A convertor at a later date, but even before fitting a convertor, the 10 will show a clean pair of phono plugs to all bar the highest of high-end CD players, and will not disgrace itself in the most outrageously expensive system.



The tough, mean, 'don't mess with me' appearance of the Teac VRDS-10.



State of the Artist

Choice staggers down to Soho to look in on a recording session by Fourth World on the new B&W Music label.

Loudspeaker specialist B&W has moved into record production by launching the new B&W Music label, and its managing director, Robert Trunz, hired producer Mark St John to record percussionist Airtó Moreira's new band Fourth World for the first recording project.

The sessions took place in the producer's 145 Wardour St studio, using a combination of B&W *Silver Signature* and Dynaudio loudspeakers for monitoring, and analogue tape for the recordings themselves. According to Mark, the *Silver Signature's* excellent imaging capabilities had proved extremely useful in the placement of instruments, but higher power handling made the Dynaudios more suitable for general monitoring purposes.

Sitting at the desk no more than three feet from the speakers and listening to one of the backing tracks, I was surprised to find that switching from the Dynaudios to the B&Ws brought the latter close to cracking under pressure, yet no blood began to drip from my ears. It didn't even seem that 'loud' by domestic standards, but the cleanliness of the source, and more importantly the extremely dead nature of the environment, served to remove the aggressive tendencies encountered with a lot of hi-fi systems. Soundwise the experience was a lot more like music than hi-fi, by which I mean that the musical content — the groove — dominated the sound, while hi-fi factors like tonal quality,



Gary Meek, Mark St John, Jose Neto, Flora and Airtó conjure up magical sounds from a weird and wonderful collection of instruments.

imaging, dynamics etc made little or no impression.

Toys for the noise

Producer Mark St John is an outspoken and inspiring guy whose claim to be 'state of the artist' not 'state of the art' — the musician always comes before the method — is reflected in the lengths he goes to in order to capture music in as natural a way as possible. A great deal of time was spent setting up a variety of different mikes, including Sennheiser and Neumann dummy heads and an original Calrec Soundfield, to achieve the most natural sound. Airtó was apparently quite taken aback at the time it took to sort out the best mikes for his extensive array of 'instruments', which includes wooden sandals and cow moo toys alongside dozens of only marginally more conventional percussive devices.

A percussionist of the highest calibre, Airtó Moreira has worked with Miles Davis, Carlos Santana, Chick Corea and Al Di Meola among others, and was a

founder member of jazz/rock band Weather Report. The other members of Fourth World are singer Flora Purim, who worked with Airtó in Return to Forever, and relative newcomers, guitarist Jose Neto and sax and flute player Gary Meek. The fact that all of these musicians are South American will undoubtedly introduce latin influences, but it would be hasty to make any assumptions about the style of music they will produce given the jazz roots that they share.

The track that Mark played in the studio was hard to describe, but both styles were distinctly evident with more besides. To my ears — and to the rest of the *Choice* team (lured down by promises of free alcohol) — it was very good stuff and the album could well turn out to be something rather special. It will be interesting to find out how much of the magic of the studio can be extracted from the finished disc (or, if we get very lucky, the vinyl), and I must pester Mark for a DAT copy of the master tape, the comparison will be very interesting.

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THE NEW 302 AMPLIFIER FROM NAD



BRITISH BY DESIGN

Statements

by Richard Black and Alan Sircom

ACCUPHASE T-108 TUNER

Expensive tuners are seldom all things to all listeners. If you want to pull in distant FM radio stations from mainland Europe, you will need all the features of a top Revox or similar model, plus of course a large and steerable aerial array. But the Accuphase *T-108* (£995) has no more features than many models at around a quarter its price, and trades basically on the promise of improved sound quality. It also trades on looks, and is to my eyes quite the smartest tuner I have seen, with champagne gold front panel and beautifully rosewood-veneered end cheeks. The insides are just as neat.

Accuphase has provided a 'traditional' tuning knob, instead of the more common up/down buttons, though like almost all modern designs tuning is in fact achieved digitally. Other features include switchable selectivity to accommodate tightly-packed radio stations, switchable inter station muting and stereo/mono; a switch marked 'filter' which is really a high-blend function to reduce noise on weak stereo broadcasts at the expense of channel separation, and a meter which can be set to read signal strength or detect and minimise multipath interference. Sixteen memories store station frequency and all other associated switch settings.

Clever touches

The technology is based on standard modern practice, though with some clever additional touches. The master oscillator is a quartz-locked synthesiser, and the stereo demodulator a 'chopper' design. However, Accuphase has taken an unusual approach to signal detection, using daisy-chained logic gates to provide a better defined signal delay than is easily achieved with conventional inductor/capacitor delay lines. The stereo demodulator is locked to a ceramic resonator to ensure long-term channel separation stability.

Unusually, the *T-108* has three sets of outputs; normal (fixed-level unbalanced), fixed-level balanced and variable-level unbalanced. Balanced operation, in con-

junction with a suitably equipped preamplifier — a rarity — theoretically gives improved rejection of hum and other interference in long cables, and hence (generally) somewhat improved sound.

I connected the *T-108* to my five element rooftop aerial and listened to a wide variety of broadcasts and several stations from two transmitter sites and under varying atmospheric conditions. I also listened to it via an FM stereo generator to enable A/B comparisons against the original signal.

Under the latter circumstances it sounded very good, about as good as I have heard in that context (bearing in mind that the effects of the generator and tuner cannot be separated from one an-

other unit. That's not to say that the *T-108* is not fundamentally a pleasurable tuner to listen to, but I could have wished for slightly better.

In one specific respect it excels: the bass has quite superb solidity and impact, an area where tuners often fall down. But high up the frequency range there is never quite the 'listen-through' quality that high-end audio can achieve. Everything is there, it's just that one sometimes has to listen a little too hard to find it.

As for value, I do have some misgivings about whether the high cost is truly justified, aside from the very high quality casework.

The circuitry is sophisticated but not outrageously so, and Pioneer's *F-93*, for



other). Music certainly lost some precision and drama along the chain, but nothing serious.

With real broadcasts, I was slightly disappointed. The *T-108* is plenty sensitive, and a quick check on the test bench showed that it meets its (very good) paper specification, but like quite a few modern tuners it seems to suffer from relatively high sensitivity to small amounts of multipath interference. Even though the multipath meter showed 'clear', my own rather aged, all-analogue tuner sounded distinctly cleaner when fed the same signal.

Even when signal quality was good, the *T-108* sounded just a tad thick and dynamically compressed, missing some of the verve and excitement I could capture with the older tuner.

This could simply mean that the Accuphase is more accurate and adding less distortion (which can sound quite 'exciting' if it's the right kind of distortion), but I listened very carefully for fine detail resolution within large orchestral works and dense big band numbers, and could only conclude that the Accuphase, while good, was actually no better than

Accuphase's elegant *T-108* tuner looks smart, but does it set the gold standard?

instance, contains far more electronics at a much lower price. So I have sadly to conclude that this promising-looking beauty fails to deliver everything that one might wish from it. Although undoubtedly a very capable tuner, it does not seem to advance the state of the art in FM reception and music making by a significant margin.

LINÆUM LFX SPEAKERS

For anyone who thinks that there is nothing new under the sun, the little Linæum *LFX* loudspeakers have a tweeter unlike any other.

Although there's a lot to be said for really big loudspeakers, there are some magical small boxes that are capable of making noises with a refinement almost beyond compare and the Linæum *LFX* is likely to join this list. There are two alternative finishes: standard black vinyl for £649, and a grey marble-like Corian at £1,399, for a loudspeaker is still slightly smaller than a *LS3/5a*, with its grille in

MORE MUSIC

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Surprisingly for such a modestly-priced model, you also get five audio inputs and a craftily-designed relay switched headphone socket to minimise sound degradation from the speaker outputs.

What's more, the PMA-250III packs a respectable 2x30 watts (RMS) of power – enough to blow the dust off your wallet in a confined space.

With all this going for it, perhaps now you can see why the PMA-250III sounds good in anybody's language.

LESS NOTES



DENON

Enquiries to: Denon Freepost Enquiries, Chiltern Hill, Chalfont St Peter, Gerrards Cross, Buckinghamshire, SL9 9BS.

* Price correct at time of going to press. Subject to availability. Price may change at any time without the manufacturer's prior warning.

place. Remove the grille and a conventional, if very small, Vifa bass driver sits below the weirdest looking treble unit around, resembling something important from the Seventies incarnation of Dr Who's *Tardis*.

Of coils and diaphragms

A glance at the illustration is helpful, showing the two loops of plastic strip that form the diaphragm, which are driven from a voice coil deep down between them. It's an intriguing design that borrows some elements from ribbon technology, some from conventional dynamic drivers, putting them together with some lateral thinking to come up with something incontrovertibly unique.

The voice coil is flat, vertical and ribbon shaped, but is used edge-on for efficiency in the magnetic gap, driving the inside edges of the diaphragm. Theory suggests that the effective source progressively narrows with increasing frequency, which is handy, while the shape should also provide some progressive horn loading towards the highest frequency. As if so much novelty wasn't enough, two complete tweeters are mounted back to back, conferring an overall bidirectional character.

This 30mm high driver is said to function over the range 2 - 30 kHz; there is also a larger 150mm variation, that operates down to 125Hz, but this is yet to be seen in the UK. It is a comparatively easy eight ohm (five ohm minimum) load to drive, with a stated (high) sensitivity of 90dB/W. While the *LFX* is bi-wirable, the copper binding posts used will not accept UK-style 4mm plugs at all. Whichever choice of cable is made, remember to have it terminated with spade lugs.

Because of the small footprint it's difficult to find a stand tall and thin enough to support them without looking silly. The heavier the stand, the better and cleaner the bass, and with a main driver this small, any low end reinforcement is a major plus.

It would be very easy to dismiss the little *LFX* before listening to it. But remove the large inverted L-shaped grille and you soon forget about the lack of deep bass and high volume that are the inherent failings of the package. It is best to think of these almost as panel speakers for the hard of wallet, or for those with serious space restrictions, or as second system speakers, for that lucky few unaffected by the present economic climate.

At less than headbanging levels, the *LFX* gives a passable impression of big

panel loudspeakers. Play them to someone in a darkened room and they expect to see a pair of big and flat speakers. Vocals especially have that 'in the room' articulation that makes listening to BBC radio plays (and Derek and Clive records) so enjoyable.

In terms of dynamic range, the box woofer actually helps the *LFX* to score over smaller, full range panel designs like the Quad, although it is not as dynamic as some bigger boxes. The imagery is quite superb; not only does it throw a neat and precise soundstage, but the very wide dispersion means those off-axis can have almost as good a time as the person in the hot seat. They can sound uncannily good with well recorded material, their sheer detail and refined mid and top highlight the recording quality, they also sound pleasing and even-tempered whatever type of music is played.

Bacon-free cymbals

I found cymbal sounds in particular were some of the most convincing I have heard from any hi-fi. I find it curious that we reviewers often write of cymbals 'sizzling', when the terminology of percussion uses more dynamic words like 'crash' and 'pang'. With the *Linæum*, one could easily hear that cymbals were made of metal, not bacon.

I am not convinced that these are the most neutral loudspeakers made, yet they are similar to Sonus Faber designs in their

rose coloured portrayal of music. All is not totally rosy however, as the bass does show some very noticeable limitations. For so small a design it goes pretty deep, but playing the C&C Music Factory reminded me of Nouvelle Cuisine or Sushi: no matter how hard you try, you're still left hungry for more. In any other speaker, such lack of depth, combined with the inability to be driven really hard, and a touch of time domain slurring on the cheaper mediate models, would eliminate the *LFX* from contention. However, the *Linæum* overcomes these hurdles. It's failings make it not something that everyone could live with, but the overall sound is also something an equally large number could not live without.

It is also highly system dependent, as that tweeter lets through both good and bad seemingly without discrimination. What really makes the speakers sing is a fine sounding but not overtly powerful valve amplifier, like one of the Copland models imported by the same distributor.

Summing up is difficult. The *Linæum LFX* is by no means a panacea among loudspeakers. Many similarly priced designs go deeper, louder or appear better value for money, by virtue of a bigger or a heavier box. On the other hand, few loudspeakers match the unique abilities of the *Linæums*, or manage to sound as good, with the right equipment. And those that do invariably cost far more and are several times the size.



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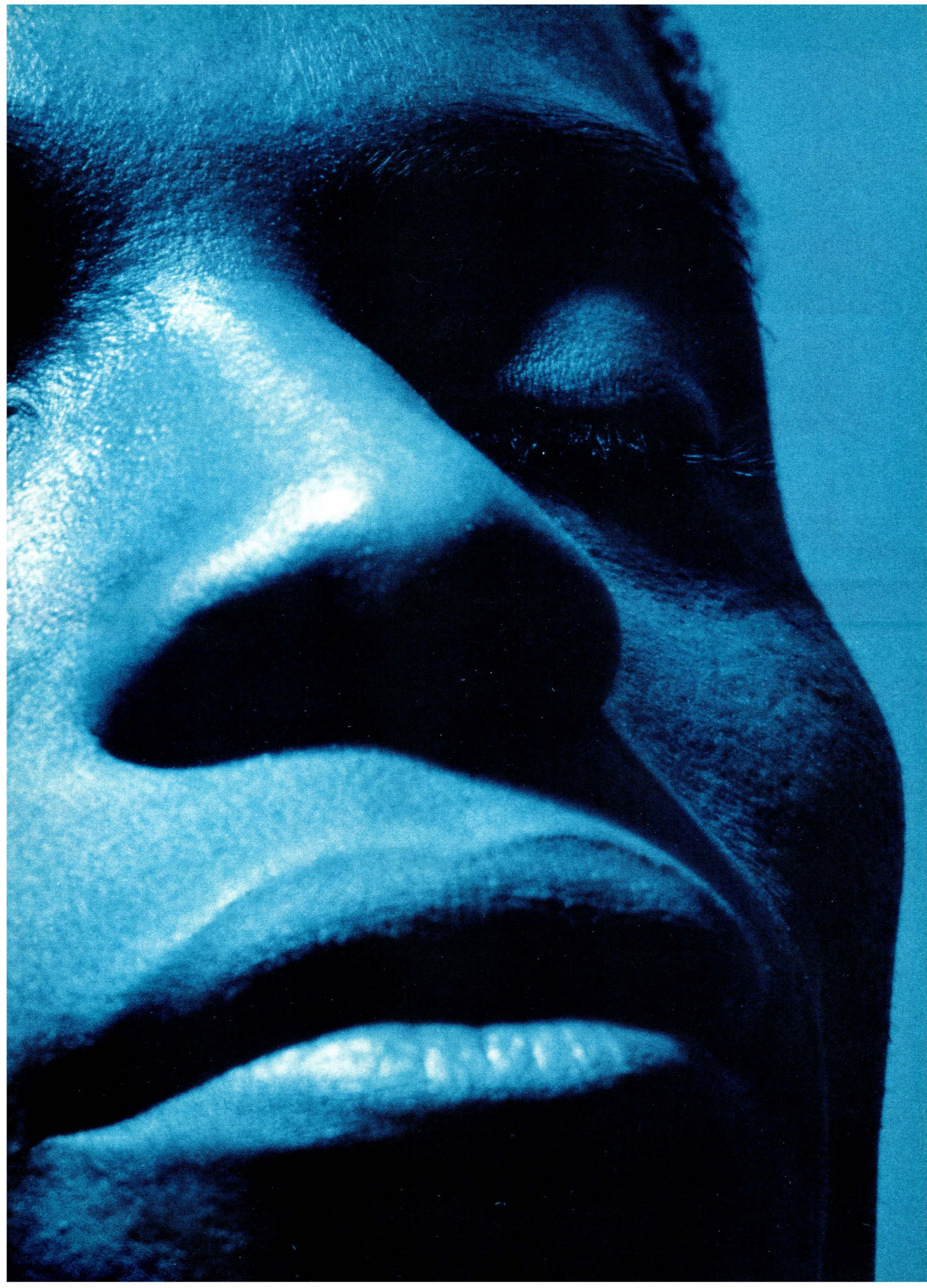


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The system and setting we're visiting this month is a perfect example of how the deep pocketed audiophile spends his time and money. Not that many people spend more than a couple of months' salary on hi-fi, and even fewer go to any serious lengths to improve the sound of music at home. Those with both the time and means to really indulge their passion for music are rarer than hens' teeth.

However, it is possible to discern a trend among this selection. Compared with what's going on with satellite broadcasting and complete audio visual home theatres, where all that's missing is the usherette, the modern audiophile looks a relatively regressive cove.

His attitude to technology is usually to eschew the premise that new is better. Audiophiles who like to discover music in the way that wise men follow stars can often be found trawling backwards through the catalogues, hunting down the supposedly deceased LP through second-hand outlets as though it was a live and elusive quarry. Those who are into classical and jazz especially look out for works combining both artistry and engineering excellence. They will talk wistfully of owning the complete Decca SXL series; of Sir Thomas Beecham's work for EMI in the late Sixties; the wondrous simplicity of an early Stax recording, and so forth.

Such music lovers often keep up with the hardware technology merely to disregard it. Many have bought a CD player just for the expedient reason of becoming familiar with repertoire which they consider has devolved from its superior analogue status. Digital Compact Cassette (DCC) and MiniDisc (MD) are similarly received with cynicism by the fully paid up audiophile, who can smell a marketing hype before he even sees the product.

Across the globe these men are listening to systems, which may be newly manufactured but which often reflect much older technology. Valve amplifiers, with basic circuitry designed more than 70 years ago, are preferred to today's solid state

SILVER DREAM MACHINE

Dan Houston visits the ivory tower of an audiophile who refuses to enter the digital era — airing his enviable vinyl collection on a costly high end system.



The *Ongaku* amplifier is the pride and joy at the centre of a system that allows you to close your eyes and believe you're really there.

transistor alternatives, and large loudspeaker cabinets using Forties style paper cones are still in vogue. Saying 'men' incidentally, is simply an observed fact and not intentionally sexist, though perhaps it does somewhat confirm the 'expensive toy' status of this equipment.

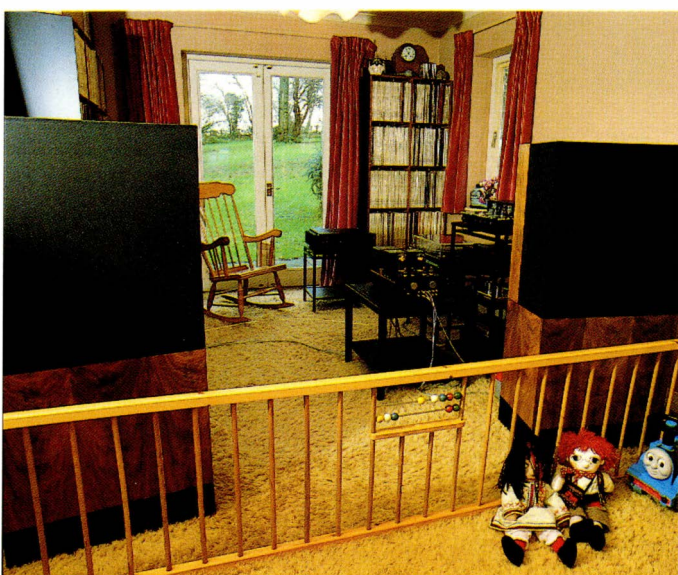
Our host this month is a computer software engineer who does not wish to be named since he works for the Ministry of Defence. We'll call him Mark.

He lives in Hampshire and listens to one of the most uncompromising hi-fi systems we have come across. Its centre of excellence is the famed Audionote *Ongaku* amplifier, a piece of silver-wired Japanese electronics which always delivers a performance that is arresting in its clear purity and simplicity. The *Ongaku* was already staggeringly expensive before the pound was devalued last September. The new exchange rates have resulted in a UK price increase of nearly £9,000!

But paying this sort of sum for an amplifier does not perturb Mark. "What else would you do with the money?" he retorts, before answering himself: "You could buy a car which sits on the drive all night. But if you have a good hi-fi system you can be inside enjoying records."

His ground floor listening room and lounge is a long rectangle of square section on one side of the house, with windows on three sides and glass doors to the garden at the back. Children's toys are scattered haphazardly around and Mark picks his way through to his listening chair at the end, some twenty feet away from the loudspeakers, though he sometimes sits closer to limit the bass frequencies reaching his ears.

The hi-fi and record collection is sectioned off by a wooden guarding rail, like a super-wide stairgate. This part of the room has the atmosphere of a study, with dark wood cabinets and the serious technical lines of the hi-fi system, which nevertheless looks extremely delicate compared to the bundles of bright coloured plastic toys that seem about to swarm over the rail.



Filling a Voyd

Mark isn't new to hi-fi. He has been steadily upgrading his system for more than 20 years. Now he has opted for the accepted synergy of a Voyd turntable, Heliuss tonearm, Audionote cartridge, and the largest Snell loudspeakers, a pair of *AIII*s. "In the early days I used a Garrard turntable with SME arm, and upgraded through the likes of a Thorens to a Linn/Naim system. I lost interest in hi-fi and music in the late Seventies.

The thing that revived my enthusiasm was hearing an Audio Innovations *Series 800* valve amplifier at Donnington Audio in 1985. I heard a whole system of Pink Triangle turntable, the *800* and Snell *J* loudspeakers, and decided I'd better spend some money on hi-fi again."

Audio Innovations has been one of the more successful valve revivalists, and Mark wasn't surprised to see valve amplification back in the shops again. Nor was he so shocked by the benefits in sound quality a decent

A look at an enviable system with the Voyd turntable surrounded by many records from the golden age of analogue recording — protected by the essential anti-toddler fence.

tube amp can bring: "I play guitar and use a Fender valve amplifier with my Telecaster. It has always had an impressive sound quality that is very undistorted compared to some other guitar amplifiers."

Mark was back on the hi-fi trail, upgrading when he could afford it through a Voyd turntable, larger Snell speakers and the Audio Innovations *Series 1000* amplifier, eventually bi-amping with *Second Audio* monobloks. He had moved to this house at the same time, so progress was a case of steady enlightenment: "I

The Ongaku is a near perfect amplifier that can produce wonderful sounds, but has the drawback that inferior recordings are exposed by its uncompromising standards.

never upgraded two things at once; it was strictly one change at a time. That way I could truly evaluate an improvement — and justify the money I was spending."

Three years ago he invested in the Snell *AIII* loudspeakers, and arrived at his present turntable combination in 1990. "The *AIII*s are slightly less efficient and need some more power to drive them, so Audio Innovations lent me a pair of prototypes, which was going to be the *Fourth Audio* model.

They never went into production, so instead I upgraded to the *Ongaku*. It's a strange amplifier, because sometimes you think it's running out of power. But then you realise it's the record which sounds that way; you put on another record which is properly cut and the *Ongaku* is full of life."

The new amplifier has found Mark completely reassessing his record collection, a procedure which will take several more months. He describes the amplifier as bringing a pure transpar-

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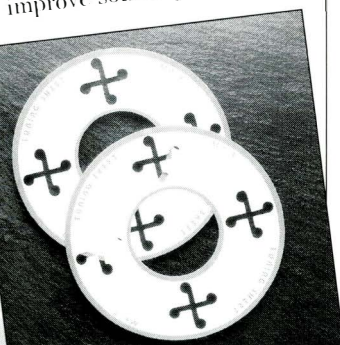
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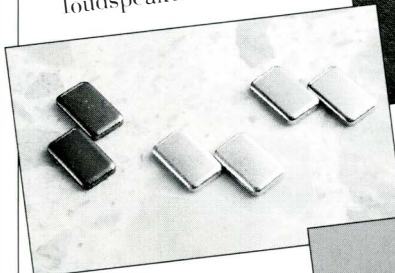


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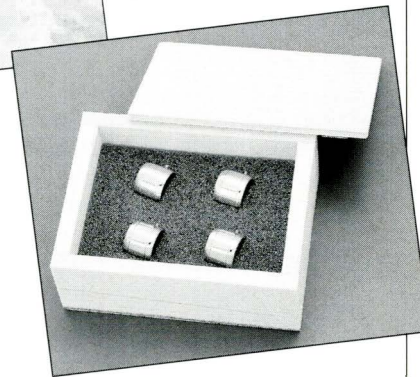
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ency and total fidelity to the system. But the uncompromising nature of the *Ongaku* is also one of its shortcomings; when electronics perform at this level, imperfect recordings are highlighted as much as the almost perfect.

However, Mark wouldn't have it any other way. For him the *Ongaku* is everything an amplifier should be: "The performance of this amplifier is totally different," he vouches. "It's much cleaner and more natural. It allows you to hear the timbre of instruments in a way that is strikingly different (to most amps). I wonder at how an amplifier can sound so different."

Mark has found himself listening to music much more, and is consequently fascinated by the business of regularly upgrading his equipment. It's almost as though each new addition to the hardware adds a complementary new dimension to all the records, bringing out new information and colour.

On the record

The record collection reflects a love of rock and pop music from his teens and twenties, and more latterly an appreciation of classical music. "As I became more interested in hi-fi, so I became more interested in classical music," he says. Many of his favourite recordings date from the Fifties and Sixties, a period which was rich with high quality studio and live recordings.

He regards most modern recordings as "pretty unsatisfactory": "There's too much processing and too many stages for the signal to pass through; the older recordings tend to sound much clearer and quieter." He is lucky enough to have a complete set of Lyrita recordings, many of which are recent, and which he regards as an exception to the rule.

Mark and other audiophiles would like record companies to adopt the hi-fi philosophy that less is more. Just as most good hi-fi aims to nurture a small electronic signal with simply laid out, high grade, minimal components, recordings which adopt the same approach can and often do sound much better than those which are compressed to sound right on a transistor radio. And there's the rub; high quality hi-fi highlights recording weaknesses which are nevertheless adequate, or even right, for cheap equipment.

In the Fifties recordings were often simply made, using a minimal number of valve microphones onto the bare minimum of tape tracks for both technical and economic reasons. As the record business grew into a huge global industry multi-

miking, -tracking and editing became the norm. Perfect sounding recordings were the aim, but the extra processing often made them dull and lifeless compared to what the LP pioneers had achieved. The cruel irony of this practice is that it is only relatively recently that our vinyl systems have let us hear what was really going on in the studio. By the time top quality record players were reaching this stage, CD was about to be launched, leading to fierce debate over which format was superior.

As an engineer Mark sees the low level resolution performance of digital music

as the main problem, and doesn't give it much praise. "Some music being released on CD looks interesting and I feel I might like to listen to it, but I rarely keep CDs. I only have about six which I like even though I've had a CD player for more than a year."

Mark hasn't exactly splashed out on his digital source, the Rotel costing a fraction of the price of the Voyd. "Maybe I should use a better CD player," he agrees, "but I haven't yet heard one which sounds that much better than the Rotel.

Finding a scarcity of new records which he wants to listen to, he has begun scour-

ing second-hand record shops, using complete editions of the *Gramophone* magazine from the Forties as a guide. "There's a shop near here I like to visit, but I'm not saying where it is in case others go there and remove the stocks. I was there recently and a Japanese guy was buying everything. He must have bought over 1,000 records. I get annoyed about that because they dump all this digital rubbish on us and now they're taking all the records away."

Perhaps unrealistically he doesn't see the vinyl era as over. Nor does he see digital music as being the undisputed way forward, preferring to regard vinyl records as a benchmark by which engineers will still set their standards.



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Audio Innovations Series 1000 preamplifier	£1,499(NA)
Audionote Ongaku	£34,500 (now £43,250)
Snell Type A111 speakers	£5,995(NA)
Audionote interconnect ANVX	£485/m
Audionote loudspeaker cable ANSPX	£350/m
Revox A77 reel to reel tape deck	(NA)
Rotel CD player	£350
Denon cassette deck	£250
Quad FM3 tuner	(NA)
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IO Silver

He may seem to be living in an ivory tower, but when he starts playing records on the system one is forced to agree that little sounds better than this. We play the Lyrita recording of Finzi's *Intimations of Immortality* and there it is again, the unmistakable and immediate hold that the *Ongaku* appears to have over the music. The openness of sound and clarity of instruments are apparent from the first bar.

It's a trick the system performs again and again, listening to Sonny Rollins' *Way Out West* album, other favourites like Jan Garbarek on the ECM label and Al Stewart on CBS. There's no sense of these records being second-hand, or sometimes 30 years old — the Audionote IO cartridge negotiates the surface noise like an otter through water. All we hear is the imaginary setting of musicians and their instruments, again and again, there with us in the room.

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Metal Guru

The original metal-cone loudspeaker man Ted Jordan talks to Dan Houston about his life and work.

It was at the Tokyo Audio Fair in October. Down one of the exhibition aisles I came across a pair of Jordan Watts Flagon loudspeakers, sitting on glass shelves and proudly flying little cardboard Union Flags. In fact the loudspeaker looks entirely un-British and jokily seems to be housed in a spherical beige jar reminding one of imported Spanish ceramics — the neck is its port. The fact that this famous one-way design from the Seventies has endured, when it looks so out-

landishly dated is saying something. Unlike flared trousers, platform shoes and great beady necklaces of brown and orange stones, the Jordan Watts Flagon isn't making a return on the wheel of fashion; it's been out there all this time.

What makes the £380 Flagon special, apart from life-threateningly kitsch looks, is that it works, and like several other designs with Jordan drivers, it works well. Two of the best-sounding speaker systems I've ever heard use Jordan drive

units. The first were the little known Amadeo loudspeaker, a joint design between Ted Jordan and architect Simon Conder, which looked more like Cleopatra's needles than conventional transducers. The second is the fabled Townshend Sir Galahad — a knight in shining armour indeed — with its rows of identical silver cones, and sweetly spoken to boot.

More recently Jordan Watts has introduced several new models, the beautifully piano-finished hexagonal JH400

being recommended in *Choice* issue 106. Seven designs are now available in varying finishes priced from £372 to £9,950. Jordan's drivers look unlike anything else and sound unique as well, with a seamless quality to the sound which provides a superb sound stage.

The cone shark

So who is Ted Jordan?

You have to go to the far west of Wales to find out. There, perched on the cliffs overlooking the Atlantic Ocean you can find Ted at home or in his workshop. It's a lonely, wild setting to which Jordan and his wife Denise moved from Buckinghamshire in 1987. They may have hoped for semi-retirement but the lower ground floor has been taken over by his design and manufacturing business, where he assembles the drivers himself, from components such as made to order foils and coils. The open plan living rooms above the workshop enjoy unbroken views, as far as the Isle of Lundy on a clear day. Several JW models are lined up in the listening area, simply but ably served by one of Ted's own amplifier designs and a CD player. The sofas face each other so there's no invitation to sit in the sweet spot; Ted's speakers are expressly designed to work off-axis.

We were joined by Ted's partner in JW Acoustics, Roy Holder, whose workshops at Hackney in London make the cabinets (except the cast aluminium *Flagnons*) and assemble the loudspeakers. During our visit the pressure of driver assembly was just about to overtake Ted, so the operation is being moved to Acoustic Components in Brighton, leaving Ted able to spend more time doing product design on his new computer.

Ted Jordan was born in 1929, and says he has a photograph of himself somewhere, aged 18 months and playing with a crystal radio set. His father was an audio hobbyist and Ted followed suit, building his own loudspeakers, radios and amplifiers. After the second world war he attended college to learn building technology: "But I failed miserably to develop any real interest in that, even though it was then supposed to be the in-thing. I was still interested in electronics and so I got a job with GEC in Wembley as a lab assistant. We were servicing televisions, and one day a colleague was admiring the sound quality from a set. 'Listen to that top,' he said. 'What's top?' I asked, and that was my introduction to hi-fi.

"It was around that time I first heard the sound of an aluminium cone loudspeaker, which Hugh Brittan, GEC's Head

of Acoustic Research was developing as a revolutionary drive unit. Aluminium cones weren't new — there's a primitive one in the science museum dating from 1920, but this was the first time anybody had started taking the technology seriously. It sounded great, with an alloy coil former turned from solid metal. I wasn't on the development team but used to hang around fascinated, and later began designing loudspeakers on my own."

In 1952 Ted went for his first design job, as an engineer with Goodmans, then based in Wembley. He remembers he wasn't as well qualified as he should have been. "I had to mug up like hell before the old man found out that I didn't know as much as I said I did. But it was fun, I was well bitten by the subject by then.

"My first project was designing an eight inch driver to compete with the Wharfedale *Gold*. I had always thought a flared cone should work well. If you make a cone with a hyperbolic profile, or flare, then it works backwards and forwards along its natural lines of elasticity, so the sound wave pattern stays even.

"I had this idea, but the tooling for the project was expensive, and the outcome wasn't certain. Edward Newland (Goodmans' Managing Director) said they would go ahead on the condition that if it worked he'd double my salary, and if it didn't he'd sack me.



Striving towards a wall of sound, Ted scrutinises one of his smaller driver designs.

The young Ted agreed and the Goodmans *Axielte 101* driver was born. It worked, boasting the flattest response of any loudspeaker yet tested, and he got his pay rise. When Goodmans heard about Quad's development of an electrostatic loudspeaker in 1955, Ted Jordan was

called in by Newland to make one as well. "We had three months to get it ready for the Audio Fair and it was a big secret, I was working in a special laboratory with painted-out windows, and no-one else knew what was going on. Somehow we did it. Apparently Quad had been working for five years on its model, and when Peter Walker (Quad's founder) saw ours at the show his jaw just dropped. He was sure we were using a normal bass unit inside it, but we were only using radiators — in strips — it was quite sophisticated. Basically we did it to prove that we could, just in case the world went that way.

Ted worked at Goodmans until 1963, improving on the *Axielte* with the *Axiom* range. His last project was designing the *Maxim* which was completed by Laurie Fincham, who later became Technical Director of KEF Electronics. He fondly remembers his time during the company's golden years: "I loved it at Goodmans, especially when Edward Newland was alive. He posed a challenge and if you won you were in; if you lost you were out. But the company was bought by somebody who was no longer progressive, and it never recovered that impetus."

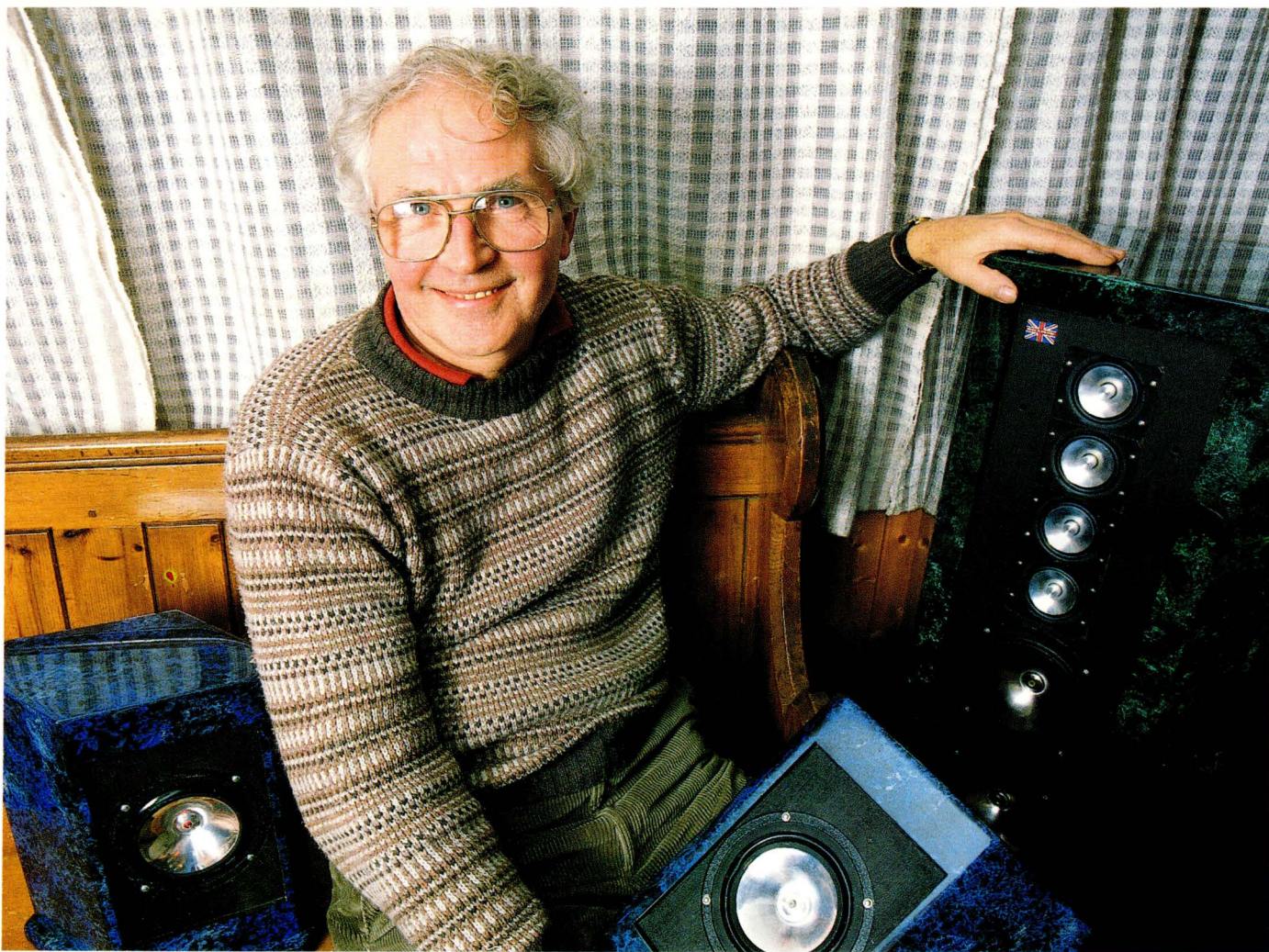
With a decade of experience under his belt Ted started his own company, teaming up with Les Watts, Goodmans' erstwhile Export Manager. He also wrote a book on loudspeaker theory, from first principles to what was the 1962 state of the art, which remains a highly regarded and seminal treatise today.

The first JW design was a retrospective on his early work at Goodmans: "I'd always liked the original single driver *Axielte*, and thought it could have been a world beater if better made. I was still interested in the idea of an aluminium cone and a flared diaphragm, and that is what we made. It was the first JW *Module* which, damn its hide, is still selling today, and was the first commercially available metal cone driver."

Cone alone

Jordan's time at Jordan Watts was short lived, 18 months after starting the company he left, working with others in the Audio and Design company before setting up on his own as a freelance designer. He describes the ensuing years as a complicated phase, helping to set up various shortlived companies making anything from turntables to tuners and amplifiers.

Apart from designing an integrated 15 watt amplifier in 1983, he continued to wrestle with the physical difficulties posed by full range single driver systems. "I felt I had pushed the technology about as far



as it would go with available materials, yet with one cone you're always about an octave short of the full audio range. If you make the cone too large you can't get the treble, and if you make it too small you can't get bass. About 4 inches or 92 mm is the optimum compromise.

"But the beauty of a full range driver is that it is crossover free. The difficulty of a two-way system with a crossover is that you need plenty of overlap, so I produced a tweeter (J50) that can go down to 100Hz." It wasn't until 1984, designing the *Amadeo* that he produced a flared aluminium cone bass unit to match the treble.

Jordan's drivers were sold through mail order along with the Jordan Manual which explains the philosophy behind his designs and includes an outline of theory as well as cabinet designs. His drivers are built into square frames for easy use in arrays, typically of four or more drivers in a vertical line. The *JH10KM* loudspeaker boasts no less than nine *J51* treble units with four *J125BM* bass units per channel.

Many of Jordan's designs deliberately angle the drivers so the directional axes of a stereo pair cross well in front of the listener. This explains the propensity for hexagonal cabinets in the current JW range. "I want to be able to move about and still have a central image," says Ted.

Simplicity is the key to the philosophy behind these very personal speaker designs.

"The best way to do that is to angle the cabinet-work and use an array of drivers. Conventional 'point source' loudspeakers produce a spherical radiation pattern of energy, so as you move in front of them the nearer one sounds louder. Using a vertical array of drivers the radiation pattern becomes a cylinder instead of a sphere, which has a far more linear energy radiation avoiding the enormous jump when you move in front of the loudspeakers. We also use a slightly rising treble response on the tweeters, that com-

"I loved it at Goodmans, especially when Edward Newland was alive. He posed a challenge and if you won you were in; if you lost you were out."

bines to give a stabler stereo image."

Another Jordan hallmark is the simple first order crossover used on his two way designs. "A crossover, even ours with just one inductor and one capacitor, gets in the way of the signal. To make it work you need a bass unit which sails way up into the treble and a tweeter which goes down low, allowing a gentle roll-off so that you can't hear the demarcation. You also need drivers designed in the same way, such

as using flared cones of the same material, to get a homogenous sound.

Ted's cone material is now a foil, some two thousandths of an inch thick. Surely this is too flimsy? "Most people take the approach that cones should be rigid to avoid breakup. But it's going to break up anyway, so we try and have something curved and soft. The cones' flexibility means they resume their shape quickly—especially important for high frequencies where cone flexing causes distortion. Our designs have much wider bandwidths, than rigid designs, and are better than plastics which are poor in this respect."

Jordan says he has always aimed for the simplest or easiest approach to design. "All components introduce distortion so the more we leave out, both mechanical and electrical, the better. I also design for me and I'm selfish about that; I don't want two separate loudspeakers, I want a wall of sound," he says.

"A few weeks ago I was walking behind a brass band and thought to myself: 'We're nowhere near it are we?' But there are still a few things we can do to improve the moving coil loudspeaker."

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More bass, with a side order of crispness, please

My system consists of a Linn Axis turntable with *Basik* arm and *K5* cartridge, Philips *CD 610 II* CD player, Musical Fidelity *B200* amplifier, Aiwa *AD-F810* cassette deck and Celestion *Ditton 15XR* speakers on cheap, indifferent stands.

**Isoda
Interconnect
Cable
Winner**

My listening room measures 4m x 3m. The speakers are sited close to the side walls, but about 1m from the back wall. My taste in music encompasses rock, classical, pop, folk, blues and some reggae. I feel that the system lacks bass extension, control and some crispness, particularly on rock music.

I would like to keep the amplifier because of its effect on classical music and wonder whether I can improve the system by upgrading the now ancient speakers and stands. I



Will your budget stretch to the Epos // loudspeakers?

have £350-£400 to play with.
J Onan
Upton, Wirral

Yep, I would point the finger at the speakers as well. If £400 is

the absolute maximum, then I would recommend speakers like the Heybrook HB1 S3 on Heybrook's own HBS1 stands, or the Linn Index II with its own Ku-Stone stands. If you can stretch the budget a little further past the £400 mark the Epos ES11, with the open frame Epos stand, is a smoother, sweeter high quality alternative.

Whichever speaker you decide upon, follow the manufacturers' recommendation as to

positioning and splash out on good cable.

Generally, I have found that MF amplifiers like a good multi-strand cable and I would suggest using something like Furukawa's FS-2T14 or Mission's Stranded cable to connect the speaker to the amplifier.

Weak amp causes boom

I recently purchased a Technics *SL-PS 620A* CD player, Technics *SA-GX 505* AV receiver and a pair of Tannoy *611* loudspeakers. Having read reports about the *611s* I am disappointed with the results. The bass seems very muffled and the speakers boom/distort easily. Could this be due to the size of the room, approx 3m by 3.5m, with speakers positioned about 0.3m from the nearest wall, or my system?

Could you also advise me on a pair of rear AV speakers. I want to bracket them to the rear wall, so the smaller the better.

Finally, could I use the speakers in my Panasonic *W25* TV as the front dialogue speakers?

James Aspin
Clayton le Moors.

When Choice reviewed the 611s, in issue 110, we were also less than happy. They were felt to be somewhat lacklustre overall, although distortion in the bass was not considered to be a problem. However, the impedance curve shows that the 611s are a demanding loudspeaker load, requiring an amplifier with good current delivery, especially in the bass. The Technics AV amplifier is designed to work with speakers in the four to eight ohm impedance range; as the 611s drop to three ohms in the bass, they may be making life less than comfortable for your amplifier.

The options are threefold, dependant on the purse-strings; change the speakers, change the amplifier, or change the lot. Swapping the Tannoy 611s over to a pair of B&W 620s would be an alternative if you must use a floorstander, although they might also prove a little current hungry for the Technics amp. I would prefer to see smaller, less demanding speakers, like the Heybrook HB1 S3, the Rega KYTE or the Royd Sapphire.

My colleagues on Home Entertainment magazine suggest that the Denon AVC-3020 and the Sony TA-AV670 are both well worth seeking out, should you decide to replace the Technics amp. In terms of rear channel loudspeakers, I would suggest a pair of Celestion 1s, Mission 760is, Goodmans Maxim 3s or JPW Minimis, with a single shielded Mordaunt Short CS-1 as a centre dialogue speaker. Unfortunately, as you have not given us the full model number of your television, we cannot say if you can use your built-in TV speakers as dialogue models, or even if it is worthwhile doing so. Generally, however, it is better to add a separate shielded speaker.

Performance problems perfected

My system consists of a VTL *50/50* stereo power amplifier, Denon *3520* CD player and a pair of Rogers *LS3/5a* speakers on Foundation stands. The CD player is connected directly to the power amplifier via a pair of Aural Symphonic interconnects and I use van den Hul *Magnum* speaker cable.

I listen mainly to female vocal and jazz and I have about £1,000 to upgrade my system. I'm after a laid back sound and I am deciding whether to upgrade the speakers or add a D/A convertor. I'm considering speakers like the Acoustic Energy *AE1*, the Celestion *SL600Si* or perhaps the Monitor Audio *Studio 10*.

P Desmond
South Perth, Western Australia

I suggest you don't change from the LS3/5as, especially to the speakers mentioned above. Both the AE1s and the SL600Sis need substantial amounts of (usually transistorised) power and the Studio 10s

may sound too forward for your tastes. Speakers to audition as replacements would tend to be beyond your current budget.

Before investigating the D/A convertor, consider getting a



The Denon 3520: combine it with a good DAC for an affordable upgrade.

good preamplifier. Using the Denon's variable output might seem like a good idea, as it shortens the signal path, but the internal op-amps used in this section generally affect the sound as much as any preamplifier. Instead, try a good passive preamplifier, like the Moth Series 30, between

CD player and power amplifier. The interconnect cables must be kept short, but it should provide a noticeable sonic improvement.

Go for a DAC next, the Sugden SDA-1 (with

AudioQuest Video Z coaxial cable) should be good but listen to the new Meridian 263 as well. If there's any spare cash look at the equipment supports. Both Townshend Seismic Sinks and Mana tables, if they are available in Australia, do wonders for CD players and valve amplifiers.

Can you justify the extra expense?

I use the following system: Roksan Radius turntable, Tabriz arm and Corus Blue cartridge, a Denon M22 cassette deck, with an Onix OA22 amplifier and a pair of Monitor Audio 100 Gold loudspeakers.

I am now looking for an appropriate CD player and tuner for my system. I thought of buying a Denon CD player (such as the DCD-1290) and a Denon tuner (ie TU-260L). Do you think that this is a good choice, or would you suggest going for a more sophisticated CD player, such as the Roksan, and a tuner like the Onix.

I listen mainly to classical music (chamber music, songs, opera) and light pop music with acoustic guitars and without big bass (Beatles, Mark Knopfler, Bob Dylan, Neville Brothers). I like a warm, detailed and transparent sound. C Braegger Zurich, Switzerland.

There are very definite improvements to be had moving over to a better CD player. A high-end CD player, like the Roksan, will subtly enhance the

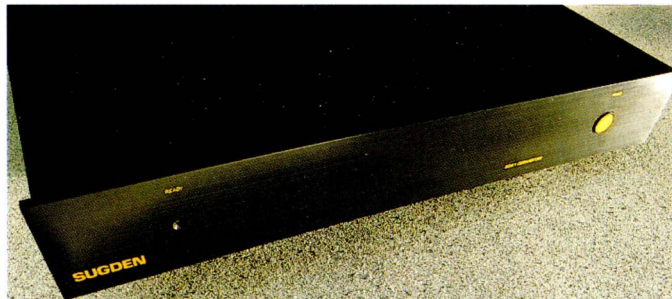
excitement, involvement and listenability of the music. Most of the improvements are more subjective than objective and as such it is not easy to pinpoint why player A is better than player B, any more than it is possible to say that a Linn Sondek is better or worse than a Roksan Xerxes.

We were less than overwhelmed by the Denon DCD-1290 that you mentioned, although it appears initially impressive. At its price, we would suggest a player like the Rotel RCD-965BX or the Kenwood DP-7040, but these players only scratch the surface of CD replay.

Looking at the tuner, make

sure that you have a particularly good aerial, otherwise it is a waste of good FM. In this country, about £100 secures a good aerial and installation, although it is possible to go aerial crazy and spend more.

Once again there are improvements in sound quality between the Denon TU-260L and an Onix BWD-1, but this time the attendant lack of presets in the Onix must be taken into account. The TU-260L is a good sounding tuner for the money, whereas the Onix, especially with the SOAP 2 power supply, is considered to be a good sounding tuner, regardless of price.



The Denon DCD 1290: Can it be bettered by a Roksan?

Speakers blow cold in new system

I am on the lookout for an upgrade to replace my Rogers LS6 (very early version) speakers as I think that they are probably the weakest link in my system. This consists of a Meridian 200/203 CD combination, Musical Fidelity The Preamp, with two Typhoon power amplifiers, AudioQuest Quartz cable and Cyrus Solid Core loudspeaker cable. The speakers are on Something Solid stands.

My room is 4.23m x 4.34m. I like a full, musical even slightly warm kind of sound and not one that is cold, sharp and bright. Do you think that my room is too small for floorstanders? K R Wilding Braunschweig, Germany.

To get the best out of such a system, there

appear to be two solutions, loudspeaker-wise; Linn's Keilidh and the Castle Chester. If you like your music full and slightly warm, then I would suggest the Chester, as it is less likely to

show up any undue harshness in the rest of the system. They lack the depth and drive of the Keilidh, yet have a richness and mid-band clarity that is very alluring.

From here, I would suggest changing the cables over to decent multistrand. As you are already using AudioQuest interconnect, I would suggest something from that range, or else something like Furukawa FS-2T14.

Castle Chesters: Perfect for a warm and engaging sound.



Big ideas, small budget

My system has grown rapidly from its budget CD player roots to the analogue system I currently use. It now consists of a Linn LP12/Lingo/Ittok LVII/AT-OC5 turntable, a Naim 32.5/Hi-Cap/90 amplifier and a pair of Epos ES11 speakers using Linn K400 cable, the turntable is sited on an Audiotech table. As my system has grown, I have found my musical tastes have broadened.

My plan now is to add a CD player costing around £300-£400 to my current system that will hopefully not feel too embarrassed when fed into the Naim. The player I would like to purchase would have to be of good build quality, with a very well engineered transport section and a coaxial digital output, as my long term plan is to add an external D/A convertor. I realise through my experience with the Linn Lingo and the Naim Hi-Cap, the benefits to be wrought from giving each piece of equipment to its own interference free housing and dedicated power supply.

My sole aim is to be able to reproduce music in the home as accurately as the original recording allows, on whatever format, whether digital or analogue. R Simpson. Co Armagh, Northern Ireland.

Aren't you asking rather a lot of a £300-£400 CD player? Solid engineering costs money, as you already have found with your Linn deck and Naim amps. Although players in this range are generally well made, they don't compare with those over £1,000.

In your system it is well worth spending a bit extra and going for an Arcam Alpha Plus CD player. This is one of the few sub £1,500 CD players that owners of Linn/Naim systems consistently suggest that they can live with.

I would not consider such a player to be good potential material for upgrading with an expensive off-board D/A convertor, as the accuracy of the digital output in the Alpha could compromise a high quality DAC. An Audio Alchemy or QED Digit may sound good with a lesser player, but improvements to the DAC, without opting for a more well made transport, should be seen as a stop-gap, until funds permit a high quality transport.

What do you think about the way things are shaping up in the ever broadening world of audio entertainment? We want to know your views and ideas, so send 'em in and each month we'll award a *Hi-Fi Choice* sweatshirt (Extra Large) to the writer of the most witty or interesting contribution.

Top quality software required

It does not take much to notice the difference in the technical quality of different recordings, even recent recordings on respected labels may vary considerably. Obviously many record companies are more interested in pushing new (more profitable) formats and issuing compiled 'best of' recordings — very profitable too — than in simply offering fine sound quality. Thus the music lover interested in good reproduction at home is not only questing for the best equipment or tweaks, but most of all for the finest recordings. Perhaps you could give some

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more space in your magazine to presenting remarkable recordings. It will please many readers, I'm sure, and at the same time

increase awareness in the industry that good recordings are appreciated. Mark Bolech, Utrecht, The Netherlands.

I agree with you, and future Choice will be highlighting some of the best audio recordings available — keep an eye on the Sessions pages. In the meantime

listen to some of the Reference Recordings discs offered in our mail order section, page 82. These are all first rate recordings.

Interfering signals cured by CD player

When I moved house a couple of years ago my system became plagued by radio frequency interference.

I currently own a Pink Triangle Anniversary, SMEV, AT OC7 record player connected to an Arcam Alpha II, with an MCP card (great value at around £20), connected by Sonic Link cable. The speakers are Tannoy's 611s which the Arcam drives admirably.

I sought the advice of dealers and bought graphite RFI rings, which I coiled the interconnect around as much as was possible, it did some

good, but not enough.

I bought different interconnect, billed as 'radio frequency shielded', this proved useless.

Having lived with a constant BBC World Service in between tracks and during quiet moments, for nearly two years, I was desperate to sort out the problem. Not being rich, I dreaded the thought of having to buy a new amplifier.

In my previous attempts to sort out the problem I had noticed that touching the earth lead from the turntable greatly increased the RFI, in fact I was a great aerial for Capital Radio.

So I decided to experiment, touching it to nearby objects, fixings and even dipping it into a glass of water. Most of these increased the RFI problem

Then enter the hero of the hour, my much under used Marantz CD65 II. Fixing the earth lead of my turntable to the digital output of the CD Player, no RFI can be heard and indeed has not been heard since, and if I'm not mistaken the finest details on vinyl now come through.

Phil Binks, London.
So CD players have their uses after all! — Dep Ed.

The vinyl nail in the coffin

Being without a job at the moment I consider your magazine in the same way one considers a fine wine; as an occasional treat. I appreciate your quality writing and comprehensive reviews.

In the December issue I read with interest the hype and controversy surrounding the latest digital recording formats; DCC

and MiniDisc. I would like to join the fray with a lament of my own at the dreadful quality of vinyl records available (specialist pressings excluded). It would seem mandatory now that each record attains a perfect 'bowl' shape before being given plenty of surface noise.

It is sad to see a valid format

being given such shoddy treatment in its twilight years. No doubt it is to try and distance them from CDs that cost almost twice as much. I have now decided it is time to swallow my pride and purchase a CD player, when I can afford one. Andrew Maddison, Trowbridge, Wiltshire.

Intolerant of vinyl nostalgia

It was refreshing to read the editorial accompanying February's turntable reviews, which made a welcome change to the often hysterical copy found in other magazines, aimed at justifying analogue's existence.

Providing you can put up with microphony, end-of-side distortion, falling frequency response (about 12kHz on inner grooves), mediocre channel separation and dynamic range, surface noise, mechanical tinkering (RIAA correction) and progressive deterioration with each playing — fine.

Personally, I was never satisfied with the vinyl medium and ditched a 20 year collection in 1983 after auditioning you-know-what.

I accept that digital sources have a sound of their own. It's called 'lack of coloration', and I have been amused occasionally to discover vinyl junkies enthusing over their 'analogue sound' which has used a digital recorder in the chain.

Can I make a plea that you confine any forthcoming similar articles to 'Junkies Corner' and reserve the main body of your excellent magazine to serious hi-fi. Colin Gavin, Flint, Clwyd.
See Menu this issue — Ed.

The Bunde bandage

I felt compelled to write and thank you for drawing my attention to the Bunde CD3 CD Repair Kit.

Imagine my pure delight, I had a CD which I have avoided playing for months and had just about written off. The 'scar' — it was more than a scratch — on the disc was 0.8mm of an inch wide and 6mm long and ran around the disc. Having followed the kit instructions the scar almost vanished. I tried playing the disc, it had improved marginally. I tried a second treatment to the damaged area only, played the disc again and hey presto, perfection. This product is a winner without a doubt. Thanks again Hi-Fi Choice, keep 'em coming R Osborne, Bicester Oxon.

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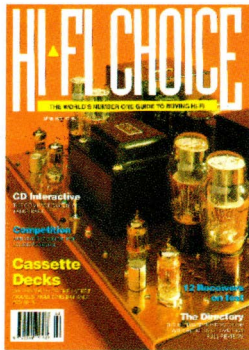
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May 1992 - Issue 106
LOUDSPEAKERS and CD
personals plus explanation of
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June 1992 - Issue 107
CD PLAYERS and phono
stages plus DCC review and
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tuners plus wide screen TV
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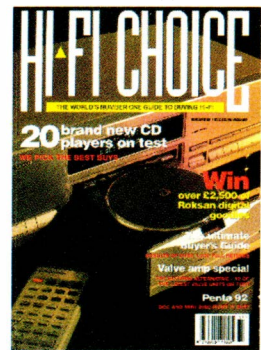
August 1992 - Issue 109
AMPLIFIERS and part 2 of our
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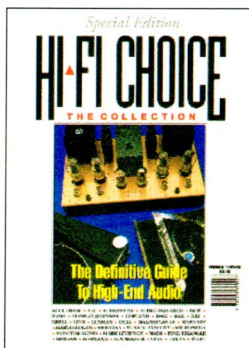
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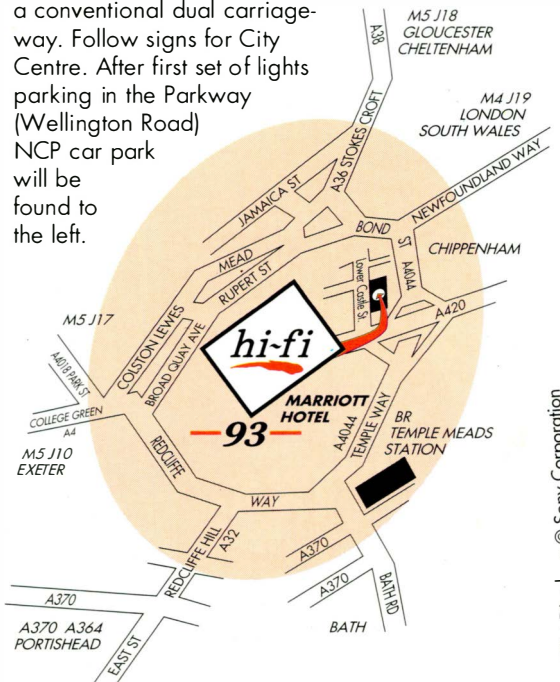
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21st Century Fox

Philips continues to push DCC with adverts that encourage copying CDs onto digital cassette. Blank 75 minute cassettes carry the sticker 'for CD'. Philips and Technics won't launch the playback-only DCC portable, which the record companies had been promised, until summer. The British Phonographic Industry, trade body for UK record companies, has written to both Philips and Sony, regretting that there is no warning that it is illegal to copy CDs in the DCC and Mini Disc ads.

Although Sony in the UK has so far played down the dub-a-CD benefits of Mini Disc, Sony in Japan will start selling a mains-powered MD deck for a components system next month. This has 'editing features' and is 'suited to the creation of "personalised" discs'. Doubtless there will be fresh calls from the BPI for a tax on blank software. And the European Commission in Brussels is already debating a plan to 'harmonize' a home recording levy throughout Eu-

With the new digital recording formats in place, Barry Fox looks at the taxing subject of home taping

rope. This means that the Brussels Eurocrats are likely to issue a Directive forcing all governments in Europe to put a tax onto blank software.

The Consumers' Association, publishers of *Which?* magazine, has always been against such a tax. In 1991 CA commissioned market research interviews to try and find out whether home taping really is the bogey that the record industry claims. The results show that a third of people who buy blank tapes use them to tape from the radio or TV. A slightly smaller percentage (28 per cent) use them to tape records owned by themselves or another member of the household. Only 22 per cent use them to tape somebody else's records. So, says CA, fewer than a quarter of the people who buy blank tapes use them in a way which can affect the sales of pre-recorded music.

On video, the CA's survey showed that only four per cent of the people who buy blank cassettes use them to copy pre-recorded videos. This is hardly surprising, because relatively few households have two VCRs or a double-deck VCR. Also, many film companies now use the Macrovision process which provides an electronic block against tape-to-tape copying. So, says CA, any tax on blank video tape would unfairly penalize 96 per cent of tape purchasers, and any tax on blank audio tape would unfairly penalize over 75 per cent of audio tape purchasers. Nevertheless, more than a third of the people questioned reckoned it would be fair to pay around 10p extra for a cassette in exchange for the right to copy.

CA's position now is that if there is to be a levy, it should be low to match the pattern of tape use shown by its survey, the law must be changed to give consumers the legal right to make copies for personal use and there must be exemptions for the blind.

So what happens next?

The idea of a tax was first raised by the European Parliament in 1991 and was discussed by Working

Groups of the European Commission in Brussels last year. It looks likely that the EC will formally adopt the proposal this year. It will then go to governments round Europe for comment, and from there back to the European Parliament and Council of Ministers for more discussion and amendment. If adopted the proposal becomes an official Directive. National governments are then obliged to pass laws which enforce the EC's decisions. Usually these laws come into force after a grace period of two or three years.

All this sounds confusingly cumbersome, with action a long way off. But be warned. When EC discussions drone on and on they have a nasty habit of suddenly turning into a tablet of stone.

A Euro-tax on blank tape and discs now looks inevitable. Also, because it will take time to implement on a European level, you can bet that the BPI will lobby the DTI for a local tax in the UK to bridge the gap, using DCC, MD, CD-R and adverts like those from Philips as ammunition, believing that the DTI is now more sympathetic to the idea. Whether or not you think the idea of a tax is fair, the main issue remains unresolved and must be debated.

How will the money be distributed?

The record industry's plan is to distribute any such tax collected on the basis of existing copyright payments, eg, giving McCartney, Pavarotti and Jagger a share of the tax based on their current earnings from record sales. This is obviously unpopular.

In the past, when the BPI was lobbying the DTI for a local tax, there was talk of the money going to industry causes, like a music school. One idea was to give it to charity, for instance for the blind or deaf. The issue of distribution must be settled before the tax is



implemented. Which could be one for a hi-fi trade body like the FBA to take on board.

Certainly no-one should make the mistake of assuming that the electronic industry's trade body, BREMA, will look after everyone's interests. BREMA was the only place I know of which got a copy of the DTI's discussion document on the law to make MAC decoders a legal obligation in widescreen TV sets that adds an extra £100 of almost redundant circuitry. And BREMA as a body did nothing to publicise the document, judging it sufficient to send copies to member companies, some of which had a vested interest in MAC and were therefore bound to welcome any law compelling people to buy decoders.

Home taping is killing music... or is it?



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Questions

1. What is the data compression system used by MD called?
2. Mission launched a new CD transport this month, what is its name?
3. What's the successor to the legendary NAD 3020 integrated amp called?
4. Which amplifier is named after a legendary sea monster?
5. Which company launched the world's smallest MD player at Las Vegas this January?
6. Who designed the drive units used in the Townshend *Sir Galahad* loudspeakers?

Entry form

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HFC/MARCH/93

Closing date: Monday, 5th April, 1993

Your answers:

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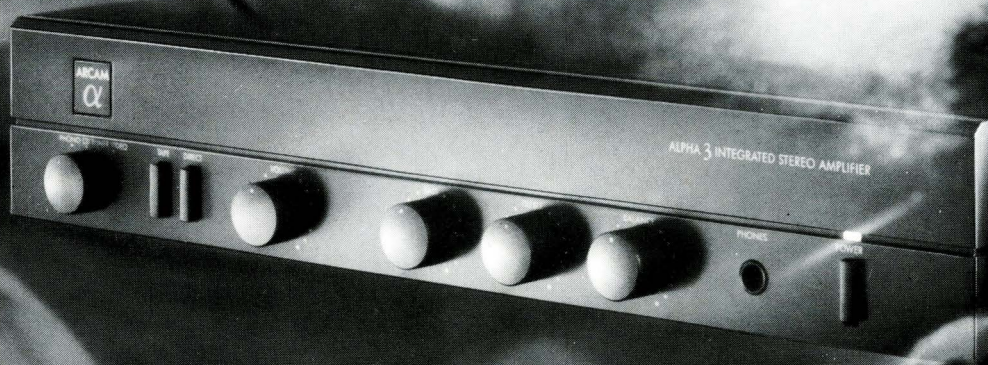
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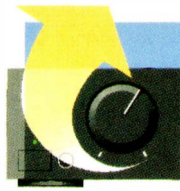
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HPC 3/93

*Jonathan Kettle, Audiophile, October 1991

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Choosing and Using . . . Amplifiers

At the heart of every hi-fi system there is an amplifier, the one component that links all the others together. This is the component that allows you to copy from CD or vinyl onto tape, for instance, but its prime task is to provide the interface between sources and loudspeakers. This superficially simple task is, in reality, dominated by extremes, from handling the minute voltages produced by a moving-coil cartridge to, say, the 100,000 times higher levels demanded by an inefficient and power hungry loudspeaker.

Just how adequately an amplifier copes with these extremes is reflected in both its technical and subjective performance, though these two arbiters are not mutually dependent. The higher-powered amplifier with vanishingly low levels of distortion will not necessarily sound better than a weaker model with loads of unwanted harmonic distortion in tow. Otherwise the small but hotly contested market for valve amplifiers would have dried up long ago.

Worried by watts? Confused by current? Paul Miller gets to grips with the heart of hi-fi, the amplifier.

Nevertheless the bulk of amplifiers made today are solid-state in design, because these are simply more efficient, flexible and reliable in execution than their valve forefathers. But even here there is a broad canvas of style and design, from the archetypal feature-laden, button-strewn mass market model to the stripped-down audiophile contender, whose designer's brief is the simple one of concentrating all efforts on the circuitry that's absolutely crucial to the music signal. Circuits like the RIAA stage that boosts and equalises the signal from vinyl disc, line stages for the tuner, tape deck and CD player plus the final power amp stages to grapple firmly with the speakers.

Anything else is judged unnecessary. Is this the sort of amplifier for you? Well, be honest with yourself, do you really need tone controls or other widgets? If you do then perhaps an imbalance lies elsewhere within the system itself. Don't buy an amp just to tweak the bass control; choose one instead that gives you the clout you're after without recourse to an electronic band-aid. It's what system matching and upgrading is all about.

Once again, this is not to say an amplifier with sensibly tailored tone controls cannot sound respectable. Indeed many popular models include a tone defeat facility in an attempt to offer the best of both worlds. Furthermore, with the decline in vinyl sales some new amplifiers are being offered with optional vinyl disc stages. These are the most difficult stages to

engineer, so why spend money unnecessarily if the amplifier is destined for a CD-based life?

But whatever their origin and configuration all amplifiers must tackle most of the extremes mentioned in the opening paragraph. A conventional integrated amplifier has the toughest job, because the sensitive vinyl disc stage and rugged power amp are both beaver away within the confines of a single case. It's easy to imagine how the dynamic swings in current demanded by the speaker could affect the delicate, low-level signals being supplied by a phono cartridge, as being rather like trying to perform micro-surgery in the middle of an earthquake.

To make the environment less hostile to the small signals, more up market amplification separates out the components into discreet pre- and power amplifiers. Preamplifiers undertake the job of signal switching and processing (tape and input selection, MM/MC vinyl disc equalisation, volume and tone controls and line stages) from the heavy-duty power amp which provides the muscle needed to control the speaker. Each can get on with its allotted task without influencing the other through sharing power supplies, earth tracks and casework as in an integrated amplifier. Pre/power amps do flaunt the promise of higher quality sound, but at a price point well above the ordinary integrated product.

Simply looking at an amplifier will give very little information regarding its prowess, whether a pre/power combination or budget integrated model. The first rule is to find a good and patient dealer willing to let you hear a variety of different models. The second rule is not to worry overmuch about 'matching' the nominal output of the amp to the power rating of your speakers. If the boxes have 50W slapped on the back this does not prohibit the use of a 30W or even a 100W amplifier.

The best basic rule is: if it sounds right then it is right. After all, you're the one that has to live with the decision, not your dealer. In fact it's easier to damage your speakers by pushing an under-powered amplifier too hard than by blasting out the occasional clean peak from something monstrous. Don't get distracted by power though, because more power does not mean more quality.

Arguably more important is the amplifier's ability to deliver peak current. A certain number of Amps (or milliamps) of current are required to maintain the voltage across the speaker load, and the lower the load (impedance) of the speakers, the more current is demanded for any given voltage level. Low impedance speakers under difficult dynamic conditions can cause the current to run dry, leading to a massive increase in distortion which can, in turn, upset and even damage the speakers.

Albarré AP4/S508

Ortofon UK, Hayden House, Chiltern Hill, Chalfont St Peter, Bucks
SL9 9EW. Tel: (0753) 889 949



Having basked in the success of the *PP1* integrated amplifier that was reviewed and Recommended in issue 104, Albarré has now launched a new pre/power combination — the £350 *AP4* and £500 *S508*. The familiar burgundy fascias imply that these newcomers are also 'vintage Albarré'; unfortunately a quick tasting suggests that a hint of Sarsons has somehow soured the recipe.

Featurewise, the preamp offers no more than the *PP1*, although the on-board phono stage must now be pre-set for either MM or MC sensitivity. This relatively simple procedure involves a rearrangement of soldered links and should lie well within the capabilities of your local dealer.

Otherwise the amplifier has the same line and tape inputs, plus the same unwise +16dB gain stage — see lab report. Input and tape-out selection is carried out hard up against the rear panel, ensuring a short 'passive' link for all line inputs. With the +16dB option engaged, however, a TL072 op-amp provides a hearty boost to line and disc inputs alike — a nice idea in theory perhaps but rather scary in practice.

The casework, meanwhile, is common to the entire range. So the power amp still has holes in its metalwork where the preamp's volume and input selector would have been fitted had this been a preamp, just as the preamp itself has holes where power amp LEDs might have glowed.

Lab report

Let's kick-off with the power amp, which

seems the more promising half of this duo. First, its output impedance is very low at 0.014ohm (lots of feedback and only a half-zobel network to muddy the water), while the spaced, symmetrical layout ensures good stereo separation.

Power, however, is hardly mind or speaker-boggling at just 46W, even though the +2.3dB boost to 79W (4ohm) pays tribute to the 'stiffness' of Albarré's power supply. Unfortunately its grasp of lower impedance loads is undermined by a fast-acting optical protection circuit, which limits the reserve to a very modest 8.1A current capability.

Then there's distortion which, though not excessive at 0.007-0.05 per cent, is still dominated by odd rather than even-order mechanisms. Glance at the 3D plot for a birds-eye view of how things panned out.

The *AP4* preamp's moving-coil cartridge input has a rather peculiar frequency response, though the errors in this instance are quite different from those encountered in the *PP1* integrated model. The 1.7dB boost at 10kHz is quite sufficient to have a clearly audible impact, especially when it's associated with a fairly rapid low frequency roll-off below 100Hz.

The MC vinyl disc input sensitivity clocks-in at a poor 3.45mV though this does improve to 392µV (and from 1V to 142mV via CD) with the +16dB facility in tow. This implies a 17dB boost via line and +18.9dB via disc, which means that a line source (an old tuner or tape deck) would only fail to achieve the power amp's 501mV input

sensitivity if its output was less than 70mV. Remember that the modern day CD player has a peak output of around 2000mV, and you can see the potential for overload problems.

Bearing in mind the MM-like sensitivity of the disc stage, its signal-to-noise (relative to 5mV) clocks-in at a miraculous 100dB but falls to 79.9dB relative to the correct IEC MC level of 500µV and with the +16dB stage engaged. The line input, by contrast, retains its 106dB signal-to-noise ratio regardless of the gain setting.

Confused? Unfortunately the numbers get even worse. Albarré's limited disc overload margins can combine with the restricted headroom of its +16dB stage to push distortion through the roof under unfortunate or unlucky circumstances (ordinarily it's still very high at 0.16-0.85 per cent). For example, in active mode the maximum output of the preamp increases from 7.2V to 11.0V but the combined disc/line headroom plummets from 22.7mV to 4.27mV (just +18.6dB).

At 20kHz the limited margins of the disc network have greatest influence, so whichever mode is engaged the overall headroom remains fixed at just +14.3dB. As a consequence the +16dB option should only be fired-up with very low-output MC cartridges, and never when a CD player is being used.

Sound quality

Those of a nervous or rather sensitive disposition should skip this part, for the

TEST RESULTS

Albarré pre/power combination was roundly condemned in two separate listening sessions. Whatever input was used a certain character or uneasiness persisted, even though CDs generally sounded louder and bigger in scale than vinyl.

Furthermore, and with no notion of the preamp's anomalous frequency response, our listeners still seized upon the prominent 'presence' (upper mid) of the LP selection, an imbalance that threw the Paganini violin forward, for example, while 'losing the piano under the floorboards'.

This lack of uniformity persisted from disc to disc, where some instruments would be in focus and others rather vague or wishy-washy. In fact it was the roughness of horns and brittleness of percussion from Rachmaninov's *Symphonic Dances* that first alerted us to its swimmy stereo focus and false sense of detail.

Vocals proved equally difficult to interpret, and Kate Bush sounded atypically electronic and soulless, lacking the warmth and humanity we had come to expect. Her voice floated aimlessly upon an uneasy soundstage.

By comparison CD sounded louder, though it also lacked any obvious sense of purpose, warmth or weight. This forward presentation stripped the ruddiness from our mellow jazz CD and left its soundstaging shallow when compared to the best integrated models in our survey. 'Sounds as if the double bass player is away on holiday', quipped one listener.

Conclusion

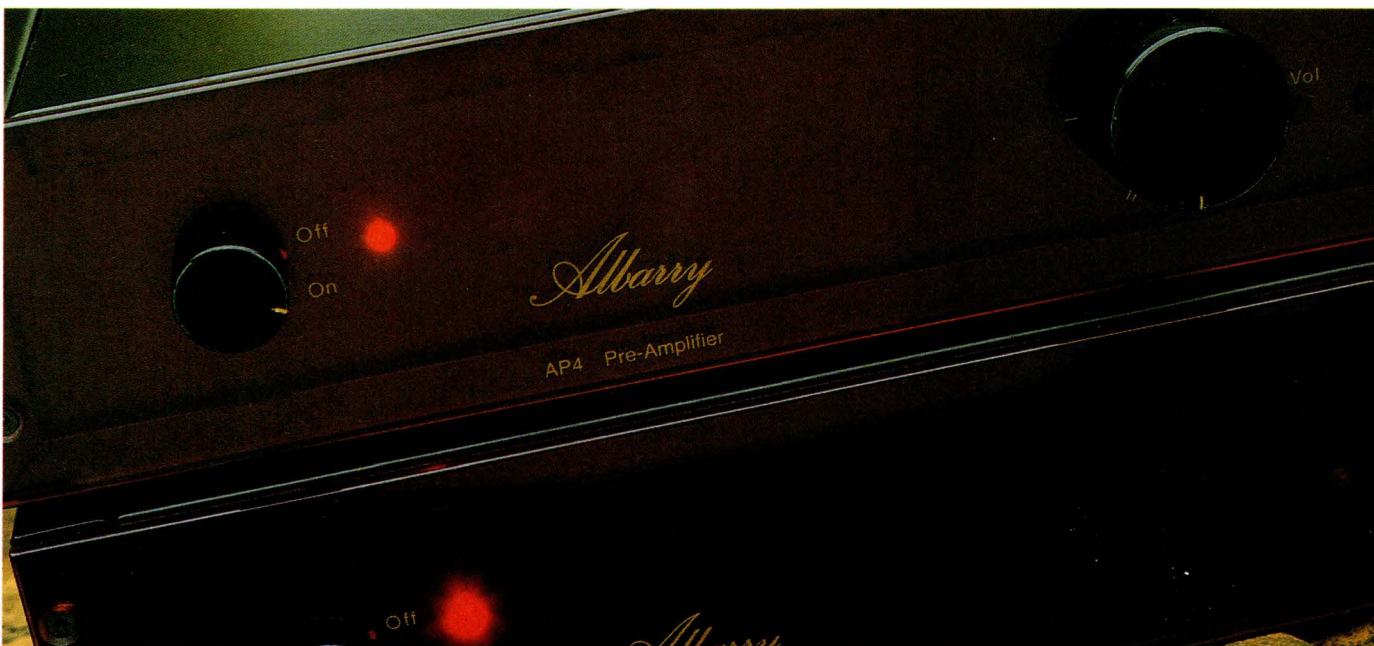
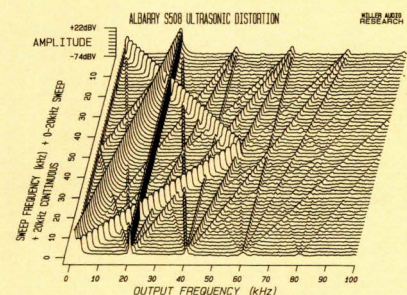
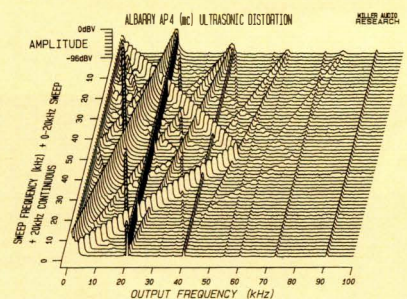
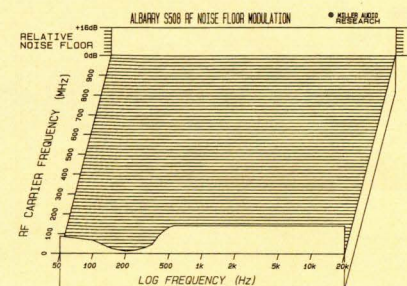
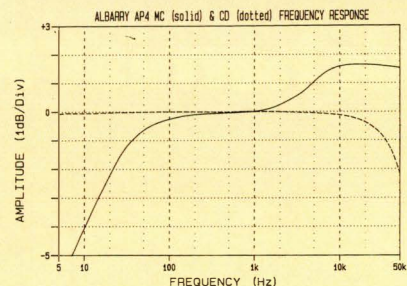
Having heard various LPs and CDs our panel emerged united. 'This is a little amplifier with big problems' they muttered, 'and one with few redeeming qualities aside from its off switch'. It seems clear that something has gone unfortunately awry during the dissection and elaboration of Albarré's much more engaging and less expensive *PP1* integrated amplifier.

Preamplifier: Albarré AP4

	Aux/CD	MC
Stereo separation		
(20Hz)	130.7dB	115.1dB
(1kHz)	92.5dB	85.6dB
(20kHz)	67.3dB	67.2dB
Channel Balance @ 1kHz		
(0dBV)	0.00dB	0.08dB
(-20dBV)	0.30dB	0.38dB
(-60dBV)	2.16dB	2.23dB
Total Harmonic Dist @ 0dBV		
(1kHz)	>-100dB	-56.4dB
(20kHz)	>-100dB	-41.4dB
CCIR Intermod. Dist.	>-100dB	-30.6dB
A-wtd Noise		
(20Hz-20kHz)	-105.7dB	-100.1dB*
Residual noise		
(unwtd)	-104.4dBV	104.1dBV
Input Sensitivity		
(for 0dBV)	1000mV	3.45mV
Disc overload:		
(1kHz)		22.7mV
(20kHz)		26.0mV
(50kHz)		26.2mV
Input Loading	6.5kohm/120pF	96ohm
Preamp Output/Impedance	7.16V (disc) /	1.5kohm
DC Offset, L/R	-3.7mV/-3.8mV	
Retail Price		£350

Power amplifier: Albarré S508

	20Hz	1kHz	20kHz
Maximum Continuous Power Output,			
8ohms	44.5W	46.4W	45.3W
4ohms	73.2W	79.3W	76.7W
Dynamic Headroom (IHF)	+0.63dB (53.7W)		
Peak Current (5msec, 1% THD)	+8.1A*		
Output Impedance	0.014ohm	0.014ohm	0.019ohm
Damping Factor	553.9	580.0	412.2
Stereo Separation			
(0dBV)	125.1dB	102.9dB	77.2dB
Total Harmonic Dist.			
(0dBV)	-82.6dB	-78.5dB	-66.6dB
(2/3 power)	-75.4dB	-73.0dB	-66.0dB
CCIR Intermod. Distortion			
(0dBV)			-77.2dB
(2/3 power)			-74.5dB
A-wtd Noise			
(20Hz-20kHz) 0dBV			-100.1dB
(A wtd, 20Hz-20kHz) 2/3 power			-122.1dB
Residual noise			
(unwtd)			-84.8dBV
Input Sensitivity			
(for 0dBV)			72.9mV
(for full output)			501mV
Input loading	9.8kohm/100pF		
DC offset, left/right	-20mV/+50mV		
Retail Price			£500



Alchemist Kraken

Alchemist Products, 4 Roseberry Mews, Muswell Hill N10 2LG.
Tel: (081) 883 3008



As legendary sea monsters go, the *Kraken's* bark is far worse than its bite, though you might still sizzle your hand on its steaming-hot heatsinks. For Alchemist's *Kraken* turns out to be a fairly ordinary amplifier, albeit one packaged with extraordinary flair.

Its contouring and green hammerite finish lend it the appearance of some Gothic artefact, which makes a distinct contrast with the brilliant gold livery of Alchemist's *Genesis*, *Freya* and *Odin* amplifiers.

The *Kraken* is the latest in a line of highly distinctive amplifier designs. It's available in line-only guise for £399 or with either MM or MC phono boards at £444 and £454 respectively, while *Choice* obtained a line-only version which had been upgraded to £444 with a new dual-transformer AC power supply.

Up to four line inputs and one tape deck are accommodated in what is, frankly, an enriched Class A/B power amp equipped with an attenuator ('passive' volume control) and selector switch. As a consequence the *Kraken* will tend to cool down as it beats out its music.

Lab report

When it comes to RF interference the *Kraken* is decidedly cranky. A glance at the RF IMD plot shows how RF noise in the 0-380MHz region is quickly demodulated while any spurious signals impinging at 600-900MHz tend to promote a low frequency instability. If any of these RF bands are in your vicinity, whether through broadcasts or associated electrical gear (such as a CD player), then the *Kraken* may well sound appropriately monstrous.

Sufficient standing current exists to afford a good 20 per cent of its 54W output in genuine Class A, though any power available at very high frequencies is restricted by a severe but contrived slew-limiting. The *Kraken*, I am assured, was designed 'by ear' rather than measurements.

Either way its LF filtering, HF slewing and minimal reserves of current suggest that difficult speakers are best avoided, hence the vast increase in intermodulation distortion at two-thirds output (1.1 per cent). In fact every order of IM distortion appears to be represented in generous quantity on the 3D plot!

Sound quality

'Sounds like a loud but little amplifier', remarked one listener, a sentiment swiftly reinforced by our other panellists who suggested its midrange was rather messy, and tended to shout rather than sing. Marty Paich's sax was bereft of its customary ambience; instead we were treated to a closer and coarser rendition, an unwelcome insistence that carried over into all styles of music.

Rock and pop suffered this same spotlight effect, isolating percussive detail in all too obvious a fashion. Bass was satisfyingly 'grumbly' but was equally prone to sounding splotchy and diffuse — hardly lightweight, but lacking tautness and definition.

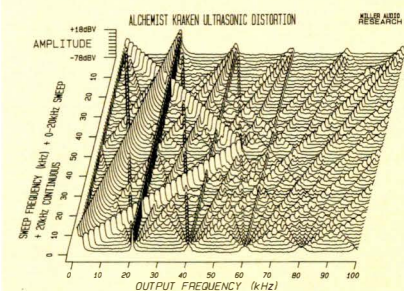
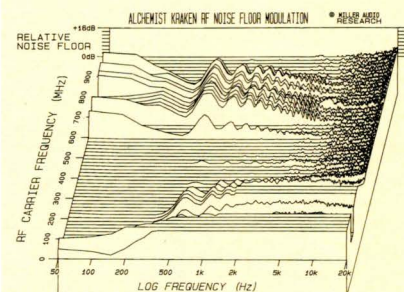
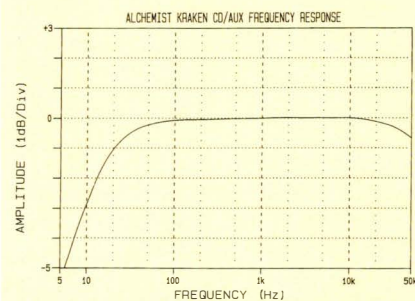
The foundation of Prokofiev's *Romeo and Juliet* hinges on both double bass and low woodwinds, but the music careered aimlessly along, even though its introduction, announced by the shimmer of strings and wood blocks, had sounded reassuringly atmospheric. This is a classic case of RF interference where the breakdown of space, separation and subtlety seems directly linked to the complexity of the recording.

Conclusion

The *Kraken* boils with Class A heat, but this is no guarantee it'll enjoy the archetypal Class A sound. Quite the opposite in fact, as its frightening sensitivity to RF interference promises a highly inconsistent performance from system to system. Cure this and the *Kraken* may truly wake up, otherwise it's an intriguing but expensive gamble.

TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output			
8ohms	53.3W	53.8W	15.6W*
4ohms	33.9W	33.9W	18.2W*
Dynamic Headroom (IHF)	+0.78dB (64.4W)		
Peak Current (5msec, 1% THD)	3.3A		
Output Impedance	0.195ohm		
Damping Factor	40.9		
	CD/Aux		
Stereo Separation			
(1kHz)	75.2dB		
(20kHz)	50.8dB		
Channel Balance			
(1kHz, -20dBV)	0.54dB		
(-60dBV)	3.03dB		
Total Harmonic Dist.			
(0dBW)	-82.3dB		
(2/3 power)	-70.2dB		
CCIR Intermod. Dist.			
(0dBW)	-59.9dB		
(2/3 power)	-33.0dB		
A-wtd Noise			
(0dBW)	-89.1dB		
(2/3 power)	-98.2dB		
Residual noise			
(unwtd)	-73.3dBV		
Input Sensitivity			
(for 0dBW)	31.5mV		
(for full output)	235.5mV		
Line Overload			
(1kHz)	>10V		
(20kHz)	>10V		
(50kHz)	>10V		
Tape Output/Impedance	As source / as source		
Input loading	46kohm/20pF		
DC offset, left/right	-6.5mV/+18.5mV		
Retail Price	£444		



AMC CVT3030

Dejac Hi-Fi, 21 The Broadway, Old Amersham, Bucks HP7 0HL.
Tel: (0494) 431 290



Rising from the ashes of the now-defunct Hi-Fi Markets operation, the man who helped bring us the original NAD 3020 amplifier now presents the £530 AMC CVT3030 — a solid-state/valve hybrid. But who is AMC? The amp itself was designed by an ex-NAD employee, it is manufactured by the Weltronics Corporation and distributed by Campus International as part of its HOME Automation series. And Campus International operates out of a PO Box in Amersham. Bemused? Join the club.

Nevertheless, the CVT3030 appears to offer all things to all men. The black case-work and rubberised controls are all rather utilitarian, but with the transistorised MM vinyl disc input, five line/tape inputs and fan-cooled valve output stage, the 3030 attempts to mix flexibility and low pricing with a 'high-end valve sound'.

It's certainly jam-packed with goodies, including a Signetics op-amp in the MM disc stage (mounted hard up against the rear phonos), high voltage Siemens MOSFETs in the line and driver stages plus a pair of Siemens EL34 pentode valves at the output. These are linked in the classic ultralinear configuration with screen taps included on the primary windings of each output transformer. In fact some eight primary and six secondary windings make up each transformer in an effort to reduce their inductance and help maintain a wide bandwidth.

Lab report

Unfortunately, in much the same way as Woodside's ISA230, massive waveform distortion limits low frequency output to just 4.8W/4.5W (using 8/4ohm speaker taps). The true clip points are indistinguishable due to core saturation and current slewing, a problem that might have been avoided had there been more iron in the transformers.

At very moderate power levels its distortion is composed almost solely of equal-

amplitude second/third harmonics, but, as the 3D plot demonstrates, a series of higher-order components are soon seen when the load is reduced from eight to four ohms. High impedance, high sensitivity speakers will be crucial to successful of the '3030 especially as the maximum current rating is a mite under 2A.

Sound quality

'Warm, cosy, self-effacing but slightly flabby and loose' was the initial consensus of our panel. Lone instruments like the triangle from Rachmaninov's *Symphonic Dances*, for example, could sound remarkably vivid and engaging but this proved to be the high-point of the amp's repertoire. Further into the symphony the soundstage quickly filled-up as 'noisy instruments' seemed crammed into a very restricted space.

Things began to look up once we switched to CD, for any loss of dynamics was less obvious, and the jazz selections were infused with a realistic sense of space and warmth even if 'the double bass was a bit gooey'. On the flipside, however, a congested, squashed and chaotic character re-emerged once the music picked-up in tempo and complexity.

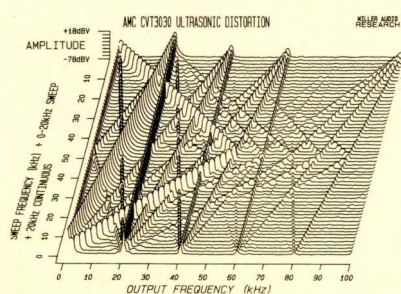
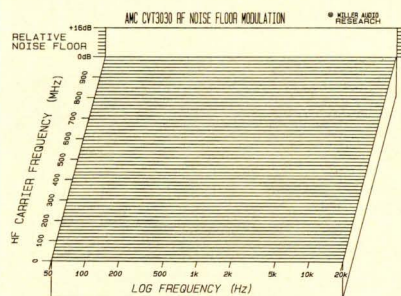
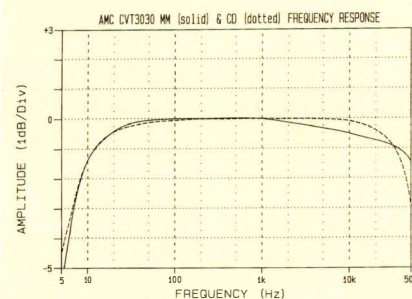
Tracy Chapman had sounded clear and approachable, until she attempted to match the increasing scale of her accompaniment, whereupon the music lost a great deal of its detail and dynamics. This proved a consistent but disappointing characteristic of this rather enigmatic amplifier.

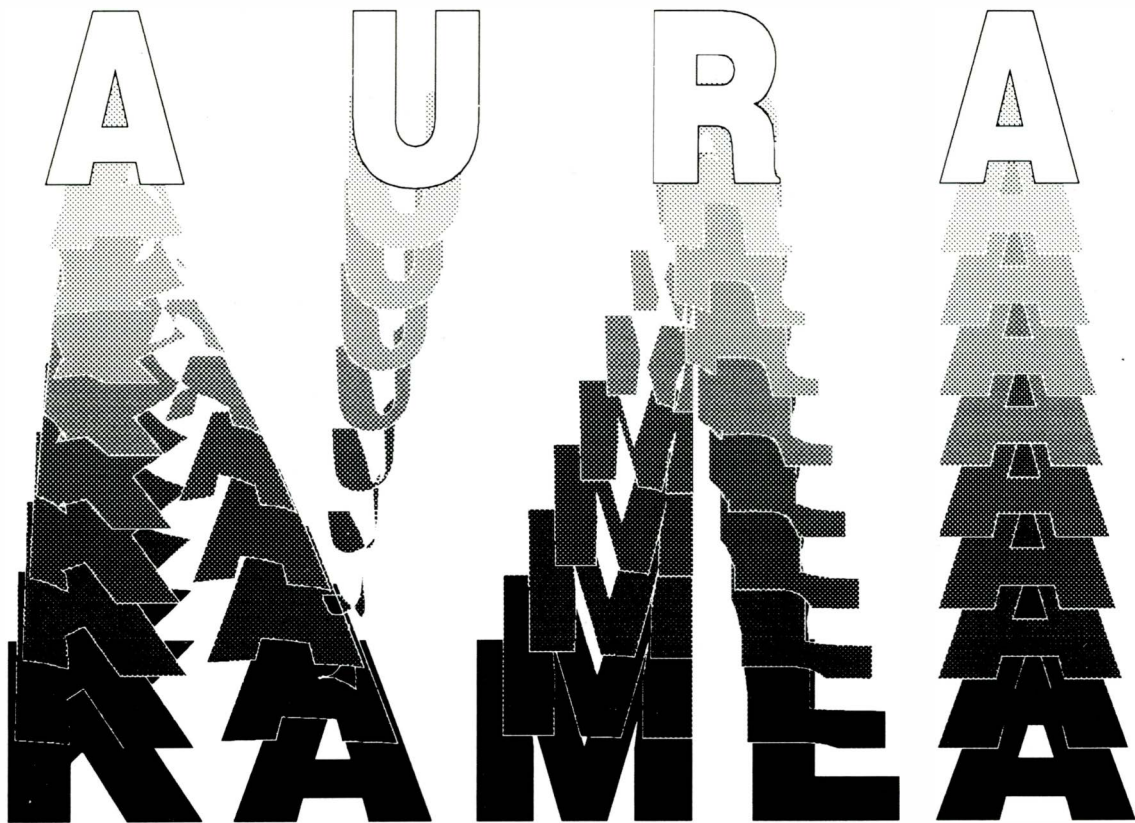
Conclusion

Given very simple material the AMC CVT3030 can sound extremely sweet, spacious and dignified — the archetypal 'high-end valve sound' that AMC was presumably seeking. Unfortunately all of this potential is lost with more complex recordings, which become confused, brash and unnecessarily busy.

TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output,			
8ohms	4.8W*	34.9W	32.8W
4ohms	4.5W*	33.9W	23.7W
Dynamic Headroom (IHF)	+0.59dB(40.0W)		
Peak Current (5msec, 1% THD)	1.9A		
Output Impedance	1.09ohm		
Damping Factor	7.3		
	CD/Aux	MM	
Stereo Separation			
(1kHz)	69.1dB	64.6dB	
(20kHz)	42.6dB	43.4dB	
Channel Balance			
(1kHz, -20dBV)	0.13dB	0.26dB	
(-60dBV)	2.77dB	2.56dB	
Total Harmonic Dist.			
(0dBW)	-66.0dB	-65.9dB	
(2/3 power)	-50.7dB	-50.7dB	
CCIR Intermod. Dist.			
(0dBW)	-63.7dB	-65.4dB	
(2/3 power)	-53.7dB	-54.0dB	
A-wtd Noise			
(0dBW)	-78.3dB	-78.3dB	
(2/3 power)	-90.3dB	-82.3dB	
Residual noise			
(unwtd)	-64.7dBV	-64.7dBV	
Input Sensitivity			
(for 0dBW)	36.4mV	558uV	
(for full output)	218mV	3.24mV	
Disc Overload			
(1kHz)		145mV	
(20kHz)		1342mV	
(50kHz)		2442mV	
Tape Output/Impedance	9.13V (disc) / 981ohm		
Input loading	21kohm/260pF 47kohm/200pF		
DC offset, left/right	0mV/0mV		
Retail Price	£529		





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Arcam Delta 290

A&R Cambridge Ltd, Pembroke Avenue, Denny End Industrial Centre, Waterbeach, Cambridge CB5 9PB. Tel: (0223) 861 550



Arcam has introduced the all-singing, all-dancing £500 *Delta 290* integrated amplifier in order, it says, 'to meet the consumer and legislative requirements of the Nineties'. As a company known for its caution and conservatism rather than fashion leadership, this is certainly a bold step, replacing the workhorse *90.2* while offering more power, full remote control of volume and (motorised) input selection, plus a complete re-design of the vinyl disc, line and power amp stages.

The latter marks a real departure for Arcam who is exchanging bipolars for pairs of quasi-complementary MOSFETs. The fuse-triggered speaker protection of old has been abandoned in favour of fast-acting relays. So, unlike its predecessors, the *D290* will not live in fear of insensitive, low impedance loudspeakers.

The stylists have been at work too, though Arcam has not exactly let its corporate hair down. Instead the *D290* comes across as sober and purposeful, a comprehensive meeting place for up to six line inputs (including two tape decks), two-way speaker selection, mono, tone defeat, pre-out and power amp-in facilities. The MM/MC vinyl disc board is an optional extra, which can be purchased and incorporated for an extra £50.

Lab report

Arcam's new MOSFET power section dominates the overall performance of the *D290*, especially at low to moderate levels where crossover artefacts are visible on all high frequency waveforms. This causes the proliferation of IM patterns to the right of the 3D plot, where high-order distortions typically exceed 0.06 per cent.

However, as its healthy 99W/152W rating and moderate 13A back-up suggest, the *D290* comfortably exceeds the 73W/118W output of the old *D90.2* (issue 74). Noise, input sensitivities, overload margins and RF

performance are similarly impressive.

Sound quality

Introduced towards the end of a day dominated by amplifiers that either sounded dark, euphonic and rather mushy, or bright, upbeat and forward, the sobriety and restraint of the *D290* prompted little but applause. Our panel voted the new Arcam 'a class act', its taut, dynamic and detailed sound uncovering subtle ambient clues that had been routinely obscured by its immediate predecessors.

We began to view recordings we had been listening to all day with fresh enthusiasm. The piano in Rachmaninov's *Symphonic Dances* that had once sounded almost buried was now brought out and dusted off alongside the brass and strings at their feverish height.

Re-introduced on Day 2, the opening notes of Paganini's piano struck up a marvellous ambience, depicting the acoustic of the venue in vivid fashion. 'You can hear the walls' announced one impressed listener. The accompanying violin was described as 'staggering', every scratch and scrape of the bow laid bare with a spine-tingling electricity. 'Sounds as if its been plugged into a three-phase mains' quipped another.

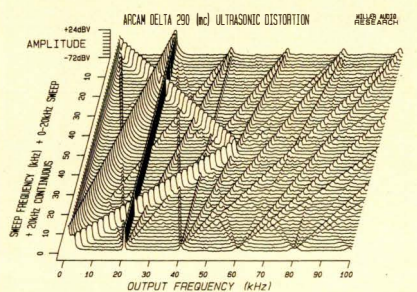
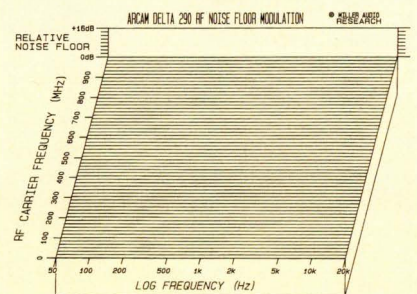
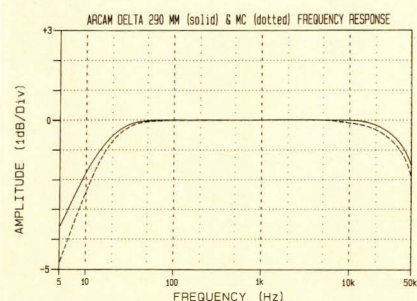
This renewed charge was tempered via CD, however, where a slight dryness pervaded. Our jazz selection sounded too close for comfort, though Prokofiev's *Romeo and Juliet* was still pronounced 'breathtaking'.

Conclusion

Amplifiers of this calibre are certainly uncommon. The secret of the *Delta 290*'s success seems to be that Arcam has cultivated a seed of dryness and restraint, a tinge that's sufficient to bind the most arduous of musical styles into a coherent and memorable performance. All this plus remote control makes for a compelling and enthusiastic Recommendation.

TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output			
8ohms	93.0W	98.5W	78.2W
4ohms	143.8W	151.7W	124.2W
Dynamic Headroom (IHF)	+1.3dB (134.0W)		
Peak Current (5msec, 1% THD)	13.1A		
Output Impedance	0.034ohm		
Damping Factor	238.7		
	CD/Aux	MM	MC
Stereo Separation			
(1kHz)	72.5dB	71.5dB	71.2dB
(20kHz)	48.0dB	46.8dB	45.9dB
Channel Balance			
(1kHz, -20dBV)	0.89dB	0.89dB	0.88dB
(-60dBV)	1.53dB	1.54dB	1.55dB
Total Harmonic Dist.			
(0dBV)	-75.9dB	-76.0dB	-74.8dB
(2/3 power)	-86.6dB	-86.3dB	-85.9dB
CCIR Intermod. Dist.			
(0dBV)	-79.5dB	-76.4dB	-59.1dB
(2/3 power)	-77.8dB	-76.4dB	-59.4dB
A-wtd Noise			
(0dBV)	-79.9dB	-79.3dB	-75.2dB
(2/3 power)	-96.3dB	-85.0dB	-76.7dB
Residual noise			
(unwtd)	-65.5dBV	-65.5dBV	-65.5dBV
Input Sensitivity			
(for 0dBV)	19.7mV	326uV	29.7uV
(for full output)	197.7mV	3.07mV	269uV
Disc Overload			
(1kHz)		145.7mV	11.8mV
(20kHz)		1331mV	69.3mV
(50kHz)		1278mV	56.5mV
Tape Output/Impedance	9.1V (disc) / 26.4ohm		
Input loading	9.6kohm/100pF 47kohm/100pF 260ohm		
DC offset, left/right	-0.5mV/-0.5mV		
Retail Price	£450 + £50 phono option		



Audiogram MB1

MPI Electronics UK Ltd, Wood Lane, Manchester M31 4BP.
Tel: (061) 777 8522



From Italy, land of pasta and opera, comes the £500 Audiogram *MB1*, manufactured by Archidee. This is an intriguing integrated amplifier, with a completely barren fascia apart from a headphone socket and power switch. The available facilities are all located on an unnecessarily bulky remote control handset. An 8-bit processor within the *MB1* handles volume while separate multiplexers switch between the MM phono, three line and tape inputs. Very neat.

The internal design is equally impressive with low noise NE5532 op-amps in both the phono and line stages, while the discrete power amp is served by a thumping great mains toroid and pairs of high-current HEXFET power transistors.

Lab report

Continuing the 'current' topic, the *MB1* will easily dump some 18A into a suitably low impedance loudspeaker (despite its modest 46W/76W power rating) yet does not feature any output protection. As a consequence the *MB1* can — and did — fry its emitter resistors when pushed too hard. Still, difficult speakers won't prove a burden.

The digital volume control operates over some 2-to-the-power-8 (256) steps, as fine as 0.05dB near its maximum setting but typically 0.15dB over the last 15dBs of its range. However, its full range is no more than 48dB (8-bits) before the *MB1* drops into full mute.

Its highly contrived distortion hovers around 0.1 per cent but includes an unusual spray of evenly distributed 2nd-6th harmonics. A similar pattern of IM products materialises at moderate power levels (see 3D plot), quirks that will undoubtedly be reflected in the sound quality.

Sound quality

Inspired by the very weighty, subtly tailored

sound that flooded from the *MB1* (regardless of input), the panel described it as 'compelling and naturally inviting'. There are no sibilant nasties to taint the strongest of vocals, but at the same time the sense of atmosphere and sparkle conjured by the very best is also lacking.

Although its large but soft-of-focus soundstaging is not always terribly realistic, the music itself remains beguiling. The quieter interludes from Prokofiev's *Romeo and Juliet*, for example, which can sound rather flat and uninteresting, retained the scale and body that ensured its various crescendos were so very engaging.

The *MB1* provides plenty of detail but it's not thrown in your face. Voices are very clear and integrated within the musical whole, rather than spotlight. The Kate Bush contribution was especially sensual on this occasion, even though the image of her voice was neither particularly solid nor distinct. Bass, and especially string bass, was described by our panel as 'rather loose, full but bloomy'.

In many respects the pleasing sound of the Audiogram *MB1* makes any cold hearted criticism quite difficult. It has the ability to draw you into the music while leaving you oblivious to and mindless of its relatively mild indiscretions.

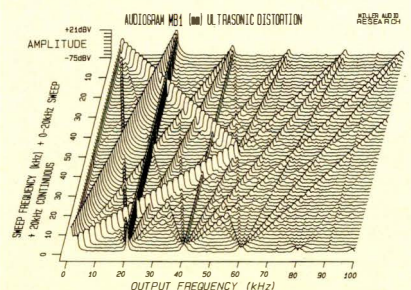
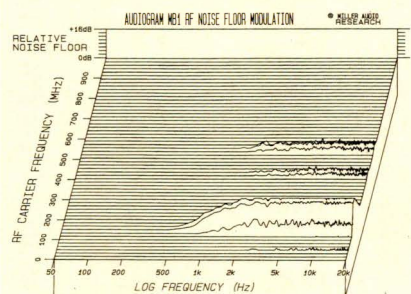
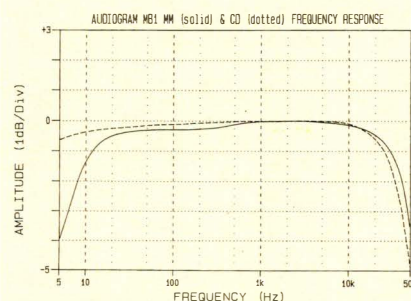
Conclusion

Auditioned not long after AMC's best shot, one member of the panel suggested he wouldn't feel robbed if he had to pay £460 for this musical alternative. Well, £500 is close enough.

It's perhaps something of a Christmas amplifier by all accounts, a model that conjures up rosy and comfortable images of chestnuts roasting over an open fire. All in all, and despite a degree of idiosyncrasy here and there, the Audiogram *MB1* is very pleasant indeed and worthy of our heartiest Recommendation.

TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output,			
8ohms	46.2W	46.0W	45.5W
4ohms	75.8W	75.8W	73.7W
Dynamic Headroom (IHF)	+1.1 dB (58.9W)		
Peak Current (5msec, 1% THD)	17.9A		
Output Impedance	0.125ohm		
Damping Factor	64.2		
	CD/Aux	MM	
Stereo Separation			
(1kHz)	72.1dB	69.2dB	
(20kHz)	47.5dB	43.7dB	
Channel Balance			
(1kHz, -20dBV)	0.10dB	0.15dB	
(-60dBV)	see lab report		
Total Harmonic Dist.			
(0dBW)	-64.7dB	-62.3dB	
(2/3 power)	-60.0dB	-60.7dB	
CCIR Intermod. Dist.			
(0dBW)	-86.3dB	-78.6dB	
(2/3 power)	-58.9dB	-60.9dB	
A-wtd Noise			
(0dBW)	-86.1dB	-81.7dB	
(2/3 power)	-93.3dB	-82.7dB	
Residual noise			
(unwtd)	-67.7dBV	-67.6dBV	
Input Sensitivity			
(for 0dBW)	84.3mV	655uV	
(for full output)	574mV	4.42mV	
Disc Overload			
(1kHz)		128mV	
(20kHz)		1229mV	
(50kHz)		2195mV	
Tape Output/Impedance	11.7V (disc)	106ohm	
Input loading	68kohm/20pF	47kohm/480pF	
DC offset, left/right	+5.5mV/-43.5mV		
Retail Price	£500		



Audio Innovations Series 700

Audio Components Ltd, Albany Court, Albany Road, Granby Industrial Estate, Weymouth, Dorset DT4 9TH. Tel: 0305 761 017



Archaic valve amplifiers have long been partnered with modern digital gear to good effect. This works particularly well as, on the whole, glowing bottles are better able to deal with the RF interference generated by CD players than their transistorised counterparts. So what, in this day and age, could be more appropriate than a line-only valve amp?

In practice the *Series 700* is a derivative of the *Series 500*, sharing the same wacky styling of enclosed mains and output transformers with a semi-circle of valves exposed to the front. Therefore, handle with care and store well away from inquisitive little fingers.

The *Series 700* also matches the *500*'s pricetag but has sacrificed the vinyl disc stage to concentrate on improvements in the execution of the power amp. Separate ECC83 drivers and phase-splitters are employed, just as the two 'phases' are level-matched, in order to keep distortion in hand.

Add to this an ECC82 double-triode and EL34 pentode output stage (in the classic ultralinear configuration) and you've got the measure of this intriguing amp.

Lab report

Compared with previous efforts from the Al stable (see issues 63, 77, 97 and 109) the *Series 700*'s technical performance is merely appalling. The 1.5ohm output impedance is particularly gruesome while its power output and dynamic headroom are even worse. If only the damn thing didn't sound so good!

It will furnish a heady 23-24W at 1kHz, for example, though distortion climbs just as power fades at the frequency extremes. So at 20Hz the 8ohm delivery rises from 5.5W to just 8.6W for an increase to three per cent THD, while its current rating (via the 4ohm tap) increases from 2.9A at one per cent THD, to 4.5A at three per cent THD and 4.7A with a thumping five per cent distortion.

On the whole, however, this distortion is composed of a smooth series of 2nd, 3rd, 4th and 5th harmonics that finally die away at the outer limits of the spectrum. Intermodulation distortion is similarly bold but also clearly defined with nothing save 2nd and 3rd order components sneaking into the audio band (see 3D plot).

Sound quality

An understated and graceful sounding amplifier 'oozing both pedigree and class', according to our panel. A wealth of atmospheric detail now surrounded the jazz sax, just as the accompanying cymbals stood out clearly without appearing bright. Furthermore, during the bass solo the pianist could now be heard 'twiddling his thumbs and striking the odd key in the background'.

Subtle and ambient distractions of this nature ensured the *Series 700* was consistently entertaining. Tonally it was judged neutral, indeed the piano from Prokofiev's *Romeo and Juliet* sounded as rich, vivid and natural as we could have wished. More importantly these complex recordings were now mercifully free of the congestion that had plagued lesser amps.

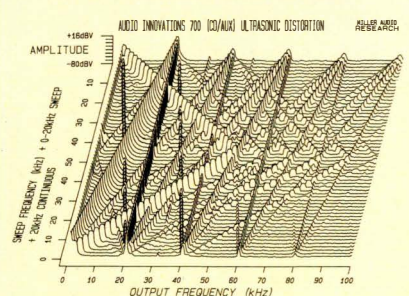
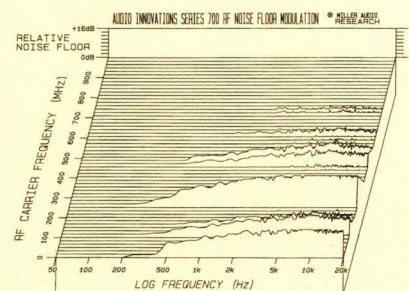
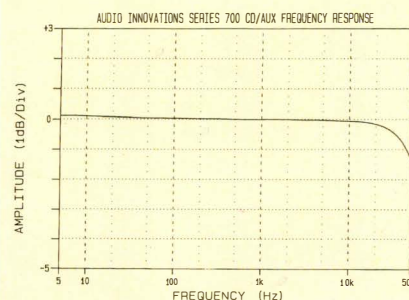
Our listeners' applause continued in a similar vein through the Jennifer Warnes track where the resonance of her bass guitar acquired an almost 'elastic' quality. Switching from the 4ohm to the 8ohm tap brought about a general softening, however, whereupon both the bass line and male harmonies were described as 'splodgy'.

Conclusion

Midnight oil still needs to be burned on technical and safety grounds, yet Audio Innovations has succeeded in maintaining its reputation for fine sound quality. Just stick with very sensitive, easy going loudspeakers and the *Series 700* will provide rich rewards with music that's clean, nimble and utterly charming.

TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output			
8ohms	5.5W	23.6W	7.0W
4ohms	5.5W	23.3W	6.2W
Dynamic Headroom (IHF)	+0.54dB (26.7W)		
Peak Current (5msec, 1% THD)	+2.9A		
Output Impedance	1.53ohm		
Damping Factor	5.2		
			CD/Aux
Stereo Separation			
(1kHz)			57.8dB
(20kHz)			43.2dB
Channel Balance			
(1kHz, -20dBV)			0.34dB
(-60dBV)			3.02dB
Total Harmonic Dist.			
(0dBV)			-66.7dB
(2/3 power)			-53.8dB
CCIR Intermod. Dist.			
(0dBV)			-64.1dB
(2/3 power)			-50.4dB
A wtd Noise			
(0dBV)			-85.7dB
(2/3 power)			-92.1dB
Residual noise			
(unwtd)			-71.4dBV
Input Sensitivity			
(for 0dBV)			57.1mV
(for full output)			293mV
Line Overload			
(1kHz)			>15V
(20kHz)			>15V
(50kHz)			>15V
Tape Output/Impedance	As source / as source		
Input loading	47kohm/100pF		
DC offset, left/right	0mV/0mV		
Retail Price	£999		



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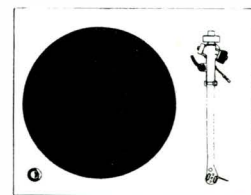


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Denon PMA-450

Hayden Labs Ltd, Hayden House, Chiltern Hill, Chalfont St Peter, Gerrards Cross, Bucks SL9 9UG. Tel: (0753) 888 447



The launch of any Denon product is traditionally associated with vast wads of hyperbole. On this occasion, however, Denon definitely has something worth crowing about. The *PMA-450*, has been 'designed from the ground up in the UK as an audiophile amplifier'.

Nevertheless its design is something of a departure for Denon with shades of both Pioneer and Marantz designs discovered inside. Which is hardly surprising as all three companies are vying to come up with the same 'UK sound'.

The circuit layout is particularly elegant with localised input selection for MM, three line sources and two tape decks. There is also relay-fired A/B speaker selection and protection plus highly symmetrical disc and power amp stages. Such simplicity is reflected in the workmanlike fascia which provides only the most essential facilities.

Internals include plenty of first rate components, including Elna *Cerafines* in the power supply and Ansar *Super Sound* polypropylene caps in both MM disc and power amp stages. All of which adds up to an intriguing brew.

Lab report

One small but significant reason for the *450's* success concerns its line and phono inputs which are not, in this sample at least, massacred by a series of ghastly ceramic RF filters. Then again, spurious RF noise in the 300MHz region will undoubtedly upset the sound somewhat.

Apart from this contentious point the *PMA-450* hits every nail squarely on the head. It can be said that the MM response trails off a little too hastily below 100Hz but distortion (typ 0.001 per cent), noise (81dB, A-wtd), 3mV input sensitivity and +30dB overload margin are textbook results for a budget MM phono stage.

At the same time Denon certainly hasn't skimped on power. A good 120-160W into

4ohm is supported by an equally generous 18A reservoir of current, a feat unequalled by few if any of its so-called audiophile competition.

Sound quality

Big, brassy and very detailed, the sound of the *PMA-450* burst from our speakers like a souped-up *MB1*, an amp with energy, atmosphere and sparkle to spare. In fact the *PMA-450* surpassed the *MB1's* performance, conveying the magic and drama of the music without, in the panel's opinion, cropping any of its bite or crispness.

This is not a rosy sound; rather it is confident and incisive. This became evident on hearing the stridency and woody timbre of Paganini's violin — the sound of a real instrument not a bland facsimile.

Tracy Chapman also sounded clear and sharp, though the image of her voice was a trifle phasy at times. The panel linked this effect to the very quiet backgrounds and wide and deep soundstage of the amp — one that can stretch the music a little too far.

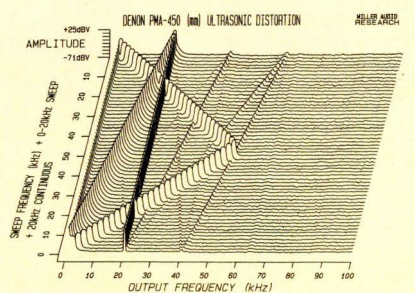
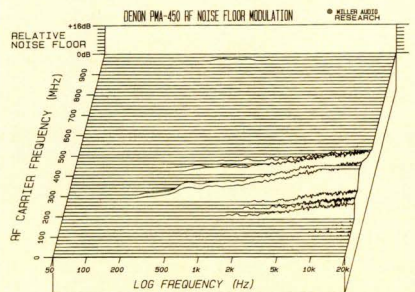
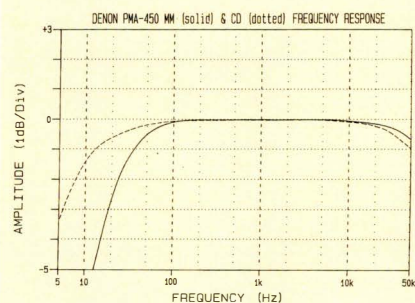
Bass, meanwhile, proved to be strong, clear and precise with music as diverse as Prokofiev's *Romeo and Juliet* (CD) and Peter Gabriel's *So* (LP). Criticisms, and there were only a few, centred on the *450's* loss of composure when pushed too hard, its cooler and less emotive presentation contrasting with the more agreeable sound of other favourites in this month's test.

Conclusion

The panel confidently identified the *PMA-450* as a 'well-executed budget amp' and was more than content to endorse its £250 ticket. Technically too, it is dependable, powerful and will comfortably wrestle with the most formidable of speakers. Whether it'll handle the most taxing of musical styles with equal aplomb is another matter, but with an elegant classical recording the *PMA-450* can truly sing.

TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output			
8ohms	90.3W	99.1W	93.7W
4ohms	123.1W	157.1W	138.5W
Dynamic Headroom (IHF)	+1.1dB (126.7W)		
Peak Current (5msec, 1% THD)	18.4A		
Output Impedance	0.045ohm		
Damping Factor	176.2		
	CD/Aux	MM	
Stereo Separation			
(1kHz)	86.2dB	86.6dB	
(20kHz)	61.0dB	59.2dB	
Channel Balance			
(1kHz, -20dBV)	0.02dB	0.02dB	
(-60dBV)	0.34dB	0.27dB	
Total Harmonic Dist.			
(0dBV)	-96.7dB	-99.0dB	
(2/3 power)	-98.0dB	-101.9dB	
CCIR Intermod. Dist.			
(0dBV)	-96.1dB	-81.5dB	
(2/3 power)	-96.8dB	-81.4dB	
A wtd Noise			
(0dBV)	-84.9dB	-79.7dB	
(2/3 power)	-97.1dB	-81.0dB	
Residual noise			
(unwtd)	-75.1dBV	-75.1dBV	
Input Sensitivity			
(for 0dBV)	18.0mV	291uV	
(for full output)	180mV	2.97mV	
Disc Overload			
(1kHz)		157mV	
(20kHz)		1489mV	
(50kHz)		3243mV	
Tape Output/Impedance	9.72V (disc) / 240ohm		
Input loading	44kohm/40pF	45kohm/200pF	
DC offset, left/right	-2.5mV / -2.5mV		
Retail Price	£250		



simply the best

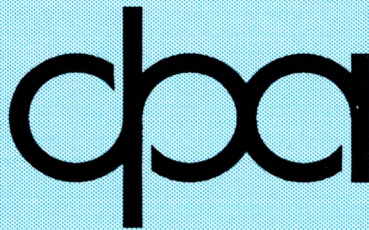
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However, rave reviews are not just the exclusive domain of DPA's PDM2. Hi-Fi World, on the PDM1 S3 said "Any enthusiast who wants the best from CD at a reasonable price

should consider (the PDM1)." What Hi-Fi, Nov '91 said ..."the Bigger Bit is set to destroy all its competition." Our amplifiers are equally well respected with Hi-Fi Choice saying of the 50S pre-power ..."unmatched detail resolution, control and transparency."

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dpa digital ltd

Unit 7, Willowbrook Lab Units, Crickhowell Road, St. Mellons Cardiff CF3 0EI,

tel: (0222) 795621 fax: (0222) 794267

Harman Kardon HK6250

Harman Audio, Unit 1B, Mill Street, Slough, Berks SL2 5DD.
Tel: (0753) 576 911



The £250 *HK6250* appears to offer very little, if any, practical advantage over its cheaper *HK6150* sibling, which was reviewed and rated a Best Buy in issue 109. It seems that Harman Kardon has simply added 3W to its rated output, put an extra sixty quid onto the pricetag and given it a different type number. In fact the company has also recently raised the prices of both models by nearly twenty per cent, an unwelcome consequence of last Autumn's sterling devaluation.

The matt alloy fascia is dotted with a series of rotary controls for A/B speaker selection, balance, bass and treble control, tape monitoring and input selection. Like the *HK6150*, it'll cope with MM phono, three line and two tape sources, but larger power supply adds a little extra grunt at the output.

Lab report

In practice Harman has sold itself short, for the *HK6250* actually offers an extra 5W over the *HK6150* into 8ohm with a boost of some 12W into 4ohm. Current has risen from 9A to 14A, which is sufficient to improve its tolerance of prickly loudspeakers, although not enough to enhance the perceived 'loudness' of its music.

Otherwise we're looking at a familiar story first told by the *HK6150*. Output impedance is still a highish 0.15ohm which is due to rather clumsy output switching, and there is still no localised input selection.

Distortion remains steady at 0.016-0.02 per cent while the 3D plot highlights the same simple second/third order mechanisms seen in both the *HK6150* and the *HK6100* before it (issue 80). Still fully discrete, the disc stage has been re-engineered, it is complemented by a bass boost at 20Hz in the power amp (see MM/CD responses).

Sound quality

Although obviously unaware of the origins

of this player, our panel of blind listeners proceeded to offer a carbon-copy of the *HK6150* review! In typical HK fashion, this amp fired the enthusiasm with its strident and gutsy performance, even if it was a little brash in the process.

Something of a rough diamond, this amp certainly captures the perspective of an orchestra, the 'body' of large, resonant instruments such as piano and the spirited flourish of violins with equal aplomb. Animated and courageous it is, to be sure, but it also lacks the warmth and subtlety that would distinguish a truly sophisticated design.

Plenty of good, firm bass clearly revealed the somewhat contrived ambience of Peter Gabriel's *So*, projecting his voice with a gruffness glossed-over by other amplifiers. Once again, a solid, forthright and dynamic sound was delivered.

A similarly big, bold and brassy sound was noticed with CD even if it did try a little too hard at times, causing the jazz trombone to sound stretched and strained. Likewise the Tracy Chapman selection was taken in its stride, giving plenty of power but not always the weight or civility to match.

Yet Prokofiev's *Romeo and Juliet* benefited from a genuine sense of enthusiasm and verve, building tension and anticipation from note to note. Here at least the bubbly character of the *HK6250* was welcome.

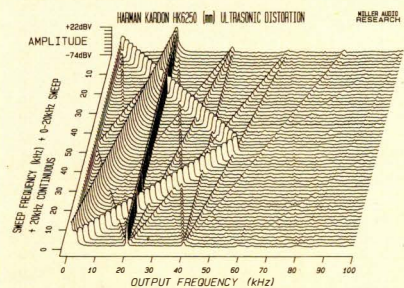
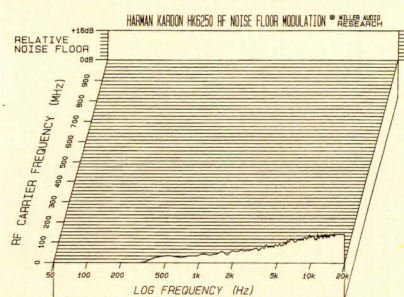
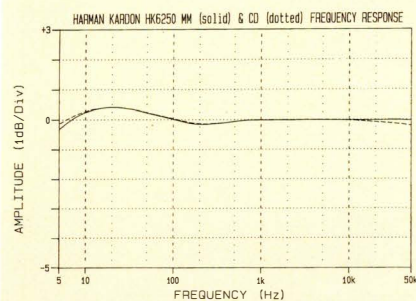
Conclusion

The sheer impetus of this amplifier carries it sailing through any style of music, despite hauling a little 'unwanted baggage' along the way. Then again the *HK6150* started our listeners just as effectively in issue 109, albeit at a saving of some £60!

With that pecuniary blot against it and very little technical advantage by way of defence, Harman's *HK6250* misses out on Best Buy status, but is still worthy of *Hi-Fi Choice* Recommendation, despite its recent price rise.

TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output,			
8ohms	50.8W	50.8W	48.8W
4ohms	77.1W	80.2W	78.4W
Dynamic Headroom (IHF)		+1.09dB	(65.3W)
Peak Current (5msec, 1% THD)			14.1A
Output Impedance			0.147ohm
Damping Factor			54.4
		CD/Aux	MM
Stereo Separation			
(1kHz)		90.2dB	83.9dB
(20kHz)		65.6dB	60.0dB
Channel Balance			
(1kHz, -20dBV)		2.20dB	2.30dB
(-60dBV)		1.20dB	1.87dB
Total Harmonic Dist.			
(0dBW)		-74.5dB	-76.1dB
(2/3 power)		-73.6dB	-73.3dB
CCIR Intermod. Dist.			
(0dBW)		-73.7dB	-70.3dB
(2/3 power)		-75.1dB	-69.4dB
A-wtd Noise			
(0dBW)		-84.3dB	-81.6dB
(2/3 power)		-94.4dB	-84.6dB
Residual noise			
(unwtd)		-72.5dBV	-72.5dBV
Input Sensitivity			
(for 0dBV)	22.4mV		363uV
(for full output)	165mV		2.55mV
Disc Overload			
(1kHz)			149.4mV
(20kHz)			625.2mV
(50kHz)			735.5mV
Tape Output/Impedance	9.61V (disc) / 340ohm		
Input loading		30kohm/250pF	36kohm/80pF
DC offset, left/right		+0.5mV/+0.5mV	
Retail Price			£250





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Kelvin Absolute Zero Integrated

Kelvin Laboratories Ltd, 6 Shanklin Crescent, Upper Shirley, Southampton SO1 2RB. Tel: (0703) 789 412



Old soldiers never die, they simply fade into the background. One such 'old soldier' is Kelvin's £700 *Absolute Zero Integrated*, which has been recalled to service and spruced up with glossy and imposing casework but is now minus its sophisticated MM/MC vinyl disc stage.

This new version is significantly more powerful, employing a battery of Darlington power transistors fed from a substantial dual-mono power supply. Kelvin's cascode circuitry retains pride of place though other design features — including pure Class A operation — have been dropped.

On the surface, all looks well with the AZI. Chunky alloy controls cater for volume, balance, input and rec-out selection for a total of six line-level sources. In addition there are facilities for pre-out and power amp-in, though the latter is saddled with a 470ohm input impedance which is a very tricky load for some preamplifiers.

However, peek under the bonnet and the AZI is a mess. Large globs of silicone sealant keep miniature heatsinks in place while hand-soldered components are scattered across the PCB. The output transistors are linked to the main board (and emitter resistors) by bundles of fine cabling which, on the left channel, mingle with the main power supply.

Lab report

Such cabling can upset the stability of the amp, and this was proved when its left channel sang-off at several MHz, frying its half-zobel network without tripping the protection relays. Fortunately the AZI had survived the listening tests before reaching my test bench.

Other problems are just as serious. The AZI is now sensitive to RF noise, for example, while restricted current delivery strangles its output into low impedances. 100W into 8ohm is fine, but a fall of 2.4dB to 57W into 4ohm would suggest that difficult speak-

ers are firmly out-of-bounds. Distortion also escalates alarmingly, showing a fifty-fold increase, across a mere 60W range.

Sound quality

This cooled down version of Kelvin's original hot little number met with distinct chilliness, from a panel which included the very same listeners who had welcomed Kelvin's inaugural *Class A* integrated with great enthusiasm way back in issue 80.

Nevertheless this latest version afforded a more forward, louder and immediate interpretation of our discs. With certain pieces of music such an animated approach worked in the amp's favour. *Romeo and Juliet*, for example, bubbled with a spacious acoustic while an impressive and dynamic bass thundered on beneath. Yet the sound of strings seemed oddly synthetic, and this character was maintained on our pop CDs, that sounded quick and detailed but also rather 'steely' and crude.

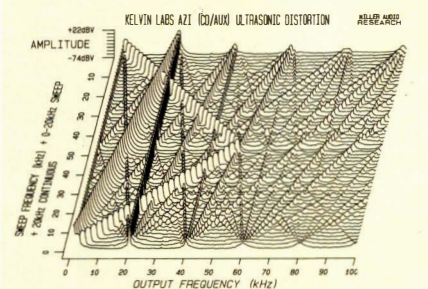
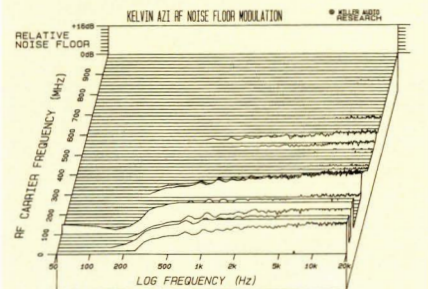
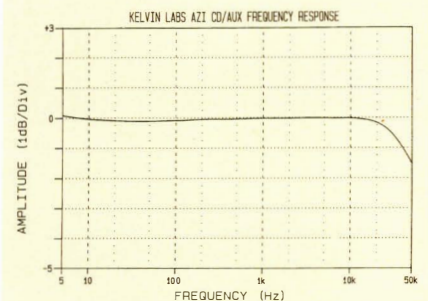
Christy Moore had an unnaturally large voice, tainted by a grating sibilance and further coloured by an irritating nasal tone that overwhelmed the chesty character we had come to expect. This almost screechy quality continued to rear its head through the jazz selection. Trumpet and sax were saddled with the 'metallic timbre of a rolling mill', a comment which confirms that the end result is now a far cry from the compassionate AZI of old.

Conclusion

Judging by the results of this review, Kelvin seems to have lost its way since the departure of its mentor and guiding light, Martin Grindrod. The potency of the original *Absolute Zero* seems to have been swamped by a series of unnecessary modifications and oversights, leaving us with a model which is flawed yet more costly — a very sad epitaph for what was once a cracking little amplifier.

TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output,			
8ohms	98.2W	100.2W	82.5W
4ohms	57.2W	57.2W	55.0W
Dynamic Headroom (IHF)	+0.64dB (116.0W)		
Peak Current (5msec, 1% THD)	4.3A		
Output Impedance	0.047ohm		
Damping Factor	168.9		
			CD/Aux
Stereo Separation			
(1kHz)			80.1dB
(20kHz)			55.4dB
Channel Balance			
(1kHz, -20dBV)			0.29dB
(-60dBV)			4.68dB
Total Harmonic Dist.			
(0dBW)			-93.3dB
(2/3 power)			-59.5dB
CCIR Intermod. Dist.			
(0dBW)			-95.7dB
(2/3 power)			-53.8dB
A wtd Noise			
(0dBW)			-82.5dB
(2/3 power)			-98.0dB
Residual noise			
(unwtd)			-70.9dBV
Input Sensitivity			
(for 0dBW)			27.2mV
(for full output)			275mV
Line Overload			
(1kHz)			2.122V
(20kHz)			2.170V
(50kHz)			2.117V
Preamp Output/Impedance	9.14V / 0.048ohm		
Input loading	9.1kohm/100pF		
DC offset, left/right	-15mV/-4mV		
Retail Price	£700		



Magnum A-Class

Hailey Audio Ltd, 328 Ware Road, Hailey, Herts SG13 7PG.
Tel: (0992) 714 811



Charming, delicate and subtle are not adjectives that spring immediately to mind when you first clap eyes on Magnum's brutish looking *A-Class* amplifier. In truth it's perhaps best likened to a waffle-iron bristling with a series of substantial alloy controls.

Naturally, the sweeping acres of heatsink are a vital part of this Class A design, making sure its crop of Hitachi MOSFET power transistors are kept at a steady 60 degrees. Over-temperature protection cuts in around boiling point (100 degrees), but this will come as scant consolation to anyone who inadvertently rests a hand on its fluted top-plate!

The controls cater for volume, balance, independent record-out and input selection for up to seven different sources (including two tape decks). A plug-in MM/MC phono option is available, although Magnum's principal markets (Taiwan and Singapore) demand that the standard *A-Class* be equipped solely for audio-visual and CD sources, a trend that seems to be building in momentum the world over.

Lab report

Put mildly, the *A-Class* is an oddball. Both its input and power bandwidth are deliberately restricted (see frequency response) in order to achieve a certain 'sound'. In practice this means that although some 18W is available in pure Class A and 55W in Class AB, any meaningful output at very high frequencies is squashed by a barrel-load of slewing distortion.

Consequently its 20kHz power figures are limited to 4.1W (one per cent THD), 9.0W (three per cent THD) and 11.0W (five per cent THD) — all very 'valve-like' in character. Midband performance seems perfectly adequate with a low 0.0025-0.0079 per cent distortion, modest 55W/88W output and healthy 16.2A maximum current.

But at higher frequencies this compo-

sure quickly crumbles, clocking-up a 19/20kHz IM distortion of some 6.8 per cent with higher order components trailing in at 6.4 per cent and 4.1 per cent respectively. As expected, the 3D plot comes from the *Boys' Own Book of Technical Horrors*.

Sound quality

Lush almost to a fault this amplifier betrays all the mythical hallmarks of a genuine Class-A goodie. It has a very smooth and detailed treble, for example, with a subtle and unforced quality that is revealed in the shimmering, delicate cymbals in Prokofiev's *Romeo and Juliet*. Jazz was equally full-bodied, the sax and trumpet described by one listener as a 'snorting brass', fullsome and impressive without sounding overblown.

Its bass, however, is not always in keeping with the rich and expansive character of the amp as a whole. Rhythm lines were simply over-powering at times, becoming detached from the main theme of the Jennifer Warnes CD and taking on a strangely woody, deadpan aspect with Marty Paich's jazz ensemble.

Nevertheless, this amp always gives the impression of having plenty in reserve, a boldness that's often achieved at the expense of spatial accuracy. This makes stereo images, that reside towards the rear of the soundstage, often appear to migrate left and right. Fortunately this is a quirk that does little to disguise the fascination and passion of the music at hand.

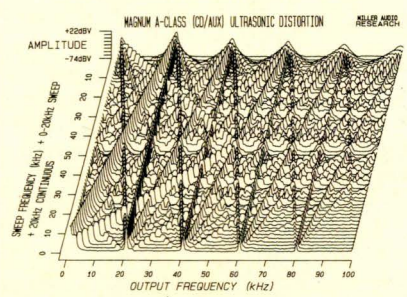
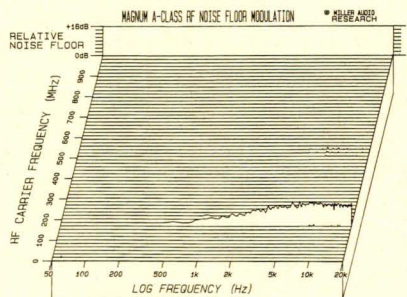
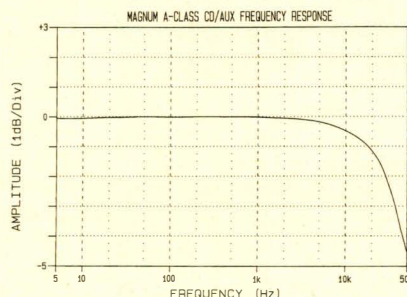
Conclusion

Not without its foibles, Magnum's *A-Class* has clearly been engineered to sound warm and approachable rather than scale the heights of technical excellence.

Nevertheless, and despite its boorish appearance, this feat has been achieved without sacrificing too much musical detail for euphony, and so the *A-Class* deserves Recommendation.

TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output,			
8ohms	54.4W	54.9W	4.1W*
4ohms	88.4W	88.4W	6.2W*
Dynamic Headroom (IHF)	+0.69dB (64.4W)		
Peak Current (5msec, 1% THD)	16.2A		
Output Impedance	0.028ohm		
Damping Factor	287.6		
	CD/Aux		
Stereo Separation			
(1kHz)	73.0dB		
(20kHz)	48.0dB		
Channel Balance			
(1kHz, -20dBV)	0.07dB		
(-60dBV)	0.32dB		
Total Harmonic Dist.			
(0dBW)	-92.1dB		
(2/3 power)	-82.1dB		
CCIR Intermod. Dist.			
(0dBW)	-45.5dB		
(2/3 power)	-17.3dB*		
A-wtd Noise			
(0dBW)	-76.1dB		
(2/3 power)	-88.9dB		
Residual noise			
(unwtd)	-51.0dBV		
Input Sensitivity			
(for 0dBW)	63.5mV		
(for full output)	474mV		
Line Overload			
(1kHz)	6.56V		
(20kHz)	6.80V		
(50kHz)	4.07V		
Pre Output/Impedance	12.7V (CD) / 1ohm		
Input loading	36kohm/20pF		
DC offset, left/right	+60.2mV/+31.2mV		
Retail Price	£599		



Marantz PM-62

Marantz Hi-Fi UK Ltd, Kingsbridge House, Padbury Oaks, 581 Bath Road, Longford, Middlesex UB7 0EH. Tel:(0753) 680 868



Once upon a time, the remotely-controllable amplifier was viewed as a reprehensible lo-fi concoction that put convenience ahead of quality. Yet is such a compromise really necessary? Here Marantz seems to have made all the right moves, even drafting in the older PM-40 amplifier as the basis for this newcomer.

The £270 PM-62 is a very elegant package with everything, except MM/MC phono selection, covered by the system remote control, including a motorised volume knob. This is an amplifier with a fair share of letters after its name: LDPs (Linear Drive Power), HR (High Resolution) circuitry, and CCNE (Current Conversion Noise Elimination, alternatively known as RNE or Rectifying Noise Eliminator). CCNE is simply an RC network designed to quell high frequency switching noise in the power supply, (see issue 109 for details)

The inside of the PM-62 is riddled with relays. Relays switch between phono, CD, tuner and its two aux inputs, relays set standby mode and A/B speaker selection, and even more relays switch source direct, tape input and tape-to-tape copying. Reflecting the Marantz/Philips relationship, it's not too surprising to find one of these tape inputs marked-up for DCC, while 'Mini Disc' is conspicuous by its absence.

Lab report

Here's a classic example of an amplifier that excels itself on the test bench yet fails to set feet tapping in the listening room. Oodles of power are on tap, backed up by a beefy 23A of current lurking in reserve, an impressively low output impedance, extremely low distortion (typically 0.0013-0.0024 per cent all inputs, all power levels), textbook input sensitivities and very, very low levels of noise (-92dB via MM, A-wtd). All of which is extremely impressive.

Close examination of the 3D plot reveals some sensitivity to flyback noise (from my

computer screen), so perhaps the PM-62 is not an ideal choice for the budding AV enthusiast. Similarly, the RF IMD spectrum might look miraculously clean, but this comes about because of the input filtering and is not a true reflection of the amp's immunity to RF garbage.

Sound quality

Despite the fine lab figures, the PM-62 somehow managed to rob music of its charisma and vigour. The overall effect was to make the music itself boring, while at the same time also displaying a tendency to exaggerate any unwanted vinyl noise.

Rachmaninov's *Symphonic Dances* sounded sweet enough, the woodwinds were especially lush, yet the more challenging sequences simply didn't hold properly together. The Paganini LP showed up a loss of treble detail and airiness — the ear seemed unable to distinguish the natural acoustic of the hall and the distance between piano and violin.

Switching to CD certainly restored the lagging treble but at the same time emphasised the lack of passion and life missing from the music. Brass, from our jazz selection, now sounded squashed while percussion appeared splashy — 'plinkety-plonkety' according to one erudite member of the panel.

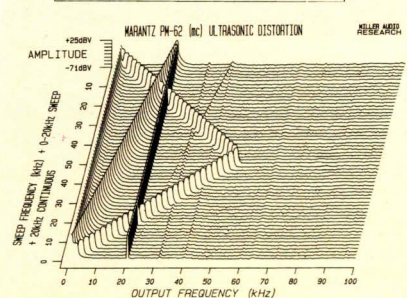
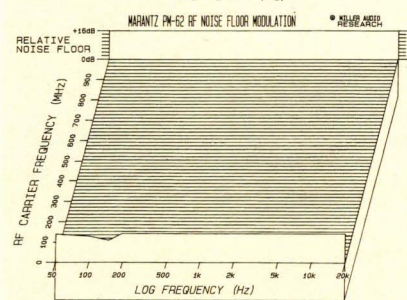
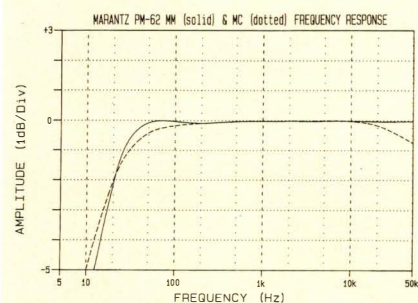
Conclusion

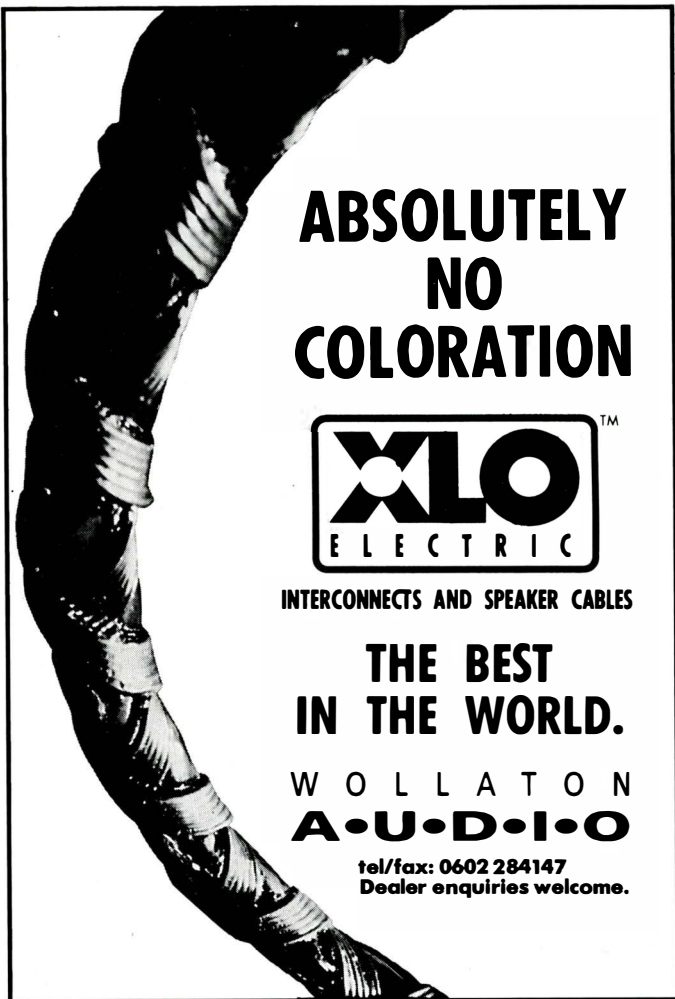
The PM-62 couldn't be easier to operate and its test bench results are good enough to make the competition green with envy. Unfortunately when it came down to the actual business of listening to the amplifier undertaking its crucial task of reproducing music, this proved to be quite hard work, and not the pleasurable experience that had been keenly anticipated.

Given Marantz' fine track record in amplifiers, this must be regarded as a very disappointing result.

TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output,			
8ohms	98.0W	100.9W	98.3W
4ohms	142.6W	159.1W	154.7W
Dynamic Headroom (IHF)		+1.4dB (138.6W)	
Peak Current (5msec, 1% THD)			23.1A
Output Impedance			0.028ohm
Damping Factor			287.6
	CD/Aux	MM	MC
Stereo Separation			
(1kHz)	97.3dB	92.0dB	92.2dB
(20kHz)	77.4dB	71.6dB	70.2dB
Channel Balance			
(1kHz, -20dBV)	0.31dB	0.47dB	0.50dB
(-60dBV)	1.40dB	1.26dB	1.21dB
Total Harmonic Dist.			
(0dBW)	-96.8dB	-93.3dB	-93.5dB
(2/3 power)	-92.3dB	-93.9dB	-97.5dB
CCIR Intermod. Dist.			
(0dBW)	-95.6dB	-82.5dB	-78.2dB
(2/3 power)	-96.2dB	-80.2dB	-74.3dB
Noise (A wtd,			
0dBW)	-87.6dB	-85.2dB	-73.5dB
(2/3 power)	-98.1dB	-91.5dB	-73.8dB
Residual noise			
(unwtd)	-81.0dBV	-80.8dBV	-80.9dBV
Input Sensitivity			
(for 0dBW)	17.4mV	265uV	27uV
(for full output)	176.5mV	2.64mV	272uV
Disc Overload			
(1kHz)		161.5mV	16.3mV
(20kHz)		1253mV	137mV
(50kHz)		1375mV	154mV
Tape Output/Impedance		10.7V(disc)	228ohm
Input loading	31kohm/130pF	45kohm/330pF	
		101ohm	
DC offset, left/right			+15mV/+16mV
Retail Price			£270





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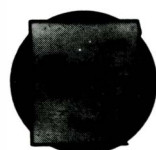
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Musical Fidelity Tempest

Musical Fidelity, 15/16 Olympic Trading Estate, Fulton Road, Wembley, Middlesex, HA9 0TF. Tel: (081) 900 2866



Wherever it passed, the Shakespearean Tempest left havoc in its wake, such as its violent and erratic nature. As the following test confirms, it will be seen that Musical Fidelity's *Tempest* has not been inappropriately christened.

There's nothing alarming about its appearance, which is just an extension of the slim and functional styling that first saw light of day with the *B1* amplifier. If you need anything more than a volume control, rec-out and input selector then look elsewhere. Otherwise the *Tempest* is ideally equipped for a basic line-only system, while vinyl users needn't fret as there's always the optional £29 MM phono board, which is culled from the old *Synthesis* amplifier.

The manufacturer's description of the *Tempest* as 'a Class B version of the *A1*', is a little too simplistic. With its low-noise BC550/560 transistors, Hitachi drivers and over-specified MOSFET output stage, in fact it adopts features of both *A1* and *B1* integrated models (issues 85 and 80) and the *Typhoon* power amp (this issue).

Either way, with its localised input switching, displaced volume pot and huge power supply, the *Tempest* represents a lot of amplifier for the money. However, it's worth noting that because the majority of the amp's gain is accommodated in the first quartile careful handling of the volume control is required.

Lab report

In common with the *Typhoon* — but in stark contrast with MF's *B1* — the *Tempest* has a vast current reservoir of some 17A. So even if its 60/90W (8/4ohm) rating seems modest, the amp will still happily handle the trickiest of speakers.

Distortion, meanwhile, remains fairly high, typically hovering around 0.8 per cent over much of the available power range. Naturally, IM distortion is also rather high

(0.1 per cent) with second to fourth orders represented in varying quantity, as can be seen in the busy 3D plot.

Elsewhere the CD/power amp frequency response is usefully extended and the signal-to-noise ratio a fairly wide -95dB, A-wtd. Only the 4.6dB channel imbalance gives any cause for concern, implying that MF should tighten-up on the selection of its volume pots, especially as no correction is available in the absence of a balance control.

Sound quality

There was no conflict of opinion here as the panel was unanimously horrified by the splash of high frequency detail, which made all styles of music sound hurried and untidy. For example, it was difficult to separate the cymbals, trumpet and trombone on Marty Paich's jazz CD. Percussion seemed to set off an electronic haze, while the 'plink, plonk' of a piano sounded 'rather like a Jew's Harp'.

The swimmy ambience of Prokofiev's *Romeo and Juliet* was something of a disappointment with the brass being heard through a fog of strings, the violins of which had a rather evil tone.

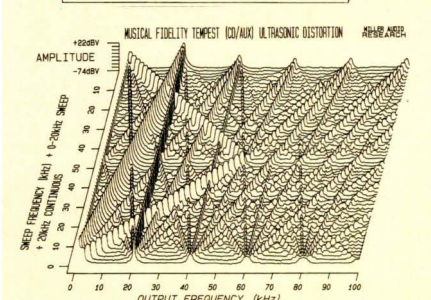
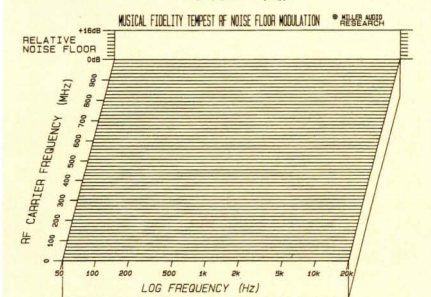
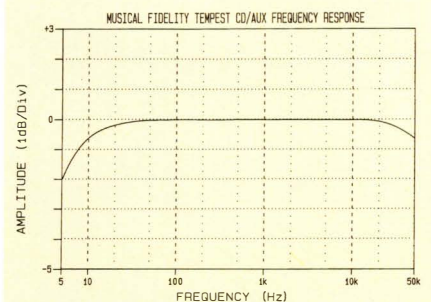
This forward and ragged treble was again highlighted by Tracy Chapman's percussion section which sounded like the random shaking of jars full of dried beans. To cap it all, the *Tempest* was subsequently voted 'the least attractive amplifier in the test'.

Conclusion

It appears Musical Fidelity's *Tempest* is appropriately named, as the sound is wholly dominated by a unnecessarily stormy treble. It is a deceptive amplifier that might sound superficially impressive but, likely as not, will rain all over your parade ground once you get it home. On the basis of the dousing received during the listening test we would suggest you don't expose yourself to the *Tempest*. Stay indoors instead.

TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output,			
8ohms	60.7W	62.4W	59.1W
4ohms	86.6W	94.1W	88.4W
Dynamic Headroom (IHF)	+1.4dB (86.6W)		
Peak Current (5msec, 1% THD)	17.3A		
Output Impedance	0.31ohm		
Damping Factor	25.7		
	CD/Aux		
Stereo Separation			
(1kHz)	67.9dB		
(20kHz)	43.6dB		
Channel Balance			
(1kHz, -20dBV)	0.09dB		
(-60dBV)	4.58dB		
Total Harmonic Dist.			
(0dBW)	-63.9dB		
(2/3 power)	-59.0dB		
CCIR Intermod. Dist.			
(0dBW)	-54.9dB		
(2/3 power)	-53.7dB		
A wtd Noise			
(0dBW)	-81.8dB		
(2/3 power)	-94.9dB		
Residual noise			
(unwtd)	-70.6dBV		
Input Sensitivity			
(for 0dBW)	31.3mV		
(for full output)	249.0mV		
Line Overload			
(1kHz)	>15V		
(20kHz)	>15V		
(50kHz)	>15V		
Tape Output/Impedance	As source / as source		
Input loading	51kohm/220pF		
DC offset, left/right	+2.6mV/+0.5mV		
Serial Number	046600		
Retail Price	£200		





Musical Fidelity The Preamp/Typhoon

Musical Fidelity, 15/16 Olympic Trading Est, Fulton Rd, Wembley.
HA9 0TF. Tel: (081) 900 2866



The move from *Tempest* to *Typhoon* brought a 'wind of change' that only 'whipped up a storm' — it's always best to get the cheap puns over with in the first paragraph — among our listeners once Musical Fidelity's amps were switched from stereo to bridged operation. But before I 'blow' it all, let's start at the beginning.

Viewed from the outside both *The Preamp* and *Typhoon* power amp are fairly unremarkable. Each is built into an old B1-style case and graced with little save the most essential of facilities. A volume control, input and tape-out selector are the only features on *The Preamp*, which will service four line inputs and two tape decks. Balancing of MF's customary eccentricity.

The design of *The Preamp* is rather elementary so there's simply no provision for an add-on phono board. Vinyl users should opt instead for MF's *Rainbow Preamp*, a new MM/MC equipped device based on the older MOSFET *Preamp 3* and *Preamp 8*, which costs an extra £100.

Prise back the lid and you'll be faced with a simple but purposeful design that consists of remote source selection and volume control with a two-stage line amplifier based around a pair of op-amps per channel. As usual, MF has scrubbed everything clean of identification, though the first stage op-amps look suspiciously like Signetics NE5534s.

A second, inverting op-amp generates the negative half of its balanced output which is summed in the *Typhoon* using a differential amplifier. As a result any distor-

tion or noise (hum) that's common to both halves of the balanced signal is rejected in line with the amplifier's Common Mode Rejection Ratio (CMRR).

Another minimalist exterior surrounds the *Typhoon* power amp, which is equipped with balanced XLR inputs and a set of hardwired 4mm loudspeaker sockets. Lifting the bonnet with a Semtex Allen key revealed a forest of fluted heatsinks, each supporting one of 16 output transistors. Separate L/R power supplies and a driver circuit culled from the *Tempest* brings the *Typhoon* bang up to date.

Lab report

Bearing in mind that most enthusiasts will use *The Preamp* in a CD-based system and that the *Typhoon* power amp requires just 730mV for full output, there's clearly no need for a huge boost at the preamp stage. Indeed, with a gain of just over unity (1.04 in fact), *The Preamp* is little more than a buffered volume control, purpose designed to handle the 2V output of most CD players.

Other than this there's little to tell, for although the signal-to-noise ratio could be wider, the 3D plot remains as clean as a whistle. The *Typhoon* is a rather different proposition, however, as in this case distortion is much higher but remains remarkably consistent with respect to both power level and frequency (typically 0.07-0.14 per cent), a contrived effect that will certainly influence its subjective performance.

Meanwhile its substantial reserves of current are more than able to sustain a

casual 62W into 8ohm and 88W into 4ohm. Yet in bridged mode its output merely doubles (an increase of four times is theoretically possible) to yield 129W/149.6W/137.0W (8ohm) and 133.2W/167.3W/142.6W (4ohm) into 20Hz/1kHz/20kHz respectively.

Oddly enough the negligible rise into a 4ohm load belies its prodigious 29.1A current capability under bridged conditions. This puts the *Typhoon* up in the same league as the *Sumo* (issue 80), Heybrook and Rotel (issue 109).

Sound quality

Our first exposure to this combination was straightforward enough, a single stereo *Typhoon* delivering an immediate and lively sound, if one that was played very close to its chest. 'Almost as if the music were contained within a bubble strung between but not beyond the speakers', suggested one listener.

Individual instruments remained close to one another, compact in stature but sharply focused. The diminutive images it produced led us to suspect the performers were 'playing three-quarter sized instruments'. Nevertheless the music itself was not dynamically restricted; although slightly flat in terms of staging, it remained both expressive and energetic where appropriate.

The vibes from Marty Paich's jazz CD were particularly strong on this occasion, although the sax was warmer and sweeter than usual — a tailoring that coincided with a similar loss of bite and sparkle from the

TEST RESULTS

cymbals. Despite the constricted sense of atmosphere and suspiciously tailored top-end, these amplifiers held our attention. Small but interesting, we concluded.

Following hard on the heels of this cramped acoustic, the bridged *Typhoon's* brought about an explosion of space, restoring a realistic ambience to jazz and classical CDs alike. Tonally it succeeded in tidying up the treble while filling out a voluminous body of bass. The one outstanding improvement that bridging made was to provide a wealth of acoustic elbow-room.

Listening to the same pieces of music over again we discovered the jazz percussion had moved back into the soundstage, the sax had shifted stage left and the vibes player had finally withdrawn his hands from the pianist's pockets. At the same time the double bass took on a more resonant quality, a fulsome sound that was both heavier and richer in tone.

The Prokofiev *Symphony* clearly benefited from the extra openness and transparency provided by the bridged *Typhoons*, one of many instances where the upgrade was judged a great success. Yet all was not sweetness and light. It was as if the intensity developed by a stereo *Typhoon* was now dissipated with the increase in volume, reducing the momentum and impetus of our pop and jazz selections.

Conclusion

If a profound sense of stereo width, depth and imagery is not fundamental to your listening pleasure then Musical Fidelity's basic *Preamp/Typhoon* combination is certainly worth checking out. Individual performers can sound as if they're packed together like sardines but its music remains both clear and to the point.

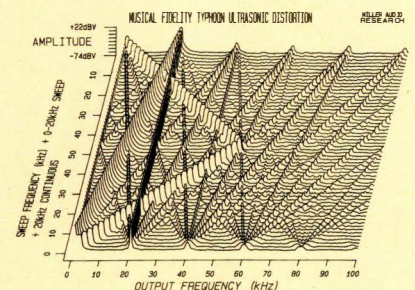
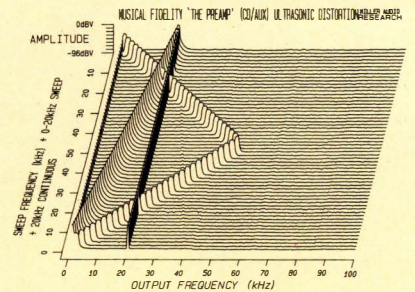
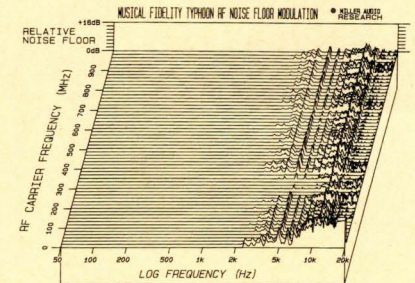
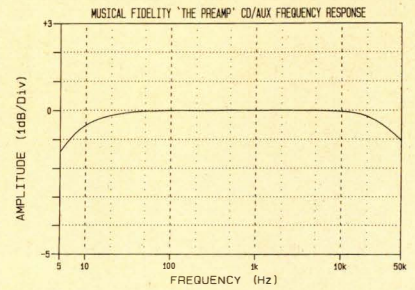
Bridging launches you into another ballpark altogether, a vast arena of space where every performer has the freedom to produce great flourishes of music. And for that an extra £300 seems very worthwhile.

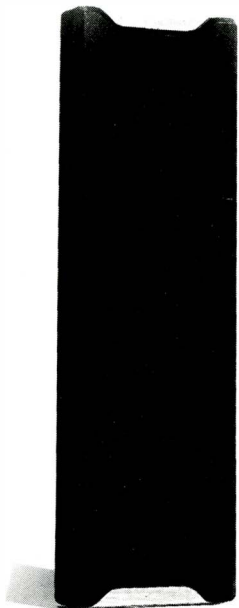
Preamplifier: Musical Fidelity *The Preamplifier*

	Aux/CD
Stereo separation:	
(20Hz)	107.4dB
(1kHz)	74.7dB
(20kHz)	50.0dB
Channel Balance @ 1kHz:	
(0dBV)	0.08dB
(-20dBV)	0.29dB
(-60dBV)	2.10dB
Total Harmonic Dist @ 0dBV:	
(1kHz)	-87.8dB
(20kHz)	-83.9dB
CCIR Intermod Dist	
A wtd Noise	
(20Hz-20kHz)	-79.8dB
Residual noise	
(unwtd)	-74.5dBV
Input Sensitivity	
(for 0dBV)	965mV
Line overload:	
(1kHz)	>15V
(20kHz)	>15V
(50kHz)	>15V
Input Loading	12.1kohm/200pF
Preamplifier Output/Impedance	10.3V / 1.15kohm
DC Offset, L/R	-4.5mV/-4.7mV
Serial Number	050852
Retail Price	£200

Power amplifier: Musical Fidelity *Typhoon*

	20Hz	1kHz	20kHz
Maximum Continuous Power Output,			
8ohms	53.9W	61.8W	54.9W
4ohms	74.1W	88.4W	82.0W
Dynamic Headroom (IHF)	+1.49dB (87.0W)		
Peak Current	18.9A		
(5msec, 1% THD)			
Output Impedance	0.114ohm	0.118ohm	0.124ohm
Damping Factor	70.3	68.1	64.7
Stereo Separation			
(0dBW)	133.5dB	103.3dB	66.8dB
Total Harmonic Dist.			
(0dBW)	-60.1dB	-60.5dB	-56.4dB
(2/3 power)	-62.7dB	-62.6dB	-56.8dB
CCIR Intermod. Distortion			
(0dBW)			-60.7dB
(2/3 power)			-59.5dB
A-wtd Noise			
(20Hz-20kHz) 0dBW			-86.8dB
(A wtd, 20Hz-20kHz) 2/3 power			-101.4dB
Residual noise			
(unwtd)			-74.5dBV
Input Sensitivity			
(for 0dBW)			95.9mV
(for full output)			733mV
Input loading			13.5kohm
DC offset, left/right			-2mV/-1mV
Retail Price			£300





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The King is dead, long live the King. From its original launch more than a decade ago NAD's stalwart 3020 series has held dominion over much of the budget amplifier market, aided by regular revisions. Does the latest design, the daringly titled 302, live up to its pedigree?

Certainly the styling is no real departure from the Lego-brick mentality of old, though this new version is more flexible with its extra tape and line inputs plus a tone defeat facility. Round the back are hard-wired 4mm speaker outlets, the customary Soft Clipping facility and a 4/8ohm impedance switch to select alternative secondary windings on the mains transformer. The important revisions all lurk under its bonnet.

These include a beefier power supply with improved regulation, a new Sanken-based power amplifier, better heat sinking, tighter RIAA accuracy (MM only) and a new low-impedance volume control. All of which adds up to an extra 20 quid.

Lab report

All this and more is confirmed by comparing these test results with those of the 3020i in issue 85. Power output has increased by a good 1dB, building from 31W to 39W (8ohm) and from 47W to 61W (4ohm). Dynamic headroom is unaltered but there's a generous 5A boost in available current plus a worthwhile reduction in output impedance. Everything NAD had predicted, in fact.

Furthermore its MM response is now far closer to the latest IEC RIAA curve and although disc sensitivity is reduced, the overload margins have all increased. Noise has also been squeezed down by 2-3dB while high frequency intermodulation distortion has fallen from 0.002 per cent to a fabulous 0.0006 per cent, results which actually uphold the manufacturer's claims.

Sound quality

'This is a real trier', announced the listening

panel, 'a loud but very positive sounding amplifier that skips its way through the busiest passages'. This loudness certainly lends the 302 a degree of confidence and poise, leaving vocals sounding clean and clear without straining, and remaining consistent with compact and vinyl discs.

However, the imaging of the 302 can prove slightly ambiguous. The piano from our Paganini LP, for example, was recessed deep into the soundstage but the lateral position of the violin was insecure, uncertain and lacking in focus. Nevertheless, the scale and sense of anticipation developed by Rachmaninov's *Symphonic Dances* was well sustained by a big, generous and sure-footed sound that belied its modest power rating.

Yet it was perhaps slightly too lively, and a little tizzy and synthetic via CD. Percussion from the pop and jazz selections sounded 'processed', not exaggerated or spotlit but lacking the metallic hue that the panel had expected.

Low frequencies also came in for token criticism as Marty Paich's double-bass bounded over in a slightly bulky, bloated fashion. 'Too full', the panel remarked 'but never so engorged that it was muddled'. Not quite accurate, it was agreed, but the music remained so spritely and uplifting that this really didn't seem to matter.

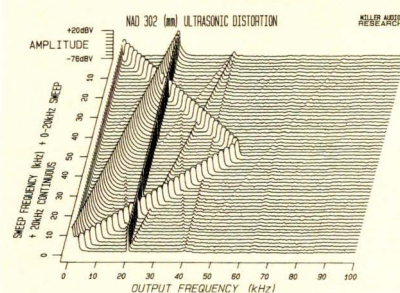
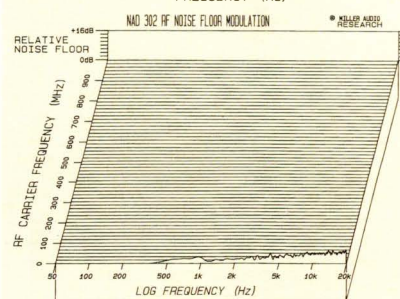
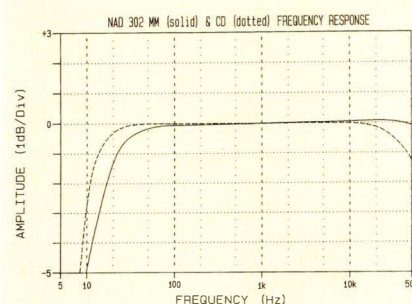
Conclusion

And so the legend continues. NAD's unassuming little amplifier just happens to sound bigger, classier and certainly more entertaining than many of its rivals. There's no trickery, fancy circuitry or flavour-of-the-month components about this amplifier, just reliable, solid engineering that delivers the goods.

It may be a little costlier than some, but with extra flexibility and power in hand the £170 price tag is easily justified, leading to another Best Buy for NAD's mantelpiece.

TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output			
8ohms	37.2W	38.7W	36.5W
4ohms	55.7W	61.0W	57.2W
Dynamic Headroom (IHF)		+1.0dB (49.1W)	
Peak Current (5msec, 1% THD)			14.8A
Output Impedance			0.105ohm
Damping Factor			76.3
		CD/Aux	MM
Stereo Separation			
(1kHz)		66.3dB	66.0dB
(20kHz)		53.1dB	56.4dB
Channel Balance			
(1kHz, -20dBV)		0.16dB	0.18dB
(-60dBV)		0.15dB	0.14dB
Total Harmonic Dist.			
(0dBW)		-92.1dB	-90.1dB
(2/3 power)		-90.4dB	-89.1dB
CCIR Intermod. Dist.			
(0dBW)		-98.1dB	-86.4dB
(2/3 power)		-96.2dB	-85.9dB
A wtd Noise			
(0dBW)		-91.7dB	-82.8dB
(2/3 power)		-100.9dB	-83.4dB
Residual noise			
(unwtd)		-78.5dBV	-78.8dBV
Input Sensitivity			
(for 0dBW)		33.9mV	540uV
(for full output)		213mV	3.34mV
Disc Overload			
(1kHz)			279mV
(20kHz)			2335mV
(50kHz)			3445mV
Tape Output/Impedance	16.8V (disc) / 2.61kohm		
Input loading	21kohm/360pF	47kohm/200pF	
DC offset, left/right		+20mV/+15mV	
Retail Price			£170



Onix OA22L

Onix Electronics Ltd, Unit 5, Kendal Court, Railway Road, Newhaven, East Sussex, BN9 OAY. Tel: (0273) 517 358



When reviewed in issue 97 the Onix OA21, forebear to the £300 OA22L looked at here, proved curiously CD-phobic, but had the saving grace of a fabulous MM disc input. It might seem something of a pity, therefore, to remove this disc stage in order to create a modern line-only amplifier.

Of course the OA22L is not identical to the older OA21 — it's rated at 35W instead of 50W for a start — but both share the same casework and established circuit design. This means that nothing apart from a volume control and unmarked rotary input selector grace the slim fascia, while a series of phono and recessed 4mm sockets decorate the rear.

Both inside and out, Onix has done a very neat job, abandoning integrated circuits for an elegant design composed entirely of discrete components. Even the protection circuit is free of ICs, monitoring the current flowing through the bipolar power amp and using a two-transistor switch to disable the differential input when things begin to get too tough. Should this occur in practice, simply switch off the amplifier, allow its reservoir banks of capacitors to discharge and the OA22L is ready for business once again.

Lab report

Onix has altered the feedback employed in both its OA21 and OA22 amplifiers since issue 97. The overall gain and sensitivity have been reduced (not that this has any real significance with CD as a source) just as distortion has been squeezed from typically 0.05 to 0.013 per cent.

However, distortion still creeps up with frequency and level, a slewing rather than clipping effect that restricts maximum output into low impedances and limits its response at higher frequencies. Therefore it would seem that fairly sensitive speakers are likely to give the best match. The 3D plot

indicates Onix's power supply is starting to show its age while the RF plot betrays a familiar susceptibility to grunge in the 200-300MHz region.

Sound quality

The precise matching of output level between one amplifier and another is just one of the many unique features of this *Choice* amplifier survey. Furthermore, different inputs are accurately adjusted to achieve a constant and predictable output level between, for example, CD and LP sources.

Even after all these pains had been carefully taken, the OA22L sounded undeniably and obviously 'loud', and this characteristic dominated all others during the listening test.

Interestingly enough this is not an excessively sibilant or spiky-sounding amplifier. Instead, in the words of the panel, 'it's what we might have expected from a fairly ordinary transistorised amplifier ten years or so ago'.

Christy Moore lacked the accustomed guttural chestiness, while the pace of his music was unusually hurried. Jazz and pop tracks alike were not offensive, yet for all its loudness, the amplifier seemed incapable of capturing a sense of drama or excitement. 'This loudness' the panel continued, 'manifests most obviously in its eagerness to reach a conclusion'.

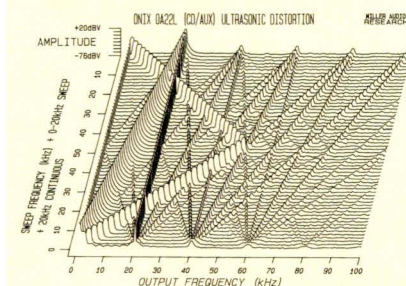
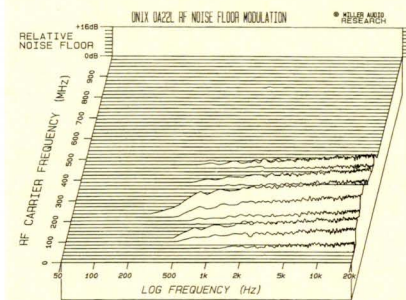
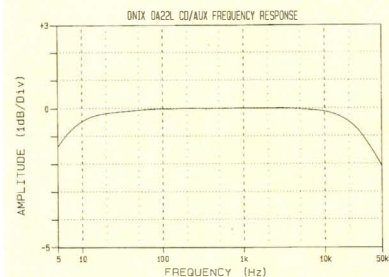
Conclusion

'Just like a prostitute', commented one anonymous panel member — before he was taken outside and shot — 'this amp does the job but is rather dispassionate in the process.'

It is clearly a well intentioned and very professionally built piece of kit, which unfortunately makes the rather uninspiring performance of the OA22L all the more exasperating.

TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output,			
8ohms	33.6W	39.1W	37.4W
4ohms	48.5W	60.2W	59.5W
Dynamic Headroom (IHF)	+0.86dB (47.6W)		
Peak Current (5msec, 1% THD)	7.2A*		
Output Impedance	0.057ohm		
Damping Factor	141.2		
CD Aux			
Stereo Separation			
(1kHz)			66.2dB
(20kHz)			41.5dB
Channel Balance			
(1kHz, -20dBV)			0.36dB
(-60dBV)			0.04dB
Total Harmonic Dist.			
(0dBW)			-87.6dB
(2/3 power)			-78.1dB
CCIR Intermod. Dist.			
(0dBW)			-86.0dB
(2/3 power)			-80.6dB
A wtd Noise			
(0dBW)			-86.1dB
(2/3 power)			-97.6dB
Residual noise			
(unwtd)			-72.8dBV
Input Sensitivity			
(for 0dBW)			35.3mV
(for full output)			223mV
Line Overload			
(1kHz)			>15V
(20kHz)			>15V
(50kHz)			>15V
Tape Output/Impedance	As source / 2.3kohm		
Input loading	+source		
DC offset, left/right	10kohm/100pF		
Serial Number	-15mV/-16mV		
Retail Price	2200490		
	£300		



Pioneer A-300X

Pioneer High Fidelity (GB) Ltd, Field Way, Greenford, Middlesex UB6 8UZ. Tel: (081) 575 5757



Who could have anticipated the hubbub that Pioneer's A-300 and A-400 amplifiers caused when they were launched? Here were two no-frills models, designed with UK ears in mind and looking set to take on specialist British amplifier manufacturers at their own game. Yet only the A-400 has really stood the market on its head, leaving its sibling as a relative also ran. So will this £200 A-300X upgrade will redress the balance?

Pioneer has brought the component selection up to A-400 quality while leaving the basic design untouched, and the A-300X looks and smells just like the original article. It features the same complement of input and rec-out selectors, dual-concentric volume control, localised input switching, honeycomb heatsink and isolated power supply.

The main PCB also looks pretty familiar though a few of the active components appear to have been changed. The op-amp for the MM vinyl disc stage and the output power transistors, for example, have certainly not been culled from the A-400.

Lab report

Regular readers might care to return to issue 92 and compare these results with those extracted from the A-300. Despite a two year interlude, the two data sheets are astonishingly similar, which is at least a testament to Pioneer's longterm production QC standards.

Power output remains fixed at 55W (8ohm) with a meagre 6W rise to 86W (4ohm) and a maximum current rating of 10A. Its output impedance is also fixed at a low 0.062ohm though, having checked-up on the quality of its volume controls, any channel balance error has been reduced to within 1.2dB.

Separation, noise and input sensitivities are as impressive as ever, though the pattern of distortion is now more uniform over

the dynamic range. Instead of shifting between 0.002-0.016 per cent, THD now hovers around 0.0045-0.0059 per cent at all power levels and via all inputs.

There are differences, however, notably in the RF IMD plots, where the A-300X betrays a vicious-looking sensitivity to spurious RF noise. This is likely to be sufficient, in my opinion, to contaminate its sound.

Sound quality

With heavy heart I sat and recorded our listeners' uncompromising verdict. 'Uninspiring', they began, 'for although it sounds subjectively quiet (via vinyl disc) this also robs its music of authority and conviction'.

Rachmaninov's *Symphonic Dances* undoubtedly sounded rather distant and murky, but the Paganini selection found the amplifier immediately sounding shrill and very intrusive. Backing instruments crept furtively forward, vocals became edgy and bass was rather insubstantial, leading to Peter Gabriel's LP being unfairly (?Ed) described as 'trivial'.

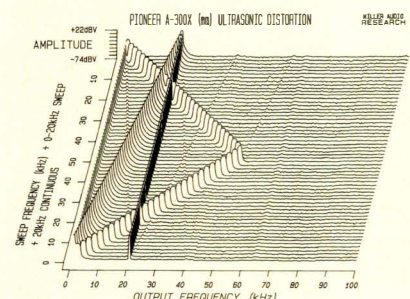
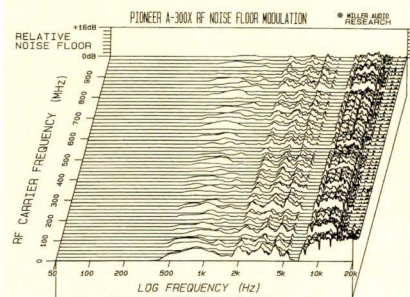
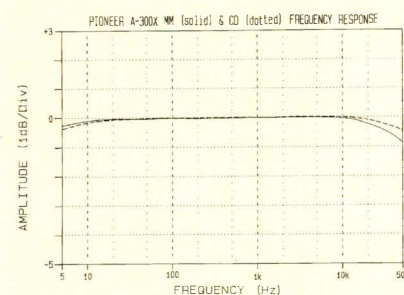
Once the Pioneer's CD input was fired-up, however, there was a marginal improvement, and greater confidence and life. Nevertheless, percussive detail sounded brittle or abrasive, jazz brass appeared tiring and piano was oddly glassy in timbre. Our listeners complained of having to 'fish for any bass'. Above all the bustling, busy nature of its music was unwelcome, unnecessary and fatiguing.

Conclusion

Two years ago the fledgling A-300 gave a rather mixed account of itself, gaining a Recommendation by the skin of its transistors. Unfortunately today's A-300X is some £20 costlier and seems to offer neither technical nor sonic advantage. Obviously there's more to the A-400 than a sprinkling of posh components.

TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output,			
8ohms	51.8W	55.4W	54.7W
4ohms	78.2W	85.6W	84.7W
Dynamic Headroom (IHF)	+1.08dB (71.1W)		
Peak Current (5msec, 1% THD)	10.0A		
Output Impedance	0.062ohm		
Damping Factor	130.2		
	CD/Aux	MM	
Stereo Separation			
(1kHz)		72.3dB	72.9dB
(20kHz)		46.5dB	46.9dB
Channel Balance			
(1kHz, -20dBV)		0.27dB	0.17dB
(-60dBV)		1.18dB	1.08dB
Total Harmonic Dist.			
(0dBW)		-87.4dB	-85.6dB
(2/3 power)		-84.8dB	-84.6dB
CCIR Intermod. Dist.			
(0dBW)		-93.7dB	-81.6dB
(2/3 power)		-77.8dB	-75.4dB
A-wtd Noise			
(0dBW)		-83.5dB	-82.1dB
(2/3 power)		-96.1dB	-87.5dB
Residual noise			
(unwtd)		-79.4dBV	-79.4dBV
Input Sensitivity			
(for 0dBV)		24mV	382uV
(for full output)		180mV	2.78mV
Disc Overload			
(1kHz)			153mV
(20kHz)			1137mV
(50kHz)			1185mV
Tape Output/Impedance		9.66V (disc) / 1.5kohm	
Input loading		64kohm/80pF	47kohm/160pF
DC offset, left/right			+16mV/+9mV
Retail Price			£200



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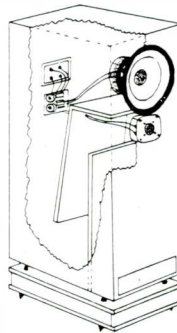


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Rega Elex

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



Although turntables now play second fiddle to CD players in the mainstream hi-fi market, Rega has shown no enthusiasm whatsoever for jumping on that bandwagon. However, the company has widened its activities from record player specialist to full systems manufacturer, by introducing loudspeakers and amplifiers.

Hence the £298 *Elex*, now the centre-piece of Rega's three-strong range and its first amplifiers in nearly 20 years of trading. This unit plays baby brother to the £730 *Elicit*, and has inputs for one tape deck, three line sources and one MM-equipped turntable. Yet to dismiss the *Elex* as 'minimalist' would be an injustice, for Rega has clearly spent time, money and effort in its styling.

In fact the *Elex* is exceptionally rugged, with two diecast halves that are fluted for decoration as much as heatsinking, sandwiching a single PCB between them. On this lies fully symmetrical and complementary circuitry, from the power supply, discrete MM vinyl disc network, op-amp line stage and the power amp. Even the Alps volume control is displaced onto the very centre of the board, midway between the dual-mono L/R channels.

Lab report

Distortion is said to remain consistent at all frequencies up to 100kHz or so and the 3D plot certainly highlights a 'carpet' of harmonic and intermodulation distortions over this range. However, many of these products (including high-order nasties) clearly exceed 0.1 per cent. The Sanken-based power amp is probably responsible.

Disc input sensitivity is spot-on for an MM cartridge, but the +25.2dB headroom is quite low and the response rolls off a little early below 100Hz. Rega's reservoir of current (to one per cent THD) could also have been more generous than the measured 7A.

In practical terms Rega's *Elex* is now in

series II guise, is more sensitive but only just achieves its 50W rating into 8ohms; and unfortunately it just fails to maintain the 80W claimed for 4ohms across the full bandwidth.

Sound quality

Any character or indeed weaknesses betrayed by the *Elex* were consistent from input to input, and included a detached treble and a brashness and stridency that briskly strips the gloss from its music. Paganini's violin sounded peaky and unnatural, complemented in this instance by a strangely dead-sounding piano.

Vocals, by contrast, are pushed forward with plenty of superficial sharpness and clarity yet very little body or authority. Peter Gabriel certainly seemed expressive enough 'but this apparent articulation shouldn't be confused with detail' added one listener. Vinyl surface noise also seemed more irritating than usual.

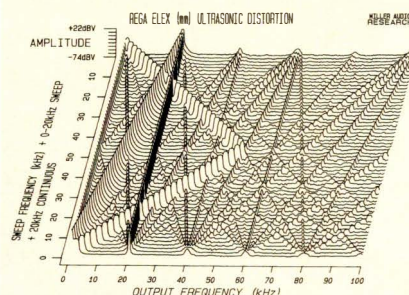
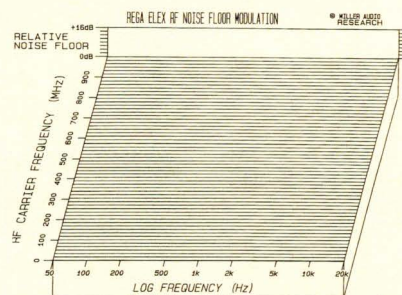
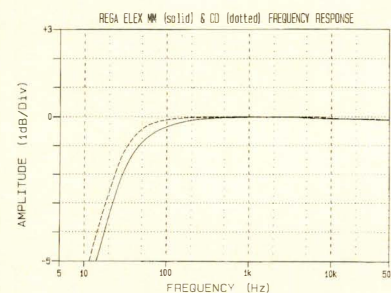
On a more positive note our Tracy Chapman CD sounded quick and responsive. The bass was clean if a little lightweight but still sufficiently bold to convey the rhythm of the piece. Nevertheless, our listeners continued to remark upon the detached feel of the music, an opinion which was only strengthened by our classical selection which lacked some feeling of ensemble and involvement. 'Perhaps', concluded the panel, 'if its imagery and soundstaging were more solid, subtler shortcomings would have been less obvious'.

Conclusion

'Clear, sharp and quick-sounding' in the view of our listeners, 'but not a terribly capable performer'. Which is a pity because this is a meticulous design that shows considerable attention to detail throughout. Perhaps the combination with other Rega components in a vinyl oriented system would have made all the difference.

TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output,			
8ohms	49.8W	50.6W	49.8W
4ohms	77.5W	86.6W	71.5W*
Dynamic Headroom (IHF)	+0.35dB (54.8W)		
Peak Current (5msec, 1% THD)	7.1A		
Output Impedance	0.21ohm		
Damping Factor	38.0		
	CD/Aux	MM	
Stereo Separation			
(1kHz)	76.7dB	74.4dB	
(20kHz)	51.0dB	48.5dB	
Channel Balance			
(1kHz, -20dBV)	0.14dB	0.10dB	
(-60dBV)	0.26dB	0.20dB	
Total Harmonic Dist.			
(0dBW)	-59.7dB	-59.6dB	
(2/3 power)	-64.8dB	-65.1dB	
CCIR Intermod. Dist.			
(0dBW)	-58.1dB	-62.2dB	
(2/3 power)	-59.8dB	-63.8dB	
A-wtd Noise			
(0dBW)	-81.9dB	-78.7dB	
(2/3 power)	-88.6dB	-81.8dB	
Residual noise			
(unwtd)	-73.7dBV	-73.6dBV	
Input Sensitivity			
(for 0dBW)	22.2mV	350uV	
(for full output)	159.5mV	2.4mV	
Disc Overload			
(1kHz)		91.5mV	
(20kHz)		861mV	
(50kHz)		1833mV	
Tape Output/Impedance	11.3V (disc) / 1.04kohm		
Input loading	24kohm/20pF	47kohm/160pF	
DC offset, left/right	-15mV/-5mV		
Retail Price	£298		



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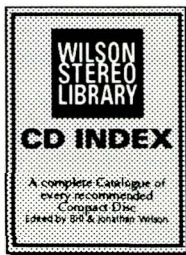
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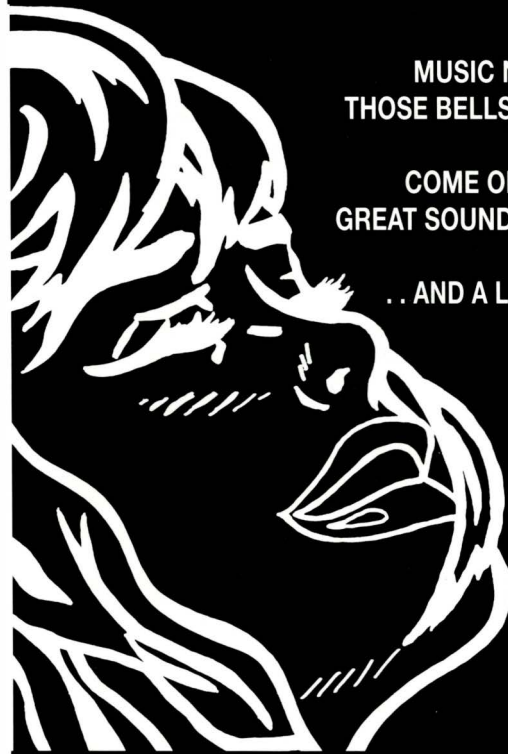
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In the November Classic CD Hi Fi Supplement, the **Ruark Swordsman Plus II** was recommended as the best speaker in the £200-£300 price bracket, and in addition the **Ruark Accolade** was joint winner with the **ATC SCM 50A** in the above £2K category. As these are three of our permanent demonstration speakers we heartily agree. They didn't include the **Ruark Templar** in the £400-£500 bracket, but then it's probably too new.

This latest little gem, when driven by the **Analogue Electronics Jupiter Amplifier** (£300), produces one of the most enjoyable and musical sounds we have experienced for some time in this price bracket.

So do come and hear these and the new **AVI CD Player** (£999) on the SCM 50A's which have new amplification. Also worth an audition is the Analogue Electronics new £450 **Mercury Power Amplifier** — a beefy but musical 150 watts/CH and the new **AMC CD6** player. Ring one of the few really independent consultants around for a home demonstration. (Ask for Ian Vaudin).

Rotel RA-960BX

Gamepath, 25 Heathfield, Stacey Bushes, Milton Keynes MK12 6HR.
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TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output			
8ohms	81.9W	87.7W	69.2W*
4ohms	127.5W	142.6W	132.1W*
Dynamic Headroom (IHF)	+0.55dB (99.6W)		
Peak Current (5msec, 1% THD)	19.8A		
Output Impedance	0.043ohm		
Damping Factor	186.4		
	CD/Aux	MM	MC
Stereo Separation			
(1kHz)	96.9dB	89.5dB	83.7dB
(20kHz)	73.2dB	72.5dB	72.8dB
Channel Balance			
(1kHz, -20dBV)	0.30dB	0.34dB	0.36dB
(-60dBV)	1.29dB	1.30dB	1.30dB
Total Harmonic Dist.			
(0dBW)	-69.2dB	-68.6dB	-68.5dB
(2/3 power)	-68.2dB	-68.1dB	-68.2dB
CCIR Intermod. Dist.			
(0dBW)	-73.7dB	-73.0dB	-72.6dB
(2/3 power)	-68.1dB	-67.9dB	-67.8dB
A-wtd Noise			
(0dBW)	-77.1dB	-75.8dB	-73.1dB
(2/3 power)	-95.5dB	-80.0dB	-75.1dB
Residual noise			
(unwtd)	-63.5dBV	-63.6dBV	-63.6dBV
Input Sensitivity			
(for 0dBW)	19.4mV	309uV	28.2uV
(for full output)	187mV	2.92mV	267uV
Disc Overload			
(1kHz)		171.9mV	15.9mV
(20kHz)		1635mV	149.5mV
(50kHz)		1589mV	139.5mV
Tape Output/Impedance	11.2V (disc) / 1.15kohm		
Input loading	47kohm/80pF 47kohm/100pF 100ohm		
DC offset, left/right	-1.5mV/+1.5mV		
Retail Price	£275		

So how', I asked the engineer 'does this latest amplifier fit into Rotel's Grand Scheme of Things?'. 'Well', he replied 'the RA-960BX is essentially a re-laid and re-packaged version of the old RA-840BX4'. Sounds simple enough, only there's rather more to this box of tricks than a simple juggling of components.

Sure enough the alloy fascia is a clear enough departure from the 840BX4, while the centralised volume control, limited-action tone controls and separate rec-out/input selectors are all part-and-parcel of 900-series practice. The phono input still accommodates both MM and MC cartridges, but in common with the RA-940BX (issue 109), Rotel's traditional shunt-feedback RIAA circuit has been replaced by one culled from its Michi preamplifier. Only the cheaper 920 and 930AX models retain this original phono stage, the latter storming home to a Best Buy in issue 104, I might add. The huge toroidal mains transformer and slit-foil electrolytics are a further departure from the 840BX4. And what has happened to those 'tweaky' Apycap coupling capacitors we heard so much about two years ago? The line stage is now based on op-amps from Analogue Devices rather than Signetics — a change from both the 840BX4 and 940BX. In fact the only real link between the RA-960BX and its predecessors would appear to be the Sanyo B817/D1047 power transistors used in its output stage!

Lab report

Technical comparisons with the 840BX4 (issue 80) are similarly fruitless. Put simply the RA-960BX is both more powerful and more sensitive, its improved layout maintaining a remarkable 73dB stereo separation (at 20kHz) while noise is lower on both CD and MC phono inputs.

Slew-limiting restricts HF output before clipping yet this remains one of the beefiest — if not the beefiest — sub-£300 amplifier

available. Distortion, however, has crept up from 0.008 to 0.038 per cent, though this new value is preserved almost regardless of input or power level. All in all it's textbook stuff from past masters of the art.

Sound quality

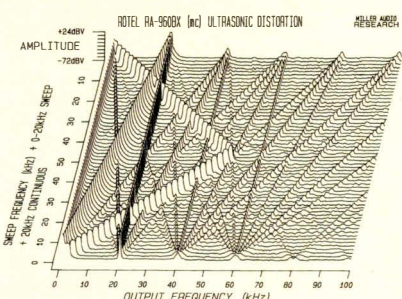
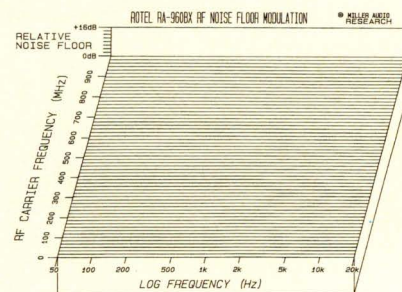
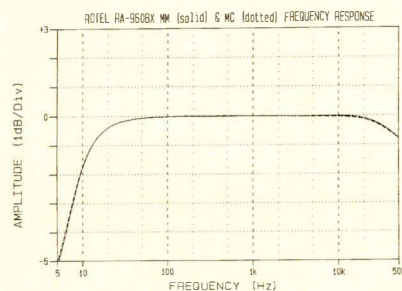
This is a well-behaved little number, an amplifier that lacks the exuberance of, say, the HK6250 or Denon PMA-450 but which trades this for a little extra body, weight and finesse. Some of our most up-beat discs, and the Marty Paich jazz CD in particular, sounded slightly restrained on this occasion, with measured rather than liberal dynamics.

This feeling of restraint, this lack of colour and character prompted two distinct trains of thought. One group of listeners clearly valued a neutrality which, they suggested, did not stand in the way of the music's emotive impact. Others thought differently, claiming the amp lacked a degree of commitment, sounding slightly bleached or bland. They even uttered that damning phrase 'competent'.

Frankly the RA-960BX is not a particularly forceful amplifier. The music ticks-over with a certain security, giving the feeling of latent rather than over-power. 'In control but wearing slightly over-heavy running shoes', they concluded.

Conclusion

Not the last word in edge-of-the-seat entertainment, the 960BX is a very polished and likeable sound nonetheless: a safe and capable amplifier, functionally styled and endowed with sufficient power to manhandle the most awkward of speakers. Its music, however, has strayed from the signature of old and now borders on pipe-and-slippers territory. Nevertheless two out of three panelists said their ears preferred it, which is more than sufficient for Recommendation in my book.



Technics SU-VX720

Panasonic Consumer Electronics, Panasonic House, Willoughby Road, Bracknell, Berks RG12 8FP. Tel: (0344) 862 444



In the beginning there was Class A+, then there was New Class A, New Class A with Linear Feedback and Computer Drive followed by Class AA and Digital Direct Drive. This season's variation on an increasingly hackneyed theme is MOS Class AA, whereby Technics' tried-and-tested circuit has been spiced-up with a sprinkling of FETs (field effect transistors).

Otherwise the £250 SU-VX720 is a bundle of joy, bristling with bass, treble and balance controls, loudness, subsonic and stereo/mono options. Genuinely useful features include the motorised volume knob, and an independent record-out and input selector for MM/MC, three line sources and two tape decks. This is accessed via Technics' system remote control which can also override the main selector and re-route tape, tuner and CD inputs via a series of local relays.

Incidentally, Class AA is rather similar to the current dumping principle employed by companies such as Quad and Deltec. Here a low-powered voltage amp determines the linearity of the amplifier as a whole while rugged current dumpers provide the muscle, the two being linked via a resistive bridge network. In this instance MOSFET's rather than bipolar transistors are employed in the low-distortion voltage stage.

Lab report

So much for the theory. In practice Technics' integrated 'power module' suffers a marked increase in third harmonic distortion at high power levels, rising from a minimum of 0.002 per cent to a maximum of 0.18 per cent over a two-thirds power range. However, drive the SU-VX720 into lower impedances — like the 4ohm used to develop the 3D plot — and distortion stays unexpectedly at bay.

Difficult loudspeaker loads should not prove taxing, as there is some 16.4A of current in reserve. Stereo separation and

output impedance are less impressive because long track runs still exist throughout the amplifier, despite Technics' use of localised input switching and speaker relays.

The 'clean' looking RF plot is simply a reflection of Technics' scrupulous RF filtering at every input. Such filters do scrub-out RF noise, but can also do a rather effective job of mangling the music too.

Sound quality

Undergoing the blind listening tests, this amp earned itself a mixed reaction. Some listeners appreciated the open, dynamic and expansive nature of its sound. It was able to reproduce difficult brass and string tones without hardening up, for example. Other listeners, by contrast, thought this was a rather 'loud' sounding amp, a loudness that influenced both the perspective and body of different instruments, such as the woody timbre of a violin.

But then Tracy Chapman's acoustic guitar was clearly reproduced, and the entire piece applauded for its clarity. 'The voice sounds more human but the sentiments still reek of self-pitying, guilt-ridden middle-class American angst' offered one listener by way of explanation. Indeed.

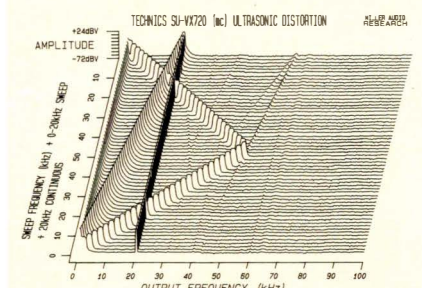
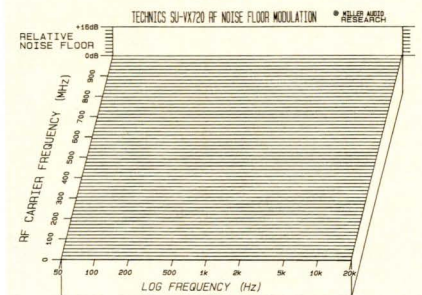
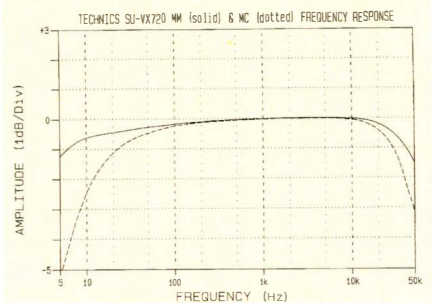
However, others interpreted the sounds as slightly rough and forward, and Prokofiev's Symphony was described as 'a big sound trying to emerge from a constricted space'. The Paganini LP also lacked a sense of perspective with the violin and piano huddling in close proximity — a marked contrast with the very real distance commonly associated with this recording.

Conclusion

Flexible, powerful and, in material terms at least, very good value for money, nevertheless, the ambivalent feelings generated by the sound quality take firm Recommendation out of its grasp.

TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output, 8ohms	78.8W	83.8W	86.4W
4ohms	111.3W	127.5W	127.5W
Dynamic Headroom (IHF)		+0.95dB (104.3W)	
Peak Current (5msec, 1% THD)			16.4A
Output Impedance			0.123ohm
Damping Factor			65.0
	CD/Aux	MM	MC
Stereo Separation			
(1kHz)	60.6dB	60.9dB	61.5dB
(20kHz)	35.7dB	35.5dB	35.4dB
Channel Balance			
(1kHz, -20dBV)	0.02dB	0.26dB	0.23dB
(-60dBV)	0.16dB	0.47dB	0.33dB
Total Harmonic Dist.			
(0dBW)	-93.0dB	-94.0dB	-92.6dB
(2/3 power)	-77.3dB*	-58.3dB*	-54.7dB*
CCIR Intermod. Dist.			
(0dBW)	-96.2dB	-78.5dB	-77.5dB
(2/3 power)	-98.4dB	-83.4dB	-78.5dB
A-wtd Noise			
(0dBW)	-80.1dB	-79.2dB	-70.1dB
(2/3 power)	-93.8dB	-89.7dB	-71.5dB
Residual noise (unwtd)	-70.4dBV	-70.5dBV	-70.4dBV
Input Sensitivity (for 0dBW)	19.5mV	291uV	26.0uV
(for full output)	180.0mV	2.85mV	241uV
Disc Overload			
(1kHz)		187mV	16.3mV
(20kHz)		1579mV	141mV
(50kHz)		1280mV	151mV
Tape Output/Impedance	11.4V (disc) / 1.05kohm		
Input loading	41kohm/840pF	250kohm/500pF	290ohm
Retail Price			£250



Woodside ISA230

Woodside Electronics Ltd, PO Box 105, Weston Super Mare, BS22 0GG. Tel: (0934) 520 248



Woodside Electronics started out manufacturing the legendary Radford valve amplifier designs from the Sixties. Its latest creation, the £900 ISA230 reviewed here, represents a break with tradition, and looks destined to meet Audio Innovations head-on by offering a line-only, bottle-filled integrated amplifier. Marching under the 'Contemporary Range' banner, the ISA230 is minimalist to the core: a high quality Alps volume control, four-way input selector and tape switch are the only features, and the standard of construction is workmanlike and durable rather than aesthetically daring.

A fuller specification ISA230P is available for £999 complete with a hybrid MM vinyl disc stage. This is not retro-fittable, however, as it involves discarding the ISA230's existing input board.

The two versions share a common chassis with a revised design philosophy. A single-ended ECC83 triode operates in push-pull mode at the input, maintaining a low output impedance and wide bandwidth as it drives the ECC81 phase-splitter and Tesla EL34 power valves. This marks a departure for Woodside whose previous amplifiers have perpetuated the old Radford/Bailey pentode/triode phase-splitter circuit.

Lab report

The ISA230 is equally contemporary in its technical performance. With secondary windings set at 6ohm you'll squeeze some 27W into 8ohm and 15W into 4ohm plus a modest 5.4A maximum current, provided three per cent distortion is acceptable.

Distortion inevitably creeps up at the frequency extremes, particularly the higher-order IM products which, at some 0.07 per cent, still outweigh the bold second order tracks on the 3D plot. There are similarities here with both the AMC and Audio Innovations amps from this and issue 109.

At very low frequencies a knee-point is

reached where the load impedance and inductance of the output transformer causes a huge jump in 'magnetising' distortion. With an 8ohm load the saturation frequency lands squarely at 20Hz — hence the abrupt power vacuum.

At 25Hz or 15Hz full power (21.5W) is achieved into 8ohm while at lower impedances the saturation frequency shifts, permitting some 12W at 20Hz into 4ohm. Such are the idiosyncrasies of this and any other valve amplifier.

Sound quality

The Woodside has very little obviously amiss in respect of tonal balance, stability of imaging or fine detailing. Nevertheless, not one member of our listening panel could muster anything more than passing enthusiasm for the music at hand.

'It's just so very bland' they remarked, despite it sounding big and loud. Marty Paich's jazz ensemble appeared all but monophonic in parts, with sax, piano, double bass, and percussion emerging with equal strength from both speakers.

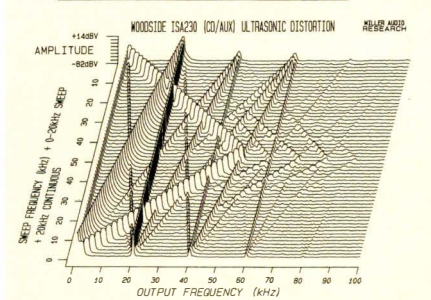
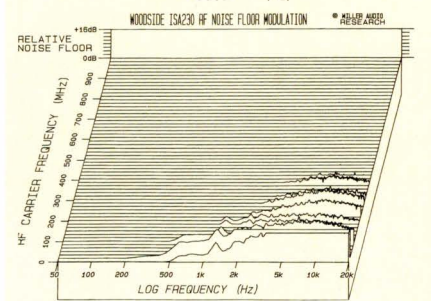
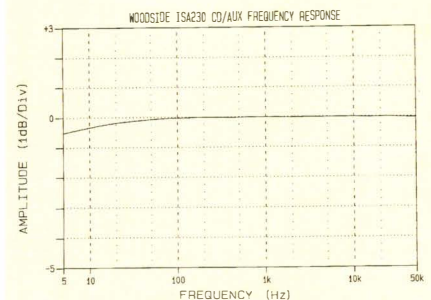
This amplifier seems content to reproduce the separate threads of the music without stressing its individuality. The busier classical CDs sparked further criticism, and bass was described variously as plump, confused and blustery. After a time a grittiness also reared its head, particularly with violins or guitars, and the naturally vivid timbre would be strangely foreshortened.

Conclusion

First impressions can be deceptive, for although this rugged valve amplifier can sound superficially ambient, neutral and detailed, close scrutiny revealed this to be a thumbnail sketch rather than an intimate portrayal of the music. 'Nice enough but it's just going through the motions' concluded the panel. 'Roger and out' was the reaction on being told the asking price.

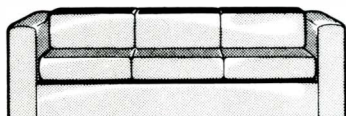
TEST RESULTS

	20Hz	1kHz	20kHz
Maximum Continuous Power Output,			
8ohms	16.7mW*	27.1W	21.3W
4ohms	12.4W	14.6W	12.5W
Dynamic Headroom (IHF)	+0.51dB (30.5W)		
Peak Current (5msec, 1% THD)	3.2A		
Output Impedance	0.588ohm		
Damping Factor	13.6		
CD/Aux Stereo Separation			
(1kHz)			84.3dB
(20kHz)			66.9dB
Channel Balance			
(1kHz, -20dBV)			0.03dB
(-60dBV)			1.09dB
Total Harmonic Dist.			
(0dBW)			-75.9dB
(2/3 power)			-69.4dB
CCIR Intermod. Dist.			
(0dBW)			-78.5dB
(2/3 power)			-88.5dB
A-wtd Noise			
(0dBW)			-72.0dB
(2/3 power)			-80.7dB
Residual noise			
(unwtd)			-55.1dBV
Input Sensitivity			
(for 0dBW)			32.5mV
(for full output)			183mV
Line Overload			
(1kHz)			>15V
(20kHz)			>15V
(50kHz)			>15V
Tape Output/Impedance	As source / as source		
Input loading	42kohm/40pF		
DC offset, left/right	0mV/0mV		
Retail Price	£900		



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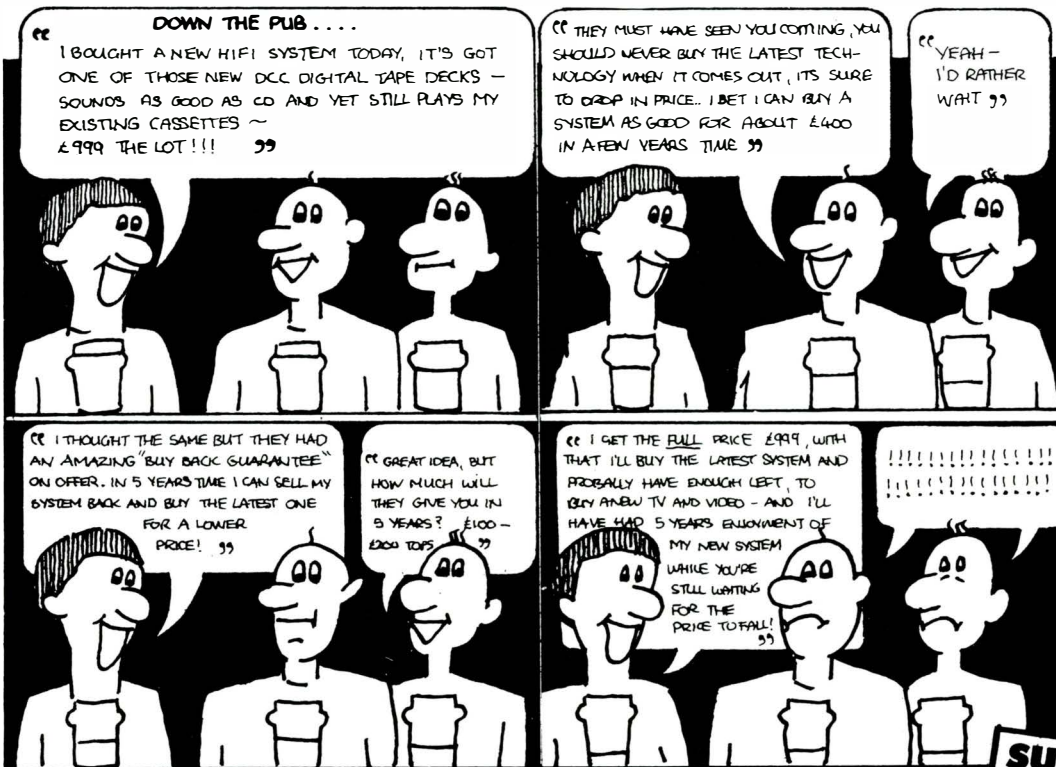
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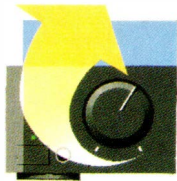
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Conclusions, Best Buys and Recommendations

This has been an unusual test, full of weird and wonderful creations that reflect the considerable diversity of the amplifier art. And make no mistake, it is an art. Designing a good amplifier still requires as much inspiration as it does skill in back-to-basics engineering. Yet, in instances where art takes control over the science, disaster and unpredictability can lurk just around the corner, a scenario all too familiar to the likes of Alchemist, whose delightful *Kraken* was drafted from the heart rather than the head.

Paul Miller hands out the laurels to the deserving winners of this month's ample test.

The Musical Fidelity *Tempest* likewise fell short of the mark, even though its related *Preamp* with bridged *Typhoon* separates combination stunned us all with its grand acoustic and rip-roaring bass. It just goes to show that nothing can be predicted in this business. One near-miss is the Technics *SU-VX720*, a lusty beast incorporating the latest MOSFET technology, but one that provoked a very mixed response from our panel.

Recommended

The Harman Kardon *HK6250* did make the Recommended grade largely because its cheaper *HK6150* sibling had already scored a home run in issue 109. Bearing in mind that the *6150* and *6250* are struck from the same mould, those differences that do exist aren't worth quibbling over.

The Rotel *RA-960BX* is one of a new series of amplifiers that feature wholesale changes in design. As a result, like much of its *900 Series*, the *960BX* simply does not sound 'Rotelesque'. Instead it offers a new sound for a new era, but is it too passive for its own good?

The new Arcam *Delta 290* is similarly confident, yet retains a flamboyance that's missing from the Rotel. The vinyl disc option is especially impressive, attractively priced and stirring in performance. An all-round good egg and one of Arcam's most significant products to date.

The Audiogram *MB1* turns in a coloured but deliciously mellifluous sound, that may be a little mushy about the edges but still makes compulsive listening. Here's an amp that may have been designed by a computer, but still sounds astonishingly 'human' — just don't go by appearances. Readers

with asbestos earlobes might care to roast awhile on the Magnum *A-Class*, an amplifier that sounds as rich and bold as it is massive in stature, that views reality through rose-tinted specs, perhaps, but this never seems to obscure its passion for the music at hand.

And for those who really want to listen out on a limb the Audio Innovations *Series 700* is a low-powered line-only valve amplifier that won our hearts with its enchanting and agile sound. Such an archaic design has no right sounding quite so irresistible. But it does, so I'll just have to accept the fact! Among separate pre/power combos, just the Musical Fidelity *Preamp* with two bridged *Typhoons* did more than sufficient to convince our panel that this more elaborate architecture was cost effective and worthwhile.

Best Buys

The Best Buys have a habit of putting more costly gear into perspective, and our winners this month are certainly no exception. The Denon *PMA-450* amplifier is certainly up in the 'budget audiophile' vanguard, confidently trading shots with the likes of Pioneer, Rotel and Marantz. Bold and incisive, the sound marches defiantly from the speakers rather than enveloping them in comfortable euphony. Furthermore it will tackle difficult speakers with equal courage, trading a little subtlety and stereo focus for impressive raw power.

Our final Best Buy of the month is NAD's ever-green budget amplifier, now re-titled the *302*. This too sounds big, gutsy, forward and exciting, if perhaps rather too electrifying to be entirely realistic. But does that really matter when music can sound this good without breaking the bank?



Tech Talk

In keeping with the *Choice* rationale each amplifier was auditioned under blind conditions at listening levels precisely matched from amp to amp, and consistent between CD and phono inputs. Any apparent change in 'loudness' is therefore a direct consequence of changes in balance or presentation peculiar to the amplifier itself. To our knowledge, these are the only regular amplifier blind listening tests conducted with such attention to detail.

Both CD and vinyl sources were used with a range of software chosen for its ability to reveal different aspects of an amplifier's subjective performance. The equipment included a Pink Triangle *TOO/SME Series IV/VdH MC Two* (analogue) and a Deltec *T1/PDM2* combination (digital), linked by Silver Sounds *16/2* cable to a pair of Audio Note *AN-J* loudspeakers. The listening programme included excerpts from: Rachmaninov *Symphonic Dances* (Athena vinyl disc), Ruggiero Ricci *Paganiniana* (Water Lily Acoustics vinyl disc), Peter Gabriel *So* (Charisma/Virgin vinyl

Wondering about the technical criteria and assessment methods used in our reviews? Paul Miller gets testy.

disc); Christy Moore *The Collection* (East/West CD), Jennifer Warnes *The Hunter* (Private Music CD), Marty Paich Big Band *Moanin* (Discovery CD), Prokofiev *Romeo and Juliet* (Decca CD) and Tracy Chapman *Tracy Chapman* (Elektra CD).

A big 'thank you' to those very nice people who willingly donated their ears so that the Rest of The World might rejoice in a new series of Best Buys and Recommendations: Alan Ainslie (Panasonic/Technics), John Bamford (Pioneer), Tom Barron (Rotel), Mike Martindell (Arcam), Terry Murphy (Yamaha), Guy Sergeant (Audio Components Ltd) and Andy Whittle (Rogers). Any response to the various quotes used in our Sound Quality sections should be addressed to the above!

Measurement programme

The test program includes both standard IHF A202 measurements, together with more advanced tech-

niques made available by IEEE-controlled digital test equipment.

Power Output, Dynamic Headroom and Peak Current

Quoted in good old fashioned Watts this refers to the maximum output voltage of the amplifier into 8 and 40hm loads, one channel driven to 1% THD. The IHF-A-202 dynamic headroom test employs a gated 1kHz signal, 20-cycles on/480 cycles off, and refers to a maximum of 1 per cent THD into 8ohms relative to the continuous power available into that same load.

The peak current available from an amplifier has been measured using a 5msec gated 1kHz signal into 1ohm, up to a limit of 1 per cent THD.

Separation, THD, IMD, noise and sensitivity

All integrated and power amplifier input sensitivities are measured with respect to an output of 0dBW (=1W) and full power at 1kHz. Preamplifiers are measured at 1V = 0dBV output (6dB higher than IHF). Noise was measured with respect to the IHF input levels of 500µV (mc), 5mV (mm) and 0.5V (line), input shorted, A-wtd and assessed as the true rms figure of 20 1/3-octave averages.

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

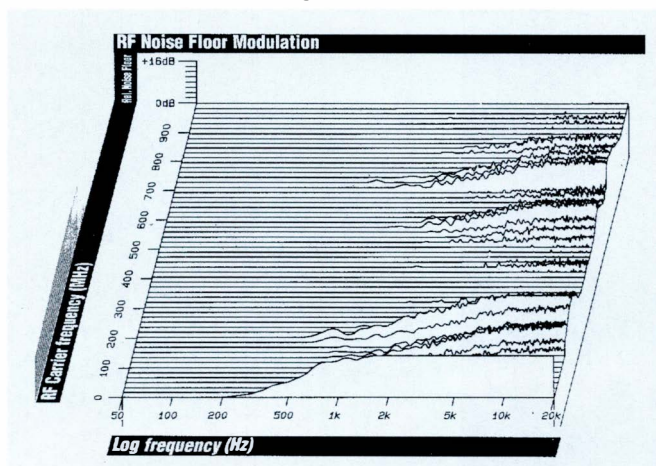
Broad-Band Radio Frequency Intermodulation Test

In general terms this radical test reveals just how sensitive an amplifier is to spurious Radio Frequency noise, whether introduced directly or indirectly. Conventional measurements examine the performance of the amplifier under closed-loop conditions where many inherent circuit nonlinearities are compensated for by the feedback network. By contrast the RF test probes the linearity of the amplifier under open-loop conditions where it is both non-linear and uncompensated.

A precision RF signal generator is used to produce an RF carrier signal at 20mVp-p, modulated to a depth of 100% using an external pseudo-random noise source. The resulting non-correlated AM/RF signal is then ramped between 1MHz-1GHz (1000MHz - now covering TV and satellite baseband transmissions) by controlling the generator through an IEEE interface bus and a dedicated program developed in this laboratory.

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

This therefore represents a change in the noise floor of the amplifier over a discrete portion of its frequency range. Such a random fluctuation may not necessarily be heard directly, but simply makes it



more difficult for the ear/brain to distinguish subtle dynamic inflections in the music signal itself.

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

Ultrasonic Distortion Test

Revised some 18 months ago, this particularly revealing test highlights the interaction of high and moderate level signals in the context of harmonic and intermodulation distortions (called 'routes' in the text) caused by such mechanisms as slew-limiting or the progressive reduction of feedback, the latter revealing an increase in open-loop nonlinearities. It is not a knitting pattern, as one irreverent *Choice* staff member would have you believe!

Three driving signals are employed, the 0-20kHz sweep ($1=F_{0-20k}$) and continuous 20kHz tone ($2=F_{20k}$) raising the amplifier to 2/3 voltage output into a 4ohm load while the 0-50kHz-0Hz reversed sweep ($3=F_{0-50k-0}$) tracks at a level some -24dB below this. For integrated amps a pre-equalised composite signal was used for either the MC or MM vinyl disc inputs (ref 20mV and 2mV @ 1kHz respectively). Strictly speaking an amplifier should be treated as a voltage source so each plot is individually calibrated in dBV (0dBV=1V at 4ohms).

These sweeps were chosen to represent the kind of HF and ultrasonic signals likely to be handled by an amplifier in normal use. The ultrasonic spurious generated by CD players is a well-documented example, but it is less widely appreciated that the 20-50kHz band noise from a vinyl disc or FM tuner can persist at levels only 10-20dB lower than peak signals in the audio band.

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

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

This example plot shows a variety of basic summation IM routes such as $F_{20k} + yF_{0-20k}$ [$y = 1,2,3$] given by (11,12 and 13) together with higher-order secondary summation IMD such as $2F_{20k} + yF_{0-20k}$ [$y = 1,2,3$] and $3F_{20k} + yF_{0-20k}$ [$y = 1,2,3,4$]. These are marked as (14)-(16) and (17)-(20) respectively. Extremely high-order routes such as $4F_{20k} + yF_{0-20k}$ [$y = 1,2,3$], (21)-(23) are also visible.

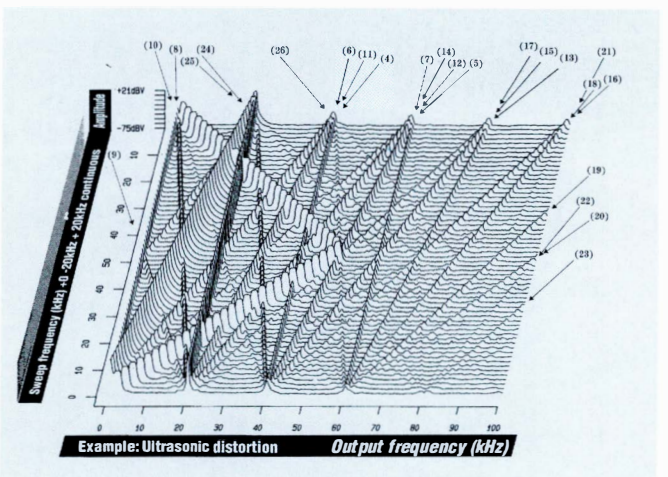
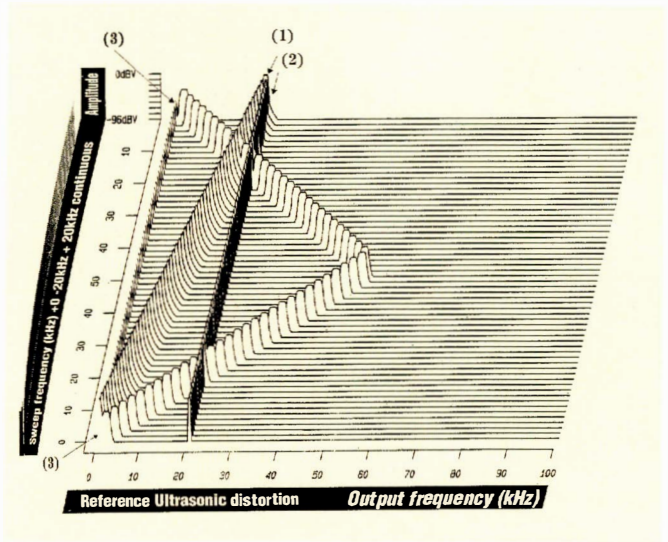
Of course there are the interactions between (3) and (1) and (2) to consider. Three summation IM routes are clearly visible: $F_{0-50k-0} + F_{0-20k}$ (24), $F_{0-50k-0} + F_{20k}$ (25) and $F_{0-50k-0} + F_{0-20k} + F_{20k}$ (26)!

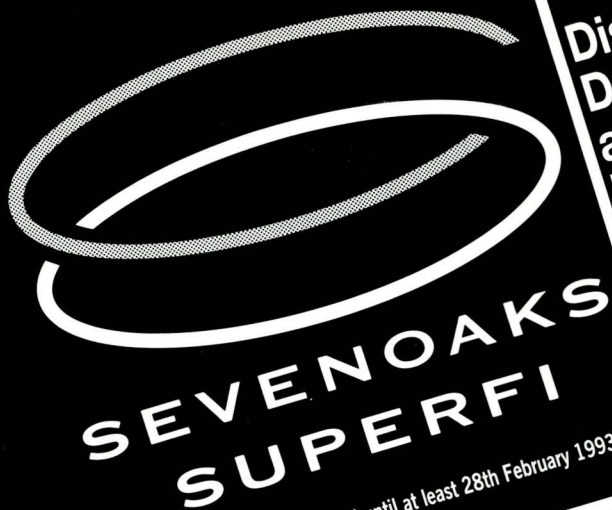
In general the presence of 2nd-order in-band IMD

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

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

The combination of Ultrasonic Distortion and RF IMD plots can provide a valuable indication both of the amplifier's subjective performance and its likely compatibility with other audio equipment, particularly CD players. An amplifier that gives rise to a 'clean' Ultrasonic plot but suffers RF demodulation may well sound coarse or muddled as a result. Conversely, a relatively constant carpet of innocuous closed-loop distortions can effectively mask the fatiguing effects of RF IMD. Taken together, the two plots give more insight than ever before into the potential sound quality of an amplifier.





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This advertisement is valid until at least 28th February 1993.

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Unlike many of our competitors, all products (subject to availability) are on display and may be auditioned in dedicated listening rooms in any of our branches. Our helpful staff enjoy and understand the equipment they sell and will be only too happy to assist you through the Hi Fi choices that lay ahead. Our Sevenoaks Superfi service dept is one of the largest and best equipped in the business and will maintain your purchase in tip-top working order at all times.

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The suggested systems priced below all include the popular NAD 5120 turntable but an alternative turntable or CD player is available at extra cost. Please see "OPTIONS" list below for further details.

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Systems
- Cartridge (turntable based systems only)
 - Speaker Leads (80 strand cable)
 - Carriage (Systems over £300)

Options
The following Compact Disc Player or Turntable may be ordered instead of the NAD 5120 in the above systems.

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- Denon DCD590 Add £79
- Denon DCD690 Add £169
- Denon DCD890 Add £229
- Denon DCD1290 Add £99
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- Marantz CD52II Add £199
- Marantz CD52SEII

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- Pioneer PDS701 Add £149
- Pioneer PDS801 Add £199
- Rotel RCD955AX Add £149
- Technics SLPG320AK Add £39
- Technics SLPG420AK Add £59
- Technics SLPG520AK Add £99
- Technics SLP620AK Add £129
- Sony CDP397 Add £39
- Sony CDP497 Add £59
- Sony CDP797 Add £99
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- Arcam Alpha III £549.95
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- Arcam Delta 120.2 £449.95
- Arcam Delta 110S £219.95
- Arcam Delta 110 £499.95
- Arcam Delta 290 £299.95
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- Aura V4100 Black £399.95
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- Audiolab 8000C(II) £669.95
- Audiolab 8000D (lead) £249.95
- Audiolab 8000P(II) £299.95
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- Marantz PM52SE £299.95
- Marantz PM62 £299.95
- Marantz PM72 £199.95
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**SEVENOAKS
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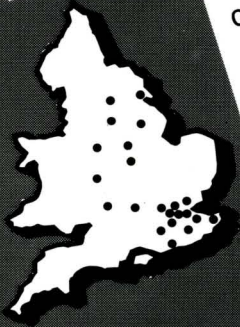


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Selected offers available from our associates Superfi

END OF LINE CLEARANCE

The following products must be cleared at crazy prices. Most are in very limited numbers so hurry to avoid disappointment. A few are brand new, most are ex display but generally in excellent condition with full instructions, accessories, leads and guarantee. Please note they can only be purchased from our **Sevenoaks, Watford & Leicester** branches. (Mail order from Sevenoaks branch only).

- ACOUSTIC ENERGY £521.95
- AE1 RW
- ARCAM Alpha 2 Spks £119.95
- Delta 90.2 £286.95
- Delta 100 £599.95
- Delta Two £299.95
- ARISTON Maxim £257.95
- Maxim CD3 £257.95
- ATC SCM20 £833.95
- B&O BC2300 £1025.95
- BE6500 £369.95
- BG4500 £429.95
- BM6500 £369.95
- CD6500 £153.95
- RL45.2

- CANON S50 £209.95
- CAMBRIDGE C70 £149.95
- CASTLE Warwick £137.95
- Warwick (grey) £119.95
- Durham £155.95
- CELESTION CEL7 £119.95
- CEL9 £143.95
- DL6SII £129.95
- 3rd Dimension £113.95
- DENON DCD480 £89.95
- DCD580 £107.95
- DCD860 £155.95
- DCD960 £179.95
- DRM800A £180.95
- DUAL CS503-2 Oak £96.95
- CS505-4 Oak £120.95
- CS750 £179.95
- C7100 £83.95

- DUNLOP/SYSTEMDEK IIXE900 £179.95
- EAR EAR 509 £1259.95
- GALE 210 £59.95
- GOODMANS MAXIM 3 £65.95
- KENWOOD DP7030 £179.95
- DP950 £101.95
- UD70 £419.95
- UD90 £509.95
- MARANTZ CD62 £179.95
- CD72 £239.95
- PM30 £77.95
- SD40 £99.95
- SD62 £149.95
- SD315 £107.95
- MOTH Line Drive £299.95
- MUSICAL FIDELITY B1 MKII £137.95
- P180 £539.95
- CD1 £239.95

- NAD 4225 £112.95
- 5440 £150.95
- 6325 £119.95
- 6340 £154.95
- 7020i £126.95
- 7225 PE £150.95
- 8225 £89.95
- PHILIPS CD604 £89.95
- CD634 £99.95
- QLN Signature £659.95
- ROGERS LS4A £153.95
- LS8A £319.95
- ROKSAN Artemiz £414.95
- Radius £319.95
- Xerxes B £599.95
- ROTEL RP855 £101.95
- SD ACOUSTICS SD3 £239.95
- SONY MHC1200 £239.95
- MHC2600 £341.95
- SPENDOR SP2/2 £332.95

- TECHNICS SBCS60K £41.95
- SLPS700K £161.95
- TEAC P10 TRANS £899.95
- P500 TRANS £389.95
- YAMAHA AX1050 £359.95
- CDX1050 £257.95
- CDC615 £179.95
- WHARFEDALE Delta 30.2 £59.95

USED BARGAINS
Available at Sevenoaks Branch only

- MARANTZ CD65 CD £139
- MISSION Cyrus One £84
- PINK TRIANGLE Pink Triangle + Helios Arm £235
- ROTEL RA820BX3 £89
- RA820BX4 £94
- AUDIOLAB 8000A-91 £294
- BEARD BB100 £519
- CREEK CAS4040 £105
- DENON DCD800 £79
- ION X Pack +3X £235
- Obelisk £59
- JPW P1 £89
- KEF 101/2 (pr) £249

Hi-Fi Choice

mail order offers

Our Mail Order Section this month features, among the old favourites such as Furukawa interconnects, some great new accessories to help improve the performance of your system

We're also pleased to be able to offer a selection of audiophile recordings from specialist labels from around the world.

Goldring Magic Record Cleaner £11.95

Kit consisting of a double sided velvet brush and spray on Goldring Magic record rejuvenating fluid

The Purifier £16.90 per pair

The Purifier is a ferrite cable clamp designed to reduce RF induced noise in audio, video and computer systems.

The clamps will accept single or multiple cables of up to half an inch in diameter and can be used on both signal and mains cables. Can be particularly beneficial for digital interconnects.

Nagaoka Anti-Static Record Sleeves No 102 £6.99

Packs of 50 plastic record sleeves that can be used on their own or inserted into an existing card or paper sleeve.

The sleeves keep records dust free and eliminate static.

Mk 10 Carbon Fibre Brush with Velvet Pad £9.99

The carbon fibres efficiently remove dirt from the record grooves, which is then collected by an integral felt pad.

System Cleaning Kit 1 £15.99

Everything needed for maintaining a hi-fi system, all contained in one handsome wallet pack. Stylus cleaner, auto-reverse, wet tape head cleaner and cleaning fluid, manual CD cleaner and fluid plus a carbon fibre record cleaning brush.

Milty Work Mat £7.99

The Milty Work Mat is a large rubber mat that has been designed to support records, Laserdiscs and Compact Discs while they are being cleaned.

It holds the disc firmly in place, without any danger of damaging it.

It's a real boon to disc cleaning and makes using cleaning brushes and solutions completely painless.

Newnes Audio and Hi-fi Engineer's pocket book (second edition) £10.95

This useful little book covers a wide range of audio topics with concise explanations to clarify the information.

The book covers everything from turntables and cartridges to DCC and DAT with as much technical information as the mere mortal could wish for.

If you really want to know what makes your CD player tick this is the book for you.



Technics Auto Compact Disc Cleaner £39.95

A powered wet/dry CD cleaner that can be run off batteries or the mains.

It works by rotating the disc and applying the wet cleaner first (cleaning solution is supplied), then reversing direction and dry cleaning it. The whole process takes just 40 seconds and a set of batteries should clean 80 discs

Audio Technica CD lens cleaner AT-6078 £16.95

The focusing assembly for the laser head of a CD player is a very delicate affair and yet it requires cleaning from time to time to give of its best.

Rather than fumbling about with cotton buds, and perhaps wrecking your CD player into the bargain, we would suggest you employ an Audio Technica AT-6078 CD lens cleaner.

This is a standard size disc with a set of eight tiny brushes set into it. To clean your laser, just apply a drop of cleaning fluid on to one of the brushes, place the cleaning disc in to your player and press play.

Ten seconds, and some rather dismal music later, hey presto, a clean laser assembly, and a cleaner sound from your Compact Discs as a result.

CD Jewel Cases £5.00 pack of five

Who invented these bloody awful things in the first place? Replace your broken jewel cases and ensure that your discs are properly protected.

Last SF-100 Extra Strength Record Cleaner £19.95

Last SF-100 is designed to remove the compounds left over from the pressing process. Use for a first cleaning of new records as well as to revitalise older vinyl.

Last SF-200 Record Preservative £21.95

Without going too deeply into the technical details Last SF-200 is absorbed into the surface of the vinyl and stabilises the vinyl to prevent gouging and fracturing of the groove wall that can occur during playback. A single application can keep records sounding 'brand new' for 200 plays or more.

Last SF-300 All Purpose Record Cleaner £15.95

The one to use to for day to cleaning after your records have been cleaned and protected with SF-100 and SF-200.

available at only £21.95 but as stocks are limited we must restrict this offer to one sample kit per reader.

As well as products to protect and clean your record collection, Last also makes a range intended to perform the same service on Compact Discs.

The SF-600 CD Cleaner and protection kit consists of a special CD cleaner/polish to remove dirt, scratches and finger prints from CDs as well as protective shields, an applicator, an application base and a brush.

Refills of cleaner/polish are also available separately.

CD cleaner and protection kit £17.95 Cleaner only £13.95

Gold plated 4mm banana plugs £7.95

Top quality solderless gold plated banana plugs for use with speaker cables. Simply push the speaker cable into the body of the plug and tighten for a perfect connection. This Furukawa plug accepts cables up to 4mm in diameter. Sold in packs of four.

Kontak cleaning solution £19.90

Kontak is a two stage contact cleaner for all audio and mains connections. All connections are susceptible to oxidation and contamination which impairs electron flow and thus affects sound quality.

Here's what Paul Messenger had to say when he tried some on his system; "The effect on the power amps alone was so astonishing I had to carry on and cover the whole system. By the time I was finished the system was utterly transformed. Timing and coherence were back with a vengeance; surface noise and coloration were both much less audible and the soundstage had liberated itself from the boxes".

The Art of Digital Audio - John Watkinson (revised reprint) £49.50

This book describes all of the essential theory of digital audio, and a good deal of practice, but it is not a history book. Nor is it a conventional textbook, largely because such things have to choose a target audience and stick to that academic level.

The need for understanding in digital audio is too wide and the subject is too interdisciplinary for that. As you can imagine this is a comprehensive tome that covers all aspects of digital technology including disc drives, rotary and stationary head recorders and even interconnects. It is a must for anyone wanting to get fully acquainted with the subject.



In order to let you try out the Last record cleaning and protection system we have negotiated a special price to enable you to purchase a full size bottle of both the extra strength cleaner and the preservative for just £34.95.

We also secured a limited number of trial samples of all three products which are



Furukawa cables

We have a variety of interconnects and speaker cables on offer, all sourced from respected Japanese specialist Furukawa and all of which were rated as either Recommended or Best Buys in our comprehensive cable survey in July and August. For those of you interested in reading more about these cables, copies of our guides to both loudspeaker cables and interconnects are available from our back issues department. We are able to supply a variety of lengths, please see the order form for prices

Speaker cables FS-2T14

Cheapest of Furukawa's Evencap range, this PCOCC cable was rated a Best Buy because of its "natural sense of dynamics and scale"

FS-2T20P

Consisting of some 80 PCOCC strands, 20P was praised for its "lively and engaging presentation" and was considered to be "taut, detailed and well controlled"

FS-2T35P

Similar to 20P, but with 140 strands arranged in seven bundles, this cable was rated "a real corker".

Digital Interconnects FV-1010

75ohm PCOCC digital interconnect which earned Recommendation for its good sense of depth and quality of construction.

FO-1110

Voted a "must for 'optical only' transports" 1110 employs a PMMA fibre. Glass and multi glass versions, the FO-1210 and FO-1310, are also available.

Analogue Interconnects FD-1010

One of Furukawa's 'unbalanced' coaxial range, manufactured from PCOCC.



Copland: *Appalachian Spring Suite, Eight poems by Emily Dickinson.* Keith Clark/ Pacific Symphony Orchestra, Marni Nixon, Soprano (in the poems).

Music by America's best loved composer, *The Appalachian Spring Suite* is presented in its original version for 13 instruments. Grammy Award nominee in 1987.

Walker & Garson: *Reflections. Portrait of a friend - Love - First song - Ethereal - Yearnings - Pied piper - The park - Magic spell - You're one of a kind - Reflections - Reason.*

Jim Walker on flute and Mike Garson on piano from the jazz group 'Free Flight' offer something peaceful and soothing for those quiet moments. Surprisingly natural sound

Helicon Ensemble: *Vivaldi/Bach Vivaldi: Sinfonia in C-Trio Sonata in G minor - Double Concerto in E-Flat. Bach: Trio Sonata in C - Double Concerto in D minor.* (Compact Disc also contains *Prelude in C*) Albert Fuller conducts from the harpsichord a varied original instrument ensemble in works featuring two solo violins, including the great *Double Concerto* by Bach and three rare works by Vivaldi.

Walton: *Facade Suite - Strauss/Hasnrohr: Till Eulenspiegel - Scriabin/Elliott: Waltz in A-Flat - Nielsen: Serenata in Vanø.* Chicago Pro Musica.

An instrumental from Walton's whimsical *Facade* in the composer's original scoring makes a perfect vehicle for these brilliant musicians.

Prof Johnson's Astounding Sound Show Sampler. *Orchestral Fanfare - Red Norvo Quintet - Cal Arts Ensemble - Richard Morris - Organ - Susan Mc Donald, Harp - Kronos Quartet - David Rosenthal, Tubulog* A perennial audiophile favourite, this sampler of Prof Johnson's early work shows what Reference can do with a wide variety of musical and sonic experiences. Includes the only known recording of an unusual tuned mallet instrument, the Tubulog

Nojima: *Nojima Plays Ravel, Miroirs: Noctuelles - Oiseaux tristes - Une baroque sur l'océan - Alborada del gracioso - La valse des cloches - Gaspard de la Nuit: Odine - Le gilet - Scarbo.*

Here is the eagerly awaited sequel to Nojima's first American recording, featuring some of his most renowned specialities. *Gaspard de la Nuit* is the pianist's Everest, attempted by only a few. The Nojima performances are simply incandescent

Respighi: *Church Windows* Keith Clark, Pacific Symphony Orchestra. This grandiose work, scored for full symphony orchestra, pipe organ and tam-tam, has at last been given its due, musically and sonically, in this celebrated recording.

Tafel Music: *Popular Masterworks of the Baroque.*

Pachelbel: *Canon & Gigue. Handel: suite from 'Water Music' Purcell: air from Suite no. 3 in D and Suite from 'The Moor's Revenge'. Vivaldi: Concerto op. 10-2, 'La Notte'*

Canada's finest original-instrument Baroque ensemble plays familiar favourites with outstanding scholarship and musical panache

Robert Farnon conducts the Royal Philharmonic Orchestra: Film music and other works *Suite from Captain Horatio Hornblower - Lake in the woods - Canadian impressions - 'A la Claire fontaine' and more* The Royal Philharmonic Orchestra, conducted by the composer, Robert Farnon at the Town hall, Watford.



Stravinsky: L'Histoire. Stravinsky: L'Histoire du soldat suite. Blackwood: Capriccio Espagnol. Chicago Pro Musica. Stravinsky's landmark composition for a mixed ensemble of seven. Grammy winning performances.

Marni Nixon: *Marni Nixon sings Gershwin Summertime - Let's call the whole thing off - Someone to watch over me - I've got a crush on you - But not for me - The real American folk song - Nice work if you can get it - Embraceable you.* Marni Nixon's impeccable intonation and diction bring a welcome elegance to these songs which are too often jazzed up.

Dick Hyam: *Dick Hyam Plays Fats Waller Ain't misbehavin' - Keepin' out of mischief now - African ripples - Honeysuckle rose - Willow tree - Stealin' apples - I've got a feeling I'm falling - Handful of keys - My fate is in your hands - Jitterbug waltz* The world's first direct-to-CD on RR-33DCD. A technological and musical triumph. RR-33DCD is available as a deluxe numbered limited edition

Encoded on the highly sophisticated, computerised Boesendorfer reproducing piano, Hyman's performances were played back for Prof Johnson's microphones, and the digitised signal was transmitted via microwave to the Compact Disc master as the music was being played. Also on ordinary CD and LP.

Eileen Farrell: *Torch Songs. Stormy weather - Round Midnight - The end of a love affair - Black coffee - When your lover has gone - Don't explain - Something Cool*

The album Farnell fans have been waiting for, America's great blues diva makes these songs of lost love her own.

Star of Wonder: *Silent night - Nativity carol - We three kings - We'll Dress the house - Come all ye faithful - Deck the hall*

Festive music for the holiday season by an outstanding professional chorus. The ideal audiophile Christmas present.

Berlioz: Fantastique. Symphonie Fantastique. Varujan Kojian, The Utah Symphony Orchestra.

This is widely considered to be the recording of this magical work. The Utah Symphony Orchestra, playing in Salt Lake City's Symphonie Hall, give a world class performance.

Opus 3 test record 1: Depth of image. Produced with the idea of analysing hi-fi systems and their ability to reproduce depth of image.

Eileen Farrell: Rogers & Hart. *I could write a book - I wish I were in love again - Wait till I see him - I didn't know what time it was - Love me tonight - Nobody's heart - and more* A wide ranging survey including many great standards and a few rarities. Farrell's affinity for the songs of this era is undisputed.

Opus 3 test record 2: Timbre. Timbre or tonal accuracy is a crucial area of performance for audio equipment, this disc is composed of tracks designed to show up the timbral strengths of the components it's played through.

Opus 3 test record 3: Dynamics. Carefully chosen extracts to illustrate what is meant by musical dynamics with comprehensive liner notes to show you what you should be listening for. How good is your hi-fi system?

Opus 3 test record 4: Depth of image, Timbre, Dynamics. Combining elements from all three discs to form a basis for completely evaluating audio equipment

Eileen Farrell: *Sings Johnny Mercer Skylark - I remember you - Early Autumn - Laura - I thought about you - T-and more.* Arranged by Manny Albam and Loonis McGlohan, this album includes rarities and favourites from the vast catalogue of America's most poetic and prolific lyricist.

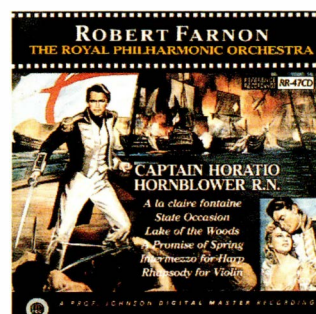
Jim Brock: *Tropic affair Pass a grill - Ladies of the Clabash - Tropic affair - Anya - Quo qui's groove and more.* Vibrant, steamy and sensual, this stunning contemporary instrumental jazz recording contains more than a touch of the tropics.

Eileen Farrell: It's over *I get the blues when it rains - How about me? - Easy to remember - Gone with the wind - I remember April* Arranged and conducted by Robert Farnon, this album gives Farrell the opportunity to demonstrate her considerable skills, in touching songs of lost love

Malcolm Arnold: *Conducts the London Philharmonic Orchestra. A Sussex overture - Bechus - Dandi Pratt - The smoke - Anniversary overture - The fair field - Flourish for orchestra - The Commonwealth Christmas overture.* On this very latest Reference recording the London Philharmonic Orchestra is conducted by the composer, Malcolm Arnold, at the Town hall, Watford. This Keith Johnson production includes first recordings of Britain's leading living composer's lesser known works.

Nojima: Nojima plays Liszt. *Sonata in B minor - Mephisto Waltz - La Campanella - Harmonies du Soir* The recipient of more rave reviews than any piano recording in recent memory, this is truly one for the history books

Chicago Pro Musica: Weill, Varese, Bowles and Martin. *Threepenny Opera suite - Octandre - Music for a farce - La Revue de Cuisine.* The Chicago Pro Musica gives brilliant performances of four magnificent 20th Century works. Kurt Weill's pungent suite for wind, brass and percussion is the centerpiece



Record and CD Price Table

Prof Johnson's Sound Show:

Ref RR-7 (LP only) (£18.50)

Berlioz: *Fantastique*

Ref RR-11 (double) (£24.99)

Ref RR-11CD (£13.99)

Tafel Musik: *Baroque*

Ref RR-13 (£18.50)

Ref RR-13CD (£13.99)

Respighi: *Church Windows*

Ref RR-15 (£18.50)

Ref RR-15CD (£13.99)

Stravinsky: *L'Histoire*

Ref RR-17 (£18.50)

Ref RR-17CD (£13.99)

Copland: *Apalacian Spring*

Ref RR-22 (£18.50)

Ref RR-22CD (£13.99)

Helicon Ensemble: *Vivaldi*

Ref RR-23 (£18.50)

Ref RR-23CD (£13.99)

Nojima Plays Liszt:

Ref RR-25 (£18.50)

Ref RR-25CD (£13.99)

Nojima Plays Ravel:

Ref RR-35 (£18.50)

Ref RR-35CD (£13.99)

Mike Garson: *Serendipity*

Ref RR-20 (£18.50)

Ref RR-20CD (£13.99)

Walker & Garson: *Reflections*

Ref RR-18 (LP only) (£18.50)

Marni Nixon: *Marni sings...*

Ref RR-19 (£18.50)

Ref RR-19CD (£13.99)

Star of wonder:

Ref RR-21 (£18.50)

Ref RR-21CD (£13.99)

Chicago Pro Musica: *Weill*

Ref RR-29 (£18.50)

Ref RR-29CD (£13.99)

Eileen Farrell: *Torch Songs*

Ref RR-34CD (£13.99)

Dick Hyams Plays Fats Waller:

Ref RR-33 (£18.50)

Ref RR-33CD (£13.99)

Ref RR-33DCD (£27.99)

Opus 3 test record 1

Ref OP-7900CD (£17.99)

Ref OP-7900LP (£17.99)

Opus 3 test record 2

Ref OP-8000LP (LP only) (£17.99)

Opus 3 test record 3

Ref OP-8300CD (£17.99)

Ref OP-8300LP (£17.99)

Opus 3 test record 4

Ref OP-9200CD (£17.99)

Ref OP-9200LP (£17.99)

Thelma Houston: *Music in me*

Ref CD-2 (£13.99)

Eileen Farrell: *Sings Rogers & Hart*

Ref RR-30 (£18.50)

Ref RR-30CD (£13.99)

Jim Brock: *Tropic Affair*

Ref RR-31 (£18.50)

Ref RR-31CD (£13.99)

Eileen Farrell: *Sings Johnny Mercer*

Ref RR-44CD (£13.99)

Eileen Farrell: *It's Over*

Ref RR-46CD (£13.99)

Malcolm Arnold/RPO:

Ref RR-48 (£18.50)

Ref RR-48CD (£13.99)

Robert Farnon/RPO

Ref RR-47 (£18.50)

Ref RR-47CD (£13.99)

William Walton: *Facade Suite*

Ref RR-16 (£18.50)

Ref RR-16CD (£13.99)

Reference Jazz Sampler

Ref RR-S2CD (CD only) (£10.99)

Reference Classical Sampler

Ref RR-S1CD (CD only) (£10.99)

Choice Offers Order Form

Accessories

Please indicate which items you require by ticking the appropriate box.

<input type="checkbox"/> JE8A	Mk 10 Carbon Fibre Brush with Velvet Pad	£9.99
<input type="checkbox"/> JE9A	System Hi-Fi Cleaning Kit 1	£15.99
<input type="checkbox"/> JE13A	Goldring Magic Record Cleaner	£11.95
<input type="checkbox"/> JE14A	The Purifier	£16.90
<input type="checkbox"/> JE15A	Anti-Static Record Sleeves	£6.99
<input type="checkbox"/> JE16A	Milty Work Mat	£7.99
<input type="checkbox"/> JE17A	Kontak Cleaning Solution	£19.90
<input type="checkbox"/> JE18A	Newnes Audio and Hi-fi Engineer's pocket book	£10.95
<input type="checkbox"/> JE19A	The Art of Digital Audio	£49.50
<input type="checkbox"/> JE20A	Technics Auto CD cleaner	£39.95
<input type="checkbox"/> JE21A	Audio Technica CD lens cleaner	£16.95
<input type="checkbox"/> JE24A	Gold plated 4mm banana plugs	£7.95
<input type="checkbox"/> JE25A	Last SF-100 extra strength record cleaner	£19.95
<input type="checkbox"/> JE26A	Last SF-200 record preservative	£21.95
<input type="checkbox"/> JE27A	Last SF-300 record cleaner	£15.95
<input type="checkbox"/> JE29A	Last SF-600 CD clean and protect	£17.95
<input type="checkbox"/> JE30A	Last cleaner only	£13.95
<input type="checkbox"/> JE31A	Trial pack, SF-100 and 200 (full size)	£34.95
<input type="checkbox"/> JE32A	Trial pack, SF-100, 200 and 300	£21.95
<input type="checkbox"/> JE33A	CD jewel case (five pack)	£5.00

Furukawa Price Table

Please circle the cables you require.

Interconnects - RCA to RCA

FV1010 (each)

FD1010 (pair)

Fibre optics - TOSLINK

FO1110 (each)

	0.5m	1.0m	1.5m	2.0m
FV1010 (each)	50.00	55.00	57.50	60.00
FD1010 (pair)	85.00	92.50	97.50	NA
FO1110 (each)	NA	45.00	50.00	NA

Speaker cables

Please state termination required, solderless, gold plated banana plugs, spades or pins or any combination. All prices are per pair.

	2.0m	2.5m	3.0m	3.5m	4.0m	4.5m	5.0m
FS2T14	52.00	57.75	63.50	69.25	75.00	80.75	86.50
FS2T20P	65.00	74.00	83.00	92.00	101.00	110.00	119.00
FS2T35P	95.00	111.50	128.00	144.50	161.00	177.50	194.00

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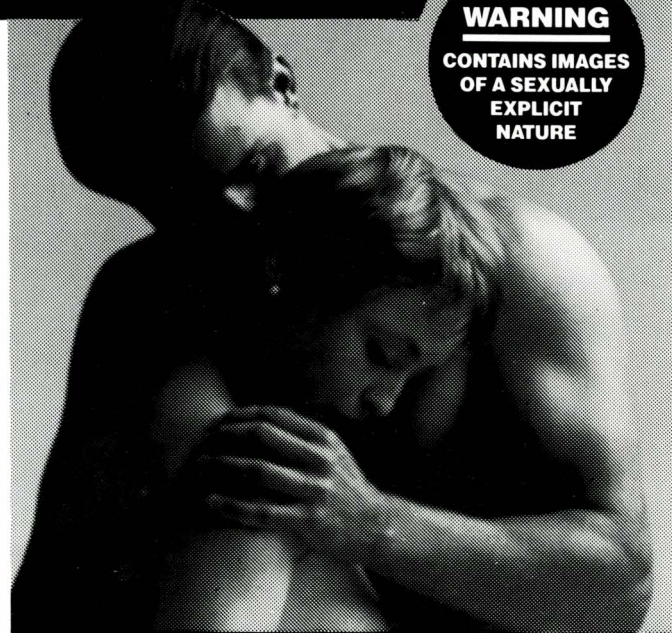
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AUDIO EXCELLENCE, 65 Park Street, Bristol. (0272) 264975. Great hi-fi carefully selected and demonstrated by friendly enthusiastic staff. Closed Mon. **BADA**
PAUL GREEN HI-FI LTD, Kensington Showrooms, London Road, Bath. (0225) 316197. Linn, Musical Fidelity, Krell, A&R, Creek, Rogers, Quad, Cust. car park. Best selection in the West.
V' AUDIO, 36 Druid Hill, Stoke Bishop, Bristol B59 1EJ. (0272) 686005 ATC, Acoustic Energy, Audio Alchemy, Boulder, Impulse, Micromega, Sound Pipes, SME, Ruark, AVI, Exposure, Dahlquist, Threshold, Pink Triangle, Wadia. Demos by appt only, home trial facilities, free installation, service facilities.

BERKSHIRE

B&B HI-FI, 11-12 Market Place, Reading, Berkshire, RG1 2EG. (0734) 583730. Aiwa, Denon, Kenwood, Mission, NAD, Panasonic, Pioneer, Rotel, Sony, Technics. Free installation, Service dept. Access, Visa, Credit Facilities including interest free credit subject to status. 9.30-5.30, Sat 9-5.30. Also at: Bracknell, Maidenhead, High Wycombe, Newbury
READING HI-FI CENTRE, 4 Queen's Walk, Reading RG1 7DF. (0734) 585463. 'The best equipment, advice and service from Berkshire's premier Hi-Fiemporium' **BADA**

BUCKINGHAMSHIRE

AUDIO INSIGHT LTD, 53 Wolverton Rd, Stony Stratford, Milton Keynes. (0908) 561551. Arcam, Audiolab, Heybrook, Ion, Linn, Meridian, Quad and more. Access, Visa, Finance, Dem. Room etc.
AYLESBURY HI-FI, 6B Cambridge Street, Aylesbury, Bucks, HP20 1BE. Tel 0926 28790. Arcam, Celestion, Denon, Exposure, Heybrook, Marantz, Micromega, Rogers, Rotel, Ruark. 2 Single Speaker Demo Room. Interest Free Credit. Lombard, Access and Visa. Open 10-6 Mon-Fri (10-30-5.30 Sat.
DEJAC HI-FI CONSULTANTS, 21 The Broadway, Old Amersham, Bucks, HP7 0HL. Tel 0494 433173
AMC, Arcam, Bose, Meridian, Quad, Rotel, Denon, NAD, Tannoy, Mission, TDL 2 Dem Rooms. Appts Necess Free Installation. Tricity Finance, Instant Credit, Open 9.30-5.30pm including Sat.
D.L. CHITTENDEN LIMITED, 59-61 The Broadway, Chesham, Bucks, HP5 1BX. (Opposite Boots), Philips, Aiwa, Denon, Kenwood, Canon Audio, Koss, Wharfedale, Nicaam, TV & Video, Surround Sound, AV Systems. Showroom Demonstrations from expert and friendly staff. No appts nec. Service Department. Credit facilities available. Open 8.30 to 17.30 Mon-Sat.
TECHNOSOUND, 7 Granville Square, Willen Centre, Milton Keynes. (0908) 604949. Bang & Olufsen, Denon, Rotel, Technics, Yamaha and enthusiast Hi-Fi. Also at Luton and Dunstable.

CAMBRIDGESHIRE

AUDIO FILE, 2 Foundry Walk, Market Hill, St. Ives, Cambridgeshire. (0480) 66123. Naim, Rega, Quad, Yamaha, Mission, Arcsm, Denon, Audio Lab, Meredon, JPW. Musical Fidelity. 9.30am-6pm 6 days. 0% Credit. **BADA**
HI-FI COMPANY, 42 Cowgate, Peterborough, Cambs. PE1 1NA. (0733) 341755. Pioneer, Technics, Yamaha, Rotel, NAD, Denon, Arcam, Audiolab, Mission, Kef. No appts necessary, home trial facilities, free install (if necessary), service dept. Access, Visa, Amex, Switch. Open 6 days 10-5.30.
STEVE BOXSHALL AUDIO, 41 Victoria Rd, Cambridge CB4 3BW. (0223) 68305. 10-6 - 6 days. 3 dem rooms, home trial, appts. preferred. Free installation and service dept. Access, Visa & credit. **BADA**
UNIVERSITY AUDIO, 1-2 Peas Hill, Cambridge. (0223) 354237. Roksan, Quads, Meridian, Arcam, Musical Fidelity, Marantz, ATC, Pioneer, Yamaha, Infinity. 2 dems, 1 single speaker. Home trial, free install, Service Dept. Visa, Access, Amex, Credit. 9-5.30

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ASTON AUDIO, 4 West St, Alderley Edge. (0625) 582704. Wide range of specialist audio, interest free credit. Visa, Access. Home trial. **BADA**
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CONGLETON HI-FI, 1/1a Duke St, Congleton, Cheshire, CW12 1AP. (0260) 297544. Arcam, Linn, Naim Audio, Nakamichi, Epos, Audio Innovations, Voyd, Royd, Neat Peite, B&W, NAD, Rational Audio. Superbly appointed single speaker demo facilities. No appts nec, home trial facilities, free installation. 2 year guarantee on all equipment. Access, Visa. Mon-Fri 10-6, Sat 9.30-5.30, Other times by appt.
PETERS HI-FI, 4 St Michaels Sq, Grosvenor Precinct, Chester. (0244) 322063/319392. Arcam, Technics, Sony, Marantz, Dual, Denon, Tannoy, Wharfedale, Quad. 2 Single speaker Dem rooms, no appts nec, free installation service dept. Access, Visa, Amex. Peters credit chargecard. Mon-Sat 9-5.30
PETER MARTIN HI-FI, 4 Duke St, Congleton (0260 273206), 1 Stanley St, Leek (0533 383780), Celestion, Creek, Musical Fidelity, Pink Triangle, Rotel, Ruark, Sony, Systemdek, Tannoy, Teac, Technics. 2 Demo Rooms. No appts nec, Home trial, Free install, Service Dept.. Access, Visa, Combar Tricity. Open 4-5.30, 6 days a week.
SWIFT OF WILMSLOW, 4-8 St Annes Parade, Wilmslow. (0625) 526213. Aura, B&W, Denon, Kenwood, Marantz, NAD, Pioneer, Rotel, Tannoy, Revolver, JPW. Open 9.30am-6.00pm 2 dem rooms. No pressure! **BADA**

CLEVELAND

ACTION ACOUSTICS, 155-157 High Street, Redcar, Cleveland TS10 3AN. 0642 480723. Audio Innovations, Cambridge, Harman-Kardon, JBL, Michell, Musical Fidelity, Pink Triangle, Revox, Rogers, Thorens, etc. Dem Room. Appts nec. Home trial facilities, free installation, service dept. Access, Visa & H.P. Open 9.15-5.30.
GILSON AUDIO LTD, 172 Borough Road, Middlesbrough. (0642) 248793. Linn, Exposure, Arcam, Mission, Cyrus, Denon, Marantz, Rotel, Pioneer, Audiolab, Tannoy. Demonstration facilities in main shop and 1 dem. room, appt nec, home trial facilities, free install. on request, service department. Access, Visa, HP. 10-5 - 6 days.

CORNWALL

ART OF MUSIC, Near Launceston, Cornwall. (0566) 86649. Cary, Cogan Hall, Convergent Audio Technology, Diamond Acoustics, Lumley Reference, Metaxas, Magnium Dynalab, R.E.L., Silver Sounds, Transfiguration. Dem studio appointments necessary, home trial facilities, & free installation. Open 7 days.
DEFINITIVE AUDIO, Cornwall, Near St Austell, PL26 6R7 (0726) 844039. For Audio Components/Systems which actually work! Impulse, Micromega, Perception, Audio Innovations, Audio Note, Voyd, Systemdek, JPW, Silver Custom Design, D.N.M. Demonstration by appointment only. Demonstrations throughout Cornwall, Free Installation. Service Facilities.

CUMBRIA

MISONS SOUND & VISION, 11 Warwick Road, Carlisle CA1 1DH. Tel (0228) 22620. Bang & Olufsen, Arcam, Quad, NAD, Yamaha, Sony. Demo Suite, No appts nec, Home trial facilities, Free installation, Service Department. 9-5.30 Mon-Fri. Thurs 9-1. Sat 9-5
PETER TYSON, 6 Abbey St, Carlisle, Cumbria, CA3 8TX. "Cumbria's premiere hi-fi centre". Part exchange welcome. (0228) 46756. Linn, Musical Fidelity, Cyrus, Marantz, Denon, Philips, Nakamichi, Technics, Pioneer, Creek & more. Dem room. Demos without obligation. Home trial, Free install. In-house service dept. Access & Visa. HP 9-5.30pm.

DEVONSHIRE

CHELSTON HI-FI, 38 Walnut Road, Chelston, Torquay, Devon TQ2 6HS. Tel: (0803) 606863. Denon, Marantz, Rotel, Musical Fidelity, Acoustic Energy, NAD, Castle, Heybrook, Celestion, JPW etc. 2 dem rooms. Home trial. Free installation. Access, Visa, Amex, Diners, Hi-Fi Markets Chargecard. Credit facilities. 9.30-7.30 Mon-Fri, 9.30-6 Sat.
THE HI-FI ATTIC, 58 New George St, Plymouth, Devon PL1 1PJ. (0752) 669511. One of the South West's oldest hi-fi shops. We stock all leading manufacturers & if out of the ordinary, we'll get it for you. We are about to be completely re-furnished to give a large demo room with free coffee! (& whiskey to console the big spenders!) We have a genuine interest in hi-fi & believe the customer always comes first. Single speaker comparators & a (hopefully) relaxed atmosphere. Bring your own equipment/dics etc. along to have a listen. We have been completely re-furnished to give a large demo room with free coffee. Home demonstrations & installations & interest free credit over £700. Open 9.30-5.30 & demos can be by appt.
STUDIO ACOUSTICS. (0626) 67060. OCM Technology, Shahinian Acoustics, Superplan amplifiers, Nobis loudspeakers & amplifiers, Mirror Image Audio, J.A. Michell, plus other fine equipment. home trial, free install, in-house service dept. Mon-Fri 9-4.30, appointments only.

DORSET

SUTTONS HI-FI, 18 Westover Road, Bournemouth. 0202 555512. Linn, Arcam, Mission, Quad, Audiolab, Rotel, Yamaha, Denon, etc. 2 Single Speaker Listening Rooms, Home Demonstrations, Free Installations. Mon-Sat 9-5.30. Call for details. **BADA**

ESSEX

AUDIO T, Gants Hill, 442-444 Cranbrook Rd, Gants Hill, Ilford, Essex
1G2 6LL. Tel: 081 518 0915 Fax 081 554 8463. Arcam, Audiolab, Cyrus, Denon, Kef, Meridian, Rotel, Micromega, Yamaha & many more. Tues-Sat 10-6. 3 yr gntee on Hi-Fi. Free del & instal. 30 day upgrade scheme. Home dems. PX. 2 dem rooms 2 single spker dem rooms. **BADA**
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BRENTWOOD MUSIC & HI-FI CENTRE, 2 Ingrave Rd, Brentwood. (0277) 221210. Alphason, Denon, Marantz, Quad, DNM, Rock/Glastonbury, E.A.R., Exposure, Kelvin Labs, Rotel, plus many more. Dem facilities, home trial, evening appts, (high end). Home installations. System problem diagnosis. Mon-Sat 9.30-5.30 (Thurs from 10am, Sat from 9am). Credit facilities, Access, Visa, Hi-Fi Markets Chargecard. Service facilities.
LYON AUDIO, 16 Peartree Business Centre, Peartree Road, Stanway, Colchester, Essex CO3 5JN. (0206) 560259. Mission, Cyrus, Arcam, Denon, Rotel, JPW, KEF, Rogers, Quad. Dem facilities. Mon-Sat 9-6. Installations. Access, Visa, Instant credit. Service dept
RAYLEIGH HI-FI, 44a High Street, Rayleigh, Essex. (0268) 779762/747571. 216 Moulsham St, On-the-Parkway, Chelmsford. (0245) 265245. 132-134 London Road, Southend-on-Sea. (0702) 435255. A&R, Creek, Cyrus, Denon, Epos, Ion, Linn, Mission, Naim, Quad, Rega, Roksan, Rotel, Royd. 0% finance. **BADA**
THOMSONS, 2 High Street, Great Baddow, Chelmsford, Essex. Tel: (0245) 71465, Fax 0245 77528. JVC, Kenwood, Mitsubishi, Toshiba, Tannoy, Mordaunt-Short, Wharfedale, Philips, Audio-Visual dealer. Home trial. Free installation. Service dept. Access, Visa, HP. Open 9-1, 25.30 Mon-Sat. Open 9-1 Wed.

GLOUCESTERSHIRE

AUDIO EXCELLENCE, 58 Bristol Road, Gloucester. (0452) 300046. Great Hi-Fi carefully selected and demonstrated by friendly and enthusiastic staff. Closed Mon. **BADA**
AUDIO T, 40-42 Albion St, Cheltenham, Glos. GL52 2RQ. (0242) 583960. Fax (0242) 226435. Great hi-fi from Arcam, Audiolab, Cyrus, Denon, Linn, Meridian, Mission, Rogers, Rotel, Yamaha and many more. Mon-Fri 10-6pm. Sat 9.30-5.30. 3 yr gntee on Hi-Fi. 30 day upgrade scheme. Home dems. PX. Single speaker dem room Free del. and instal **BADA**
HUTCHINSONS, 295-297 High Str, Cheltenham, Glos. GL50 3HL. (0242) 573012. Pioneer reference point, Technics, Dual, NAD, JWharfedale, Celestion, Marantz, Aiwa, Kenwood, Sennheiser. No appts necessary, free install, service dept. Instant credit up to £1000. Open Mon-Sat 9.15-5.30.
RLEWIS & CO LTD, 45 High Str, Stroud, Gloucestershire GL5 1AW. (0453) 762485/9. Bang & Olufsen, Denon, Dual, Mission, Mordaunt-Short, Pioneer, Sony, Technics, Yamaha, Celestion etc. In store dems, free install, service dept. Access, visa. Open 8.30-5pm 6 days.

HAMPSHIRE

AUDI O T, 4 Feathers Lane, Basingstoke, Hants. RG21 1AS. (0256) 24311, Fax (0256) 24430. Great hi-fi from Linn, arcam, Audiolab, Cyrus, Denon, Linn, Meridian, Mission, Rotel, Yamaha and many more. Mon-Sat 9.30-5.30pm. 3 yr gntee on Hi-Fi. Free del & instal. 30 day upgrade scheme. Home dems. PX. Single speaker dem room. Free del. and instal. **BADA**

HAMILTON ELECTRONICS, 35 London Rd, Southampton, Tel: 0703 228622/3 Fax: 0703 332141. Hi-Fi and Surrounded Sound and theatre Specialists. Harman Kardon, Marantz, Denon, QED, Tannoy, Celestion, Thorens, B&O, Boston, Quad, Aiwa, Technics, JBL, Heco. Studio Demonstration. No appts nec, Free Install, Full service and installation facilities. Open 9-5:15pm Mon-Sat.
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**
JEFFERIES HI-FI (Portsmouth) 29 London Road, Portsmouth PO2 0BH
Tel: 0705 663604. 2 Dem Rooms, closed Mondays. Late night Wed. Free Parking Bus route. Credit facilities. **BADA**
TRU-FI SOUND & VISION, 10-12 Grosvenor Road, Aldershot, Hants. Tel/Fax: (0252) 26390/332424. Aiwa, Audio Technica, B&W, Nakamichi, Mission, Mordaunt-Short, Nagaoka, Sony, Technics. Dem fac. Free install. Service dept. 0% finance. Access, Visa. Mon-Sat 9.30-6.

HEREFORDSHIRE

ENGLISH AUDIO, 95 Whitecross Road, Hereford HR4 0DG. (0432) 355081. Musical Fidelity, Arcam, Pink Triangle, Denon, Marantz, Mission-Cyrus, Tannoy, Rotel, NAD, Nakamichi, TDL, and others. Single Speaker Dem room. Home trial. Free install. Service dept. Access, Visa, Credit arranged. Open Mon-Sat 10am-6pm.
GOSPEL MUSIC AUDIO, 32A High St Kingston, Herefordshire. (0544) 230254. New Shop open: Castle Video, 1 Spa Centre, Station Crescent, Llandrindod Wells (0587 824 0200) Alphason, Alison, Revolver, Luxman, Yamaha, QED, Audio Systemline, Wharfedale, Jamo, Micromega. No appts nec., home trial facilities, service dept. -5.30 + evening dems.

HERTFORDSHIRE

ACOUSTIC ARTS LTD, 101 St Albans Rd, Watford, Herts. (0923) 245250. Fax (0923) 230798 Absolute Sounds, Acoustic Energy, Audiolab, Denon, Marantz, Meridian, Quad, Ref Imports, TDL., Teak, Tues-Sat 9.30-6.00. **BADA**
RADLETT AUDIO, 141 Watling Street, Radlett, Hertfordshire, WD7 7NQ. (0923) 856497. Mark

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Levinson, Proceed, PRO AC, Magnepan, Martin Logan, Tube Technology, Teac, Roksan, Audioblab, Rotel. Home trial facilities, Free Install, Service Dept. Visa, Access 9-5:30 Mon-Fri 10-5:30 Sat
STUDIO 99, 82 High Street, Harpenden. ((0582) 764 246. Linn, Naim, Meridian, Rega, Nakamichi, Mission/Cyrus, Quad, Creek, KEF, Bang & Olufsen, Yamaha etc. Quiet single speaker dem room. Appts nec. Home trial, free install. Service Dept. Visa/c, Access/c & finance terms. 9-5:30pm (Mon-Sat). Closed Weds.

BADA

NORTH HUMBERSIDE

JUST AUDIO, 2A Foston Lane, North Frodingham, Driffield. Tel 0262 488700, call for details.
SUPERFI, 4 Dock Str, Queens Gardens Hull, HU1 3DL. (0482) 24051. See main entry under Nottinghamshire for full details.

KENT

CANTERBURY HI-FI, 50 Burgate, Canterbury, Kent, (0227) 765 315 B&W, Denon, Kenwood, Cerwin-Vega, Yamaha, Technica, Rogers, Musical Fidelity, Sony, NAD. No appointments necessary. Free Installation Service Dept. Access and Visa Mon-Sat 9-5:30

JOHN MARLEY HI-FI CENTRES, 2 Station Rd, West Canterbury. (0227) 769329. Also at Dover - (0304) 207562. Arcam, B&W, Heybrook, Infinity, JPW, Pro-Ac, Pioneer, Rotel, Tannoy, Technics. Dem and home trail fac. Mon-Sat 9-5:30 closed Thurs. Free install. Credit to £1,000. Access, Visa, Credit charge. Service dept

KIMBERLEY HI-FI, 193 Broadway, Bexleyheath, Kent. (081) 304 3272. Pioneer, Technics, Kenwood, Denon, NAD, Aiwa, Tannoy, Mission, Wharfedale, B&W Separate dem room, no appt nec. Free installation. Service Dept. Instant credit facilities. 9-30-5:30. No early closing.

PANATEC SOUND & VISION CENTRE, 83b High Str, Gillingham. (0634) 5731141 B&W, Bose, Dual, Kenwood, Marantz, Pioneer, Philips, Sony, Tannoy, Technics. Dem room facilities. 0% credit, Service Dept. Free Installation. Pioneer Reference Point Dealer.
PANATEC SOUND & VISION, 17 Week Str, Maidstone. (0622) 661 488. See above for details.

SOUNDCRAFT HI-FI, 40 High St, Ashford (0233) 624441. No.1 in Kent for Linn, Naim, Rega, Roksan, Exposure, Onix, Epos, Royd, Creek. But before you choose equipment choose where to buy it. Dem room, appts necessary. Home trial and free installation. Visa, Access, Bada Chargecard. 9-5:30 Mon-Fri (Wed & Sat to 5 only). Service Dept.

BADA

VOLUME ONE, 41 Upper Wickham Lane, Welling, DA16 3AD. 081 304 4622. Arcam, Dual, Epos, Exposure, Mordaunt Short, Monitor Audio, JPW, Marantz, Micromega, Nakamichi, Pink Triangle, Rotel, Royd, Ruark, Sony, Systemdek. Large dem room, no appt nec. Evening dems in shop by appt. Home trial & demo, free delivery & installation. Access & Visa, 10.00-6.00 Mon-Sat.

V J HI-FI, 29 Guildhall St, Folkestone. (0303) 56860. Mon-Sat 9-6. NAD, Yamaha, Marantz, Sony, Tannoy, Denon, Kenwood, Rogers, Musical Fidelity, Quad, Dem and home trial facilities, free install, credit to £1000. Amex, Diners, Visa, Access. Service Dept.
V J HI-FI, 119 High Street Margate. (0843) 226977. For full details see our above entry.

LANCASHIRE

NORMAN AUDIO, 131 Friargate, Preston, Lancs, PR1 2EE. Tel 0772 53057. Fax 0772 562731. Marantz, Pioneer, Yamaha, Audioblab, Arcam, Mission, Cyrus, B&W, KEF, Sendor Catalogue. Home Cinema Dem room plus audiophile dem room plus three sales areas. No appt nec, Home trial facilities, free installation, service department. Instant credit subject to status. Open 9.30-5.30, late night Wed till 8.00pm.

BADA

ROMERS HI-FI CENTRE, 94-96 High Street, Rishton, Blackburn, Lancs, BB1 4LQ. Tel: 0254 887799 Musical Fidelity, Technics, Pioneer, Marantz, Revox, Tannoy, Celestion, Sony, Panasonic, Mission. Single Speaker Dem Room, Also wired for pro logic. No appts

nec. Home trial fac by arrangement. Free Install, Service Dept. Access, Visa, Switch, Interest free on selected products. Open 9-5:30 Wed 9-1:00

LEICESTERSHIRE

MAYS HI-FI, 27/33 Churchgate, Leicester. LE1 3AL. (0533) 625625. Sony, Technics, Denon, Kenwood, Pioneer (Reference Point) Philips, B&W, Tannoy, Mission/Cyrus, Dual, Listening room, free install, service dept. Full range of credit facilities. Open Mon-Sat 9-5:30 Thurs 9-1:30

LEICESTER HI-FI CO, 6 Silver Walk, St Martins Square, Leicester LE1 5EW. Tel: (0533) 539753. Fax (0533) 626097. Acoustic Energy, Arcam, Marantz, Micromega, Mission/Cyrus, Musical Fidelity, Nakamichi. Meridian, Rogers, Roksan, "and oodles more". 2 Dem rooms, home trial arranged, free install, service dept, Credit facilities, Access, Visa, Diners, Amex, 6 days 9.30-5.30. Bada Member

BADA

LISTEN INN, 6 Hotel Street, Leicester. (0533) 623754 (Fax) 0533 623758. Linn, Arcam, Royd, Heybrook, Creek, Neat, Mission, Cyrus, Audioblab, Quad, Denon, etc. 2 Dem Rooms.

BADA

SOUND ADVICE, The Factory, Duke St, Loughborough LE11 1ED. (0509) 218254. Shahinian, Rega, Naim, Linn, Royd, Yamaha, Rotel, Arcam, Nakamichi, JPW. 3 demonstration areas, no appts necessary, free installation, service department. Lombard credit charge, Access, Visa. Mon-Fri 9.30-6.00, Sat 9.30-5.30.

STEREO SHACK, 1-3 Guildhall Lane, Leicester. Tel 0533 530330. Aiwa, A.R., Denon, Kenwood, Jamo, Mission, NAD, Philips, Pioneer, Rotel, A/V Speciality. Free Install Open 9.30 - 5.30 6 days. Credit available

LINCOLNSHIRE

BOSTON HI-FI CENTRE, 65a Wide Bargate, John Adams Way, Boston, Lincs PE21 6SG. (0205) 365477. Quad, Nakamichi, Arcam, Marantz, NAD, Castle, JPW, Rogers, etc. Separate demo studio. Home trial. Free installation. Access, Visa. Tues - Sat 9-5 pm.

BADA

STAMFORD HI-FI CENTRE, 9 Red Lion Square, Stamford, Lincs PE9 2AJ. (0780) 62128. Pioneer, Technics, Cyrus-Mission, Rotel, NAD, Yamaha, Kenwood, Marantz, Quad, plus all major speaker manufacturers. Expert advice, comparator demonstrations, on two floors, part exchange HI-FI purchased for cash. No appointments necessary, home trial facilities, free installation, service department. Mastercard, Visa & credit charge, finance available. Mon-Sat 9-5.30pm, closed Thursdays.
SUPERFI, 271A High Str, Lincoln LN2 1JG. (0522) 520265. See main entry under Nottinghamshire for full details.

LONDON

ANALOG AUDIO, 849 High Road, London N12. (081) 445 3267. Cambridge, Denon, Rotel, Yamaha, Marantz, Wharfedale, Teac, Mordaunt-Short, Cerwin Vega, Nad. Free install. Service dept. Instant credit up to £1000. Visa & Access. 9.30-6.6 days.

AUDIO T, 190 West End Lane, West Hampstead, London NW6 1SQ

(071) 794 7848, Fax (071) 431 3570. Great hi-fi from Linn, Arcam, Audioblab, Cyrus, Denon, Meridian, Mission, Philips, Rotel, Proac, Micromega, Yamaha, and many more. Tue-Sat 10-6pm. 3yr gntee on Hi-Fi. Free del & instal. 30 day upgrade scheme. Home dems. PX. 2 dem rooms. AV Dept.

BADA

BILLY VEE SOUND SYSTEMS, 248 Lee High Road, London SE13. (081) 318 5755. Arcam, Linn, Naim, Quad, etc. 2 dem rooms. Int. free credit. Access, Visa. Closed Thurs.

BADA

CORNFLAKE SHOP, 37 Windmill St (just off Tottenham Court Rd), London W1. (071) 631 0472 (domestic). (071) 323 4554 (multiroom). Fax. (071) 323 4554 Fax. (071) 4367165. Tues-Sat 10-7 Rega, Roksan, Naim, Monitor Audio, Arcam, Nakamichi, Rotel, Epos etc. 3 dem rooms. (incl. home cinema) Friendly, professional service. Home trial facilities. Appointments preferred. Full delivery and repair service. Multiroom specialists. Access & Visa.

COVENT GARDEN RECORDS, 84 Charing Cross Road,

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DOUG BRADY HI-FI, 14-18 Monmouth St. London WC2H 9HB. (071) 379 4010. Wide range of top specialist hi-fi from Britain, America and Japan. 3 dem rooms. Closed Monday.

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GRAHAMS HI-FI, Canonbury Yard, 190a New North Rd, London N1 7BS. (071) 226 5500. Winner Sony/HFN Greater London Dealer Award 1986-1989-1990. Linn, Naim, Rega, etc. £400-£3000-£13,000. Open Tues-Sat

BADA

HI-FI COMPONENTS, 84 Battersea Rise, London, SW11 1EH. Tel: 071 2231 110. Tannoy, Kenwood, Rotel, NAD, QED & Wharfedale, Dual, Shure, Ortofon, Celestion. Appts nec, Service Dept. Access, Visa, Diners, Amex, Open 10-6 Closed Wed.

KJ WEST ONE, 26 New Cavendish St, London W1M 7LH. (071) 486 8262/63. Fax (071) 487 3452. Arcam, Audio Alchemy, Audio Lab, Audio Research, Croft, Deltec, Epos, Marantz, Meridian, Mission, Musical Fidelity, Pink Triangle, Roksan. Appts nec. Home trial. Free installation. Service dept. Major credit cards. Mon-Sat 10-6pm. (Late night Thur til 7pm).

MUSICAL IMAGES LTD. See under Middlesex & full page advert in the Product Directory.

MYERS AUDIO, 6-7 Central Parade, Hoe Street, Walthamstow, London, E17 4RT. Te (081) 520 72777 Fax 081 5036677.

SOUND ORGANISATION LONDON, 4 Pickfords Wharf, Clink Street, London, SE1 9DG. Tel 071 403 2255. Audio Research, Aura, Creek, Epos, Exposure, Heybrook, Koetsu, LFD, Lyra, Martin Logan, Micromega, Naim, Nakamichi, Rega, Rotel, Roksan, Royd, SME, Sonus Faber. Interesting new equipment always under evaluation. 2x single speaker listening rooms. Appts preferred. Free Installation. Service Department. Open Tues-Sat. 10-6. Late dem by appointment.

SOUND SENSE, 350 Edgware Road, London W2 1DX. (071) 402 2100. Alphason, B&W, Kenwood, Nakamichi, Celestion, Denon, Monitor Audio, Marantz, NVA, Sony ES, Yamaha. Appts preferred. Installations available. Access, Visa, Standard credit facilities. Mon-Sat 9.30-6.30.

STUDIO 99, 79-81 Fairfax Road, Swiss Cottage, London NW6. (071) 624 8855. Naim, Rega Quad, Meridian, Mission/Cyrus, AC, Nakamichi, KEF, Yamaha, Arcam, Epos, Acoustic Energy, Bang & Olufsen, etc. 2 single speaker dem rooms. Service dept. Visa/c, Access/c & finance terms. 10-7 Mon-Fri, 10-6 Sat.

BADA

SUPERFI, 2-4 Camden High Street, Camden, NW1 0JH (071) 388 1300. See main entry under Notts for full details.

UXBRIDGE AUDIO - CHISWICK, 109 Chiswick High Road, Chiswick, W4 2ED (081) 742 3444 Fax (081) 742 3295. 2 Demo Rooms, Installations, 2 Year Guarantee, 7 day exchange. Major credit cards, Tues - Sat 10 - 6. See Middx entry for brands stocked.

BADA

VOLUME ONE, 41 Upper Wickham Lane, Welling. (081) 304 4622. For full details see entry under Kent.
ZEBRA, 18-24 Brighton Road, South Croydon CR2 6AA. 081 688 2093. Audio Lab, Arcam, KEF Reference, Marantz, Mission, Micromega, Pioneer, Rotel, Sony, Tannoy, and large range of AV equipment. S2 Air Conditioned Demo Rooms. in a more casual environment. Service department. Mon-Sat 9.30-6.00. Access, Visa & instant credit up to £1000 subject to status.

GREATER MANCHESTER

CENTRAL RADIO, 30-32 Shudehill, Manchester M4 1EY. Tel 061 834 67600. JBL, Mission, B&W, Wharfedale, Aiwa, Teac, Harman Kardon, Dual, Thorens, Pioneer. Service Dept. Free installation. Access, Visa, Switch. Interest Free and standard. Credit available. Mon-Sat 9-5:30.

THE AUDIO COUNSEL, 12 Shaw Road, Oldham,

Manchester OL1 3LQ. (061) 6332602. Linn, Yamaha, Rega, Rotel, Arcam, Micromega, EPOS, Creek, Nakamichi, Denon. 2 dem rooms. Free install. Visa, Access, Licenced credit brokers up to £1000 instant credit. 10.00-5.30 Tues, Weds, Sat; 10.00-7 Thurs & Fri. Closed Mon.

MURRAY HI-FI, 19 Middle Hillgate, Stockport. (061) 429 7666. Linn, Naim, Rega, Arcam, Yamaha, Royd, Epos, Creek, Nakamichi, Rotel. Full demo facilities, free installation & delivery, service dept. Full 2yr guarantee on all products. Access, Visa, Lombard Tricity, licenced credit broker. 10-6 Tue-Sat
SWIFT OF WILMSLOW, 4-8 St Annes Parade, Wilmslow. (0625) 526213. Aura, B&W, Denon, Kenwood, Marantz, NAD, Pioneer, Rotel, Tannoy, Revolver, JPW. Open 9:30am-6:00pm 2 dem rooms. No pressure!

BADA

MIDDLESEX

AUDIO T, 159a Chase Side, Enfield, Middx EN2 0PW. (081) 367 3132, Fax (081) 367 1638. Great hi-fi from Arcam, Audioblab, Cyrus, Denon, Meridian, Micromega, Mission, Philips, Rotel, Yamaha and many more. Tue-Fri 10-6pm. Sat 9:30 - 5:30 3yr gntee on Hi-Fi. Free del & instal. 30 day upgrade scheme. Home dems. PX. 3 dem rooms. A/V Dept.

BADA

HARROW AUDIO, 27 Springfield Rd, Harrow. (081) 863 0938. Mon-Sat 9.30-5.30. A&R, Audioblab, Cyrus, Denon, Epos, Monitor Audio, Musical Fidelity, Nakamichi, Quad, Rotel, Tannoy, Thorens, Yamaha. etc.

BADA

MUSICAL IMAGES LTD. 173 Station Rd, Edgware (081) 952 5535, fax (081) 951 5864 and 45 High St, Hounslow. Tel (081) 569 5802, fax (081) 569 6353. Most brands available - see full page advert in Product Directory. Interest free credit available, ask for details. Demo Room, Repairs & Service, Mail Order facilities

RIVERSIDE HI-FI LTD, 422 Richmond Road, East Twickenham, Middlesex TW1 2EB. Tel. (081) 892 7613. Fax (081) 892 7749. A.R., Arcam, Audio Research, Creek, Dual, Denon, KEF, Luxman, Michell, Musical Fidelity, Micromega, Marantz, Nakamichi, Rotel, Spenhdor, Systemdek, Tannoy, Yamaha. One demo room, in-car demo for car hi-fi systems. Appts not always necessary. Home trial facilities. Free installation, service dept. Lombard Tricity, Access, visa, Amex, Diners Club. Mon-Sat 9.30-6, Thurs, Fri 9.30-7.

SIGHT N SOUND, The Treaty Centre, Hounslow, Middlesex TW3 1ES. 081 572 5418, fax 081 572 5417. Sony, Kenwood, Finlux, Toshiba, Philips, Sanyo, Grundig, Pioneer, Technics, Akai. No appts nec, free intal, service dept. Access & Visa, financing available. 9-6pm Mon-Sat.

MERSEYSIDE

W.A. BRADY & SON, 401 Smithdown Rd, Liverpool L15 3JJ. (051) 7336859. Largest choice of specialist Hi-Fi in N.W. £100-£20K+, All credit cards. 3 dem rooms. Closed Monday.

BADA

P & A AUDIO (BIRKDALE) LTD 31 Liverpool Road, Birkdale, Southport (0704) 68373. Arcam, Cambridge, Creek, Denon, Michell, Mission/Cyrus, Mordaunt-Short, NAD, Pink Triangle, QED, Revolver, Rogers, Rotel, Royd, Tannoy. 3 Single speaker demo rooms and Nicam surround sound dem room. Free delivery, installation (Merseyside) Service dept. Mon-Sat 9 - 5:30 Half day Tues, Access, Visa, Lombard.

PETERS HI-FI 11 Werburgh Sq, Grange Precinct, Berkenhead. (051) 647 5626. 9-5:30 closed Thurs. See Cheshire entry for full details.

PETERS HI-FI, 8 High Street, Bromburgh, Wirral. (051) 334 1874/2825. Open 9-5:30 6 days a week. See Cheshire entry for details.

WEST MIDLANDS

AMADAEUS SOUND & VISION, 10 Boldmere Road, Sutton Coldfield, West Midlands Tel (021) 354 2311. Arcam, Audio Innovations, B&O, Carver, Castle, QED,

The Choice Dealer Directory

Wharfedale, Yamaha, Cambridge Audio, Hafier. Single Speaker demo, appts preferred, service available, installations, B&O link install, home trials. Access, Visa, interest free credit available subject to status. 9.30-6pm 6 days.

FRANK HARVEY HI-FI EXCELLENCE, 163 Medieval Spon Street, Coventry. (0203) 525200. All major agencies. Free inst. Service dept. Part ex. 3 dem rooms. Mon-Sat 9.30-5.30. Wed til 8pm. **BADA**

GRIFFIN AUDIO LTD, 94 Bristol Street, Birmingham. (021) 692 1359/(021) 622 2230. Arcam, Castle, Cyrus, Denon, Linn, Marantz, Naim, Quad, Rega, Rotel Tues-Sat 10-6 **BADA**

MUSICAL APPROACH, 37 High Street, Aldridge, Walsall, W. Mids. (0922) 57926. Linn products, Arcam, Creek, NVA, Revolver, Onix, Epos, Marantz, Rotel, Quad & more. Dem facs. Home trial. Service dept. Credit facs available. Access, Visa. 9.30-5.30 Mon-Sat. 9.30-1 on Thurs.

MUSIC MATTERS, 351 Hagley Road, Edgbaston, Birmingham B17 8DL. (021) 429 2811. Roksan, Nakamichi, Arcam, Audiolab, Musical Fidelity, Mission/Cyrus, Meridian, KEF, Monitor Audio, Pink Triangle. 2 single speaker luxury demo rooms. Appts nec, home trial facilities, free installation, service dept. Access, Visa, instant credit up to £1000, interest free credit available. Tue-Thur 10.30-6, Fri 10.30-8, Sat 10-5.30.

NAAMHI-FI VISION, 122-123 New Street, Birmingham. (021) 633 4944. Pioneer, Akai, Aiwa, Panasonic, Yamaha, Toshiba, Hitachi, Bose, Wharfedale, Sony. Demo facilities available, appointments preferred. Access, Visa, 10 month interest free credit. Amex, Lombard Tricity Creditcharge. Mon-Sat 9-6.00.

NORFOLK

BASICALLY SOUND, The Old School, School Rd, Bracon Ash, Norwich NR14 8HE. (0508) 70829. Arcam, Linn, Naim, Denon, Spendor, Exposure, Audio Technica, Creek, Rega, Epos, etc. 2 comprehensive dem rooms. Home trial. Free installation. Visa, Access, HP facilities. Tues-Sat 9.30-1, 2-5.30.

MARTINS HI-FI, 5 High Street, Kings Lynn. (0553) 761683. Est. 1968. Making good vibrations for 20 years **BADA**

MARTINS HI-FI, 85/91 Ber Street, Norwich. (0603) 627010. Est. 1968. Making good vibrations for 20 years **BADA**

NORTHAMPTONSHIRE

AUDIO CRAFT 23-25 Derngate, Northampton, NN1 1TY. Tel: 0604 36291/Bang & Olufsen, Kenwood, Technics, Marantz, Celestion, Mordaunt-Short. No appts nec, Free Install, Service Dept. Open Mon-Sat 9-5:30pm

CLASSIC HI-FI + VIDEO, School Lane, Kettering, Northants. (0536) 515766. Rotel, Musical Fidelity, Wharfedale, Yamaha, JBL, Cyrus, Nad, Pioneer, Marantz, Kenwood, Kef, Celestion, and many more. Home trial, free instal., service dept. Access, Visa, credit facs. 9.30-5.30pm.

LISTEN INN, 32 Gold Street, Northampton. (0604) 37871 (Fax) (0604) 601430. Linn, Naim, Epos, Royd, Mission, Cyrus, Arcam, Audiolab, Neat, Creek, Quad, Denon etc. 2 Dem Rooms **BADA**

NOTTINGHAMSHIRE

CHANTRY AUDIO, Chantry Walk, 18a Eldon Street, Tuxford, Nr Newark, Notts NG22 0LH. (0777) 870372. Pink Triangle, Delttec, Rotel, SD Acoustics, Ruark, NVA, Michell, Ion Systems, Croft Acoustics, Kelvin Labs, and much more. 2 dem rooms. Home trial, free installation. Access, Visa & credit facilities and mail order. Mon-Fri 9.30-5:30pm Sat 9.30-5.30. Sun & evenings home dem by appt.

DEFINITIVE AUDIO, (0602) 813562. For a carefully considered approach to building a true hi-fidelity audio system with components derived from the following manufacturers; Audio Innovations, Snell, Wadia, Micromega, Delttec, Voyd, Systemdek, SME, Revox, Ortofon, Pioneer. Demos by appt. Please phone for further details. Installation free of charge. Mon-Sat 10-7pm, Closed Wed a.m.

NOTTINGHAM HI-FI CENTRE, 120-122 Alfreton Road, Nottingham. (0602) 786919. Over 25 years experience, superb demo rooms, extensive range, free parking. Mon-Sat 9-5.30. **BADA**

PETERELLIS AUDIO, 29 Kirkgate Newark, Nottingham, NG24 1AD (0636 704571) Quad, Castle, Arcam, QED, Sugden, Tannoy, Thorens, Marantz, Denon, Teac. Demo Room, Free Install, Service Department. Access, Visa, Mon-Sat 9-5:30 Close at 1:00pm on Thursday.

SUPERFI, 15 Market Str, Nottingham NG1 6HY. (0602) 412137. Kenwood, Technics, Denon, Aiwa, Rotel, Wharfedale, Mission, Marantz, NAD< Celestion, and many more. 2 single speaker dem rooms. Free install on systems, service dept. Access & Visa, Amex. Open 9-5.30, 6 days

OXFORDSHIRE

ASTLEY AUDIO LTD, 3 Market Place, Wallingford (0491) 39305/34349. Technics, Panasonic, Pioneer, Kenwood, Sony, Yamaha, Denon, Dual, Mission, Tannoy. Home trial, free installation. Service dept. Access, Visa, Amex, Diners. Instant credit. Tue-Fri 9-5.30, Sat 9-5. Records & CDs stocked.

AUDIO T, 19 Old High St, Headington, Oxford OX3 9HS. (0865) 65961, Fax (0865) 60415. Great hi-fi from Arcam, Audiolab, B&O, Cyrus, Denon, KEF, Meridian, Mission, Rotel, Sony, Yamaha and many more. Open Mon Fri 10-6pm, Sat 9.30-5.30. 3 yr gntee on Hi-Fi. Free del & instal. 30 day upgrade scheme. Home dems. PX. 2 dem rooms. A/V Dept OXFORD AUDIO CONSULTANTS LTD, Cantay Hse, Park End Street, Oxford OX1 1JE. (0865) 790879 fax (0865) 791665. NAD, Rotel, Musical Fidelity, Pioneer, Marantz, Rogers, TDL, Thorens, Audio Research, Proceed. 2 Demo rooms. Service Dept, Home trial and free installation. Instant credit, Access, Amex, Visa. 10-6 Mon-Sat.

WESTWOOD AND MASON, 46 George Street, Oxford Tel: 0865 247783 Arcam, Rotel, Rega, Epos, Tanoy, Royd, JPW, Mission, Nakamichi, Denon, Aiwa, Naim, Quad, Aura, Teac. Open 9:30-5:00pm. Dem room. Closed Thursdays **BADA**

WITNEY AUDIO VISUAL, 28 High St, Witney, Oxford. (0993) 702414. Aiwa, Akai, AR, Bose, B&W, Cambridge, Dual, Mordaunt-Short, NAD, Onkyo, Pioneer, Roberts, Sony & Sony ES, Tannoy, Wharfedale, Yamaha, Reference Point Dealer. Dem facilities. Mon-Sa 110-6 Free installation, credit to £1,000. Access, Visa. Service dept.

SHROPSHIRE

AVON HI-FI, 12 Barker Street, Shrewsbury, Shropshire SY1 1JQ. (0743) 55166. NAD, Quad, B&W, Arcam, Kenwood, Aiwa, Bose, Nakamichi, Revolver, Onkyo. Dem room. Home trial. Free install. Service dept. Access, Visa. £1000 instant credit. Mon, Tues, Wed, Fri, Sat 9-5.30.

CREATIVE AUDIO, 9 Dogpole, Shrewsbury. (0743) 241924. Linn, Naim, Roksan, Mission, Arcam, Rogers, Denon, Marantz, Rotel, Celestion, etc. Dem room Home trial and free installation. Credit to £1000. Access, Visa. Tues-Sat 9.30-5.30. Service dept MID-SHROPSHIRE AUDIO, 4 Holland Court, Dawley, Telford TF4 2EX. (0952) 630172. Audio Innovations, Marantz (inc Music Link), Denon, Tannoy, Ortofon, Pink Triangle, Ion Systems, Systemdek, Ruark, Monitor Audio etc. 2 dem rooms. Home trial, service dept. Instant credit up to £1000 Access, Vsa, Amex.

SOMERSET

MIKE MANNING AUDIO, 110 Middle Street, Yeovil, Somerset BA20 1NE. (0935) 79361, Fax (0935) 32923, Mobile (0850) 325965. Naim, Roksan, Pink Triangle, A+R (Arcam), ION, NAD, Pioneer, Rotel, Denon, etc. Dedicated listening lounge, for relaxed and unpressured demonstrations. Appts not usually nec. but best to phone first. Home trial facilities on request, free installation, service department. Instant credit, Access & Visa, etc. 9-5.30 closed Mondays.

STAFFORDSHIRE

GRANGE HI-FI LTD, 153 Branston Rd, Burton-on-Trent, Staffordshire DE14 3DQ. (0283) 33655. Audio

Innovations, Arcam, Castle, Denon, Pink Triangle, Marantz, Rotel, Rogers, Systemdek, SME, Tannoy, Dem fac, appts nec on Sat, Free Install. Service dept Access, Visa. 9:00-5:30pm. Closed Mon & Wed aftr, open until 7:00pm Thursdays. Closed for lunch 12.00-12.30.

SUFFOLK

BURY AUDIO, 47 Churchgate Street, Bury St Edmunds, Suffolk, IP 33 1RG. Tel 0284 724337. Arcam, Furukawa, Heybrook, Infinity, Marantz, Meridian, Michell, Pink Triangle, Proac, Rotel, Target, Roksan, Shahinian, Quad. Etc. Single Speaker Room. No appointments necessary. Home trial facilities. Free Installation. Service Department. Access, Visa, Switch. Open 6 days a week. Mon/Tues/Sat 9.30-5.30 Thurs/ Fri 9.30-7.00. Closed Wed

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

SURREY

AUDIO SOUTH, 24 (The Woolmead) East Str, Farnham, Surrey GU9 7TT. (0252) 714555 Audio Innovations, Audio Note, Deltrec, Yamaha, Cary, JPW, Marantz, Rotel, Snell, Voyd. Dem room and evening appointments available. Home trial facilities. Free installation. Access, Visa. 10.30-6 Mon-Sat. Closed Tuesdays.

COSMIC, 244/256 Station Road, Addlestone, Surey, KT15 2PS. (0932) 854522/851753/843769. Fax (0932) 841615. Most brands stocked, including Aiwa/Arcam, Denon, Mission, Cyrus, NAD, Nakamichi, Pioneer, Quad, Rotel, Yamaha, etc. Open 7 days 9-6pm. Part exchange, large free car park, service dept, instant credit available. Access, Visa, Switch.

DATASOUND, 23 South Street, Dorking, Surrey RH4 2JZ. (0306) 882897. Arcam, Celestion, Denon, Dual, Marantz, Mission, Musical Fidelity, NAD, Rotel, Tannoy. Dedicated listening room. Free install. Service dept. Up to £1000 instant credit subject to status. 9.30-5.30 6 days.

PJ HI-FI - the Hi-Fi Shop, 3 Bridge Street, Guildford, Surrey GU1 4RY. Tel: (0483) 504801. 9-6 Mon-Sat. Linn, Meridian, Creek, Arcam, Quad, Revox, Musical Fidelity, Rotel, NAD, Nakamichi, Marantz. **BADA**

RIVERSIDE HI-FI, 422 Richmond Road, East Twickenham. TW1 2EB. Tel: (081) 892 7613. Fax: (081) 892 7749. See main entry under Middlesex.

ROGERS HI-FI, 13 Bridge Street, Guildford, Surrey. (0483) 61049. Aiwa, Creek, Denon, Dual, JPW, Marantz, Philips, Pioneer, Systemdek, Tannoy. Demonstration facilities available, no appointment necessary. Free installation. Service department. Access/Visa. Instant credit up to £,000 subject to status. Monday-Saturday 9.30-6pm, later by appointment.

SOUNDSEXCLUSIVE, 1 Kent House, High Str, Cranleigh GU6 8AU. (0483) 268185. Michell (amplification & decks), Marantz, Ariston, Ortofon, AME, Sumo, Proac, Jamo, Origin Live, Kiseki. Demo room, appts preferred, home trial facilities, free install, service dept. Access, Visa. Open 9-5.30 Mon-Sat.

SPALDINGS HI-FI, 352-4 Lower Addiscombe Rd, Croydon, Surrey. (081) 654 1231/2040. 3 dem rooms and home dem. Free installation, credit. Mon-Sat 9-6. Tues to 8. Closed Wed. Service dept. **BADA**

SURBITON PARK RADIO, 48 Surbiton Rd, Kingston-Upon-Thames, Surrey. (081) 546 5549. Quad, Castle, Dual, Denon, Kenwood, Rotel, Pioneer, QED, B&W, Tannoy. Demo facilities. Access, Visa. 9.30-5.00 Tues-Sat. Service dept

SURREY HI-FI, 45 High Street, Godstone, Surrey RH9 8LS. (0883) 744755. Parking, easy access - just 2 mins off junction 6, M25. Tube Technologies, Rel Acoustics, Audio Lab, Quad, TDL, Nakamichi, KEF, Thorens, Rotel, Marantz, Denon, Michell, Tannoy, Top Line, Rel Acoustics, Single speaker demo room. Demonstration by appointment, free installation, service dept. Access, Visa, Mastercard. 0% Credit. Open 9-6, closed Wed.

TRU-FI SOUND AND VISION, 2 Central Parade, Redhill, Surrey. (0737) 767404/766128. Aiwa, Audio Technica, B&W, Nakamichi, Mission, Mordaunt-Short, Nakoaka, Sony, Technics. Dem. facilities. Free installation. Service dept. 0% finance. Access, Visa. Mon-Sat 9.30-6.

TRU-FI SOUND & VISION, 10 Church Street, Leatherhead, Surrey. (0372) 378780. Sony, Technics, Panasonic, Mitsubishi, Ferguson, Aiwa, Pioneer, Sanyo, B&W, Mission. Free installation. Credit facilities. Access, Visa. 9.15-5.30 Mon-Sat. Closed Wed. Service dept.

ZEBRA 18-24 Brighton Road, South Croydon CR2 6AA. 081 688 2093. See main entry under London.

SUSSEX (EAST)

DEFINITIVE AUDIO, Brighton. (0273) 208649. Audio Innovations, Impulse, Voyd, Snell, SME, Audionote, Micromega, Goldring, JPW, Pioneer, Demonstration by appointment, home demonstration a pleasure. Free installation, Access, Visa. Mon-Sat 9.30-6.00pm.

JEFFRIES HI-FI, 69 London Road, Brighton, East Sussex. Tel: 0273 609431. 2 Dem Rooms, closed Mon. Late night Wed. Free parking. Bus route. Credit Facilities. **BADA**

JEFFRIES HI-FI, (Poutrsmouth), 29 London Road, Portsmouth, PO2 0BH Tel: 0705 663604. 2 Dem Rooms, Closed Mondays. Late night Wednesday. Free parking. Bus route. Credit facilities. **BADA**

JEFFRIES HI-FI, 4 Albert Parade, Green Street, Eastbourne, East Sussex. Tel: 0323 31336. 2 Dem Rooms. Closed Mon. Late night Wed. Free Parking. Bus Route. Credit Facilities. **BADA**

THE POWERPLANT, 66 Upper North Street, Brighton BN1 3FL. (0273) 775978. Roksan, Musical Fidelity, Marantz, Rotel, Yamaha, Tannoy, Audiolab, B&W, Micromega, Epos, JPW, etc. Comfortable single speaker demonstration rooms. No appts. nec. Home trial facilities, free install. Service dept. Credit facilities available on request. Mon-Sat 10-1.00, 2.00-6pm.

SUSSEX (WEST)

AUDIO DESIGNS, 26 High Street, East Grinstead, W. Sussex RH19 3AS. 0342 314569. Linn, Naim, Alphason, Arcam, Rotel, NAD, B&W, Quad, Tannoy, Thorens, TEAC, etc. Very comfortable listening room. No appts nec., Home trial facilities, free installation, service dept. Access/Visa. 9:30-6:00 Mon-Sat, late Tue till 8pm.

BOWERS & WILKINS LTD, 1 Becket Buildings, Little Hampton Rd, Worthing. (0903) 2 64141. B&W, Nakamichi, Castle, Denon, Dual, JVC, Mordaunt Short, Philips, Quad, Sony, Technics. 3 dem rooms. Mon-Sat 9-5.30, Wed 9-1pm. Home trial facilities, free install. Credit to £1000, Access, Visa. Service dept.*

CHICHESTER HI FI, 7 St. Pancras, Chichester, W. Sussex PO19 1SJ. Tel: (0243) 776402. Linn, Naim, Rega, Creek, Nakomichi, A&R, Denon, Roksan etc. Tues-Sat, 10-1, 2-5.15 (closed Mon). **BADA**

TYNE & WEAR

BILL HUTCHINSON LTD, 87A Clayton Street, Newcastle-Upon-Tyne. Tel: (091) 230 3600. A.R. Aiwa, Denon, Dual, JVC, Mission, Mordaunt Short, Omar, Technics, Yamaha, etc. Demo facilities. Free Install, Service Department, Instant Credit, Access, Visa, Mon-Sat, Late Tue till 8pm

RED RADIO SHOP AND HI-FI CENTRE, 11 Olive Street, (Off Park Lane), Sunderland. Tyne & Wear SR1 3PE (091) 5672087. Castle, Carver, Denon, JVC, Kenwood, Mordaunt-Short, Michell, Teac, Tannoy, Monitor Audio etc. Dem room, large with comparator facility. No appts nec, Free install. Service dept. Interest free credit and no deposit 9am-5.30pm daily.

WARWICKSHIRE

CASTLE HIFI, 59 Smith Street, Warwick. CV 34 4HC. Tel (0926) 499963. A.R. B&W, LPW, Jensen in car, Marantz, usical Fidelity, NAD, Pioneer, Rogers, TDL, Yamaha, Dolby Pro Logic. Dem Room. No appt nec, Home trial facilities, Free Installation, Service Department. Interest

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free credit, Access, Visa, Chartered Trust. Open 10-6 6 days a week.

FRANK HARVEY HI-FI, 163 Spon Street, Coventry, Warwickshire, CV1 3BD. Tel 0203 525200. Arcam, Mission, Cyrus, Musical Fidelity, Marantz, Rotel, NAD, Tannoy, Yamaha, KEF. Open 9:30-5:30 closed Thursdays.

NAAM HI-FI VISION, 78 Lower Precinct, Coventry CV1 1DX. (0203) 632086. NAD, Yamaha, Marantz, Pioneer, Kenwood, AR, Akai, Aiwa, Panasonic, Toshiba, Wharfedale, KEF. Demofacilities. Access, Visa, Amex, Lombard Tricity credit charge. 9.00-6.00 Mon-Sat. Closed Thurs

STRATFORD HI-FI, 25 Henley Street, Stratford Upon Avon, CV39W. Tel (0789) 414533. Please call for further details.

WILTSHIRE

AUDIO T, 60 Fleet St, Swindon, Wiltshire. SN1 1RA. (0793) 538222. Fax (0793) 487260. Great hi-fi from Arcam, Audiolab, Cyrus, Denon, Linn, Meridian, Mission, Rotel, Sony, Yamaha, and many more. Tue-Sat 9.30-5.30. 3 yr gntee on Hi-Fi. Free del & instal. 30 day upgrade scheme. Home dems. PX. 2 dem rooms. AV Dept.

PR SOUNDS, 58 Castle Street, Troutbridge, BA14 8AU. Tel 0225 777799. Also at Melksham & Devizes. Pioneer, Technics, Kenwood, Denon, Marantz, B&W, Tannoy, JPV, Dual. Where music is a pleasure, personal service, no appointments necessary. Installations & much much more. Access/ Visa £1000 instant credit. Open 9-6, 6 days.

WORCESTERSHIRE

NAAM HI FI VISION, 27 The Cross, Worcester, WR1 3PZ. Tel 0905 726375. Denon, Marantz, NAD, Musical Fidelity, Acoustic Research, Harman Kardon, Sony, Technics, Akai. Appts nec for demonstrations. Installation 7 days a week up till 9 pm. Interest Free credit over £400. Open 9-5:30 Mon-Sat

WEST MIDLANDS AUDIO, 158 Ombersley Road, Worcester WR3 7HA. (0905) 58046. Nakamichi, Naim, Rega, Absolute Sounds, Meridian, Arcam, Ion Systems, Roksan. 3 dem rooms for budget & high end audio. Appointments necessary. Free installation. Service Dept. Access, Visa, Amex, Diners, Lombard/ Hitachi. Mon-Fri 9.30-8.30 by appt Sat 9-5.30

YORKSHIRE (NORTH)

THE AUDIO CLINIC, 22 Lord Mayors Walk, York, Yorkshire, Y3 7HA. Tel 0904 646309. Mission, Revox, Yamaha, JVC, Audio Innovations, Celestion, NAD, Musical Fidelity, Allison, Thorens. No appts nec, Home trial facilities, Free Installation. Service Department Access/Visa, Credit. Open 10-5:30 Mon-Sat.

SCARBOROUGH HI-FI CENTRE, 14 Northway, Scarborough, N. Yorks YO11 1JL. (0723) 374547. Aura, B&W, Mission, Quad, NAD, Oxford, Alphason, Rogers, Nakamichi, Ruark, Voyd. Dem room, appointment preferred. Home trial facilities. Free installation. Service dept. Access/Visa/Credit charge/ £1,000 instant credit/ Amex/ Diners. 10-6 Tues to Sat.

HARROGATE HI-FI CENTRE, 15 Commercial Street, Harrogate, N. Yorks HG1 1UB. (0423) 504274. Aura, B&W, Mission, Quad, NAD, Oxford, Alphason, Rogers, Nakamichi, Ruark, Voyd. Dem room, appointment preferred. Home trial facilities. Free installation. Service Department. Access/Visa/Credit charge/ £1,000 instant credit/ Amex/ Diners. 10-6 Tuesday to Saturday. SOUND ORGANISATION YORK, 2b Gillygate, York YO3 7EQ. Tel: (0904) 627108. Linn, Meridian, Micromega Naim, Rega, Roksan, Arcam, Mission, Denon, Epos, Rotel. 3 single speaker dem rooms. Appts. preferred. Home trial. Free installation. Service dept. Credit fac on request. Access, Visa. 10am-5:30pm Tues-Sat. Sony Dealer Award nominated '86, '87, '88.

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YORKSHIRE (SOUTH)

BARNSELY HI-FI CENTRE, 40-42 Sheffield Road, Barnsley, S. Yorks. S70 1HP. (0226) 205549 Fax (0742) 467207. Arcam, Quad, Audiolab, Mission Cyrus, Technics, Denon, Tannoy, Nakamichi, Dual, Rotel. Purpose built demo room, no appts necessary, free install, service dept, Access, Visa, varying finance packages. Open 9.30-5.30, 5 days (closed Thurs).

HI-FI STUDIO, Sunnyfields, Doncaster. (0302) 781387. Heybrook, Monitor audio, Art Audio Valvues, AMC Valvues, Michell, Sugden, Ruark, Albarry, Alphason, Teac. Listening room demos. Home trial. Free installation. 2 yr guarantee on all equipment. Service available. Access, Visa. 10-8pm 6 days. Phone for further info & FREE fact pack.

YORKSHIRE (WEST)

AUDIO PROJECTS, 45 Headingley Lane, Leeds. (0532) 304565. A&R, Audiolab, Creek, Heybrook, Linn, Musical Fidelity, Naim, Quad, Rega, etc. Tues-Fri 9.30-6, Sat 2.30-5.30.

AUDIOVISION (BRIGHOUSE) LTD, 5 Bethel Street, Brighouse, (1 mile from junction 25, M62) W. Yorks. HD6 1JR. Tel 0484 713996. Largest range of Technics Hi-Fi in Yorkshire. Aiwa separates, Castle, Cerwin Vega, Mordaunt Short speakers. Panasonic Nicam TV's, VCR's and camcorders. Yamaha, Philips widescreen TV's, CD-Interactive Players. Dolby Pro-Logic AV Surround Systems, Reproduction Furniture. Telarc, CD-Audio, CDI and DCC. Demo's. Free expert install. Panaservice in-store service dept. Access, Visa, credit charge. Mon-Sat 9-5:30.

CLEARTONE (Formerly Erricks), Rawson Square, Bradford, (Near John St Market). (0274) 309266. A&R, Linn, Quad, Exposure, Nakamichi, Mission, Denon, Kenwood. Private demo rooms, no appt nec, home trial facilities, free installation, service dept. Access, Visa, licenced credit broker. Mon-Sat 9-5:30 (Tue 10-5:30).

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IMAGE HI-FI, 17 The Springs, Wakefield, WF1 1QE. (0924) 200272. Arcam, Linn, Meridian, Mission, Quad, Rotel, Etc. 2 Listening Rooms. Free Parking, Del. & Instal Mon-Sat 9:30-5:30 pm.

IMAGE HI-FI, 8-10 St Annes Road, Headingley, Leeds, LS6 3NK (0532 789374) Arcam, Linn, Meridian, Mission, Quad, Rotel, Etc. 3 Listening Rooms. Free Dem & Instal. Mon-Sat 9:30-6:00pm.

Northern Ireland

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ZEUS AUDIO, 6 Hope Street, Belfast, (0232) 332522. Audio Innovations, Pink Triangle, Roksan, Marantz, Celestion, Linn, Meridian, Mission Cyrus, Ortofon, etc. Mon-Sat 10.00-5.30. Late night Thursday.

COUNTY DOWN

ASTON AUDIO, Unit 8, Kings Road Shopping Centre, Kings Road, Belfast. Tel: 0232 402220. Akai, Technics, JVC, Mitsubishi, Samsung, Toshiba, Panasonic, and many more. Demos available, Open Mon-Fri 10-8pm Sat 10-5pm

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ZEUS AUDIO, 23a Kingsgate Str, Colraire, BT52 4LB. (0265) 56634. Marantz, Mission Cyrus, Aiwa, Akia, Alphason, Sony, Pink Tri, Celestion, Rotel. Open Mon-Sat 10-5.30, Closed Thurs.

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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. Mon-Sat 10-6. Free installation, instant credit, Access, Visa

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ACTION GATE AUDIO, 4 Ruabon Rd, Wrexham, North Wales, Tel 0978 364 500, Arcam, B&W, Marantz,

Mission, NAD, Quad, Rega, Rotel, Tannoy, Yamaha, etc, Dem Facilities, A.V. on dem, Mail Order. No appts nec, home trial fac, Free install, Service Dept. Access, Visa. 9.30-5:30 closed Weds PM

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I&H GRIFFITHS & SONS, 313 High St, Bangor LL57 1YA. (0248) 370655. Yamaha, Tannoy, Teac, Goodmans, Wharfedale. Demos available, no appts nec, home trial facilities, free installation, service dept. Access, Visa, Lombard credit charge. Mon-Sat 9-5.30, Wed 9-1. Audio Visual Specialists.

PETERS HI-FI Victoria Buildings, Mostyn Avenue, Craigh-y-don, Landudno. (0492) 876788. 1 Single speaker dem room. Open 9-5.30. Closed Wed. See Cheshire branch for details.

DEALERS!

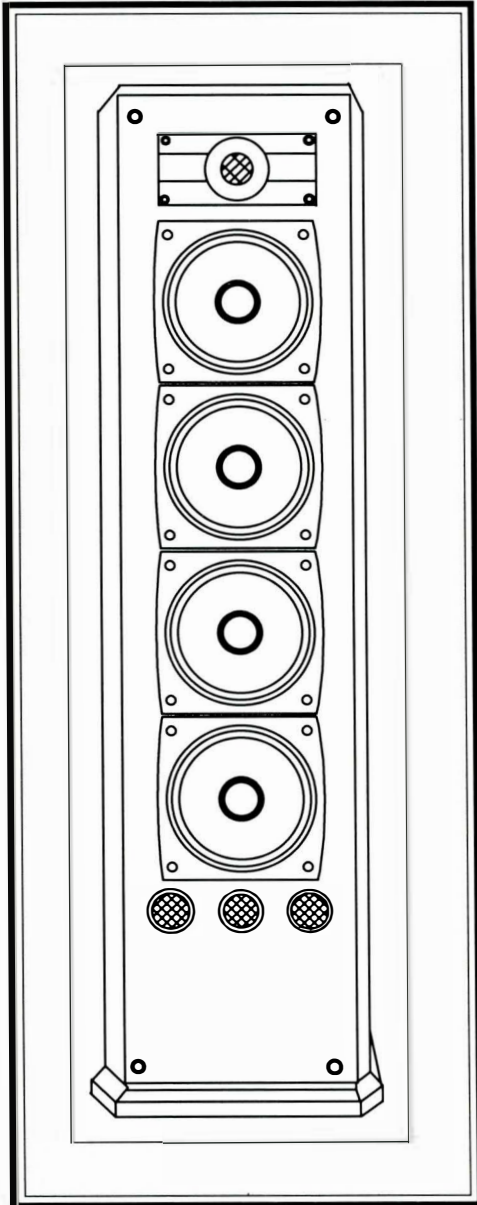
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The Directory

The *Hi-Fi Choice Directory* was conceived as a reference guide to all the audio products reviewed by *Choice* that are currently available. The products are split into suitable categories, each with its own introduction containing information about the product type and its applications. They are particularly relevant to the uninitiated first time buyer and help sort out the order of priorities when buying a piece of equipment.

Each product along with its current retail price is placed in its respective category in alphabetical order. The prices of the products are updated on a regular basis, although it should be noted that our value rating are based on the product's price at the time of review.

The next column contains the ratings for the standard achieved in laboratory and listening tests, with the exception of certain product groups where lab tests were not carried out. One important point to remember is that they cannot be used to compare products from different categories — for example, a cassette deck rated 'excellent' in sound quality will not usually offer the same standard of fidelity as a similarly rated turntable or CD player (unless you can get hold of first generation copies of the master tape!).

The Comments column contains a potted summary based on the original review, emphasising the

salient points of a product's character and sonic performance. The space available doesn't allow for great detail but in the 20 or so words we have attempted to put across the essence of the review, in some cases using quotes from the review itself. Obviously, important information on compatibility or auxiliary equipment used in the test cannot be included, and we would advise you to refer to the original review for this, of which more later. Please note that these comments are those of the reviewer and not, as is the case with some magazines, those of the manufacturer.

The next column varies from category to category but is usually either features or specifications, the former being facilities available on a cassette deck or amplifier or the type of drive system on a turntable.

Specifications vary with product type but usually relate to suitability or capability. For instance, in the case of arm matching, figures are given with the cartridges, which tie in with the mass figures for the tonearms themselves, making it easier to avoid compliance/mass mismatches.

Perhaps the most influential letters in the *Directory* are those found in the Value column, the Rs and BBs denoting the Recommended and Best Buy ratings that are appended to products we consider meritworthy. The Best Buy tag

means that a product not only offers good sound quality, but is reasonably priced as well. With source components a price limit of approximately £300 is usually used as a guide.

Recommended means that either the performance of a product is particularly good irrespective of price or, alternatively, that a good value standard is achieved but overall attainment falls short of Best Buy classification. Please note that an expensive Recommended product will nearly always sound better than a cheap Best Buy. An ideal situation would be to choose suitably priced Best Buy or Recommended products from relevant categories and create a Best Buy system, but, due to the variety in tonal balance that exists in much audio equipment, system building is unfortunately not quite that simple.

These ratings make a useful guideline for shortlisting components, but only experiencing the actual combination will tell you whether it works for you.

The final column contains a reference to the issue of *Hi-Fi Choice* which featured the complete review. If you wish to get a better idea of a product by reading the complete review it is possible to order a copy (if still in print) through our back issues department. Every *Choice* issue contains a Back Issues page for this purpose.

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To order back issues, please turn to page 35.

SYSTEM BUILDING

Pre-packaged one-make systems have been commercially very successful, with advantages like cosmetic consistency, competitive pricing, and (assumed) technical compatibility. However, despite the mass market clout of the consumer electronics giants, the hi-fi tradition of specialised separate components seems to be as strong as ever, and certainly represents the route taken by those who place sound quality first.

The first step in putting together a system is to decide which sources you require. There are now three different prerecorded music media competing for the affection of the hi-fi user, and to go for all three will either cost a lot of money or involve substantial compromises in the sound quality of each. For this reason many separates purchasers may start with just one source, adding others or a tuner when funds permit.

Cassette has never really challenged vinyl's superior quality,

but it's a multiple role format, offering 'go anywhere' flexibility, a useful recording capability, plus a broad catalogue of prerecorded music cassette material. As a hi-fi medium cassette suffers from prerecorded material which has been improving but is still patchy in quality and can usually be bettered by a home recording. There is also the worry that a tape made on a specific machine usually plays best on that machine, which may cause aggravation when upgrading a few years hence.

CD is the relative newcomer but in the last decade it has come to dominate the market. The sound quality remains controversial, hailed as near perfect by its fans but derided by vinyl freaks. It is probably fairest to say that CD is fine for the majority of listeners, but may not suit everyone. Certainly the lack of background noise and deterioration are major strengths.

The advent of two box audiophile players has certainly

helped to gain better acceptance for the format and unless you are prepared to spend a substantial sum, CD arguably offers the best performance in terms of sound per pound. Players are now exceptionally cheap, having been reduced dramatically since the format was launched, however, the prices of the discs remains extortionate.

Choosing the components of a system is only part of the task of getting the system as a whole working as well as possible. Both components and loudspeakers benefit to a surprising degree from proper support in the form of stands that enable them to give their best performance, whether floor-standing or wall mounted.

The loudspeakers are most critical of placement, because it is their job to create the stereo image, and it will be impossible to do this if the sound from each is not roughly similar at the listening position. Each loudspeaker should operate in a simi-

lar immediate acoustic environment, unencumbered by other furnishings and structure, and a similar distance from listeners, nearby walls, and corners. Some loudspeakers are designed to operate close to a rear wall, others a metre or so out into the room, but all loudspeakers benefit from rigid support

The key to getting the best results from a separates system lies in finding an experienced and skilled dealer in the first place, one who takes the trouble to find out what you really want and then demonstrates some likely alternatives.

The *Directory* has been compiled as a guide in the sense that you should use the information in it to make a shortlist of equipment and then audition it before taking the plunge. Tastes inevitably differ and it's unwise to buy purely on the basis of our recommendation, as dealers are the most experienced people around when it comes to making systems work as a whole.

AMPLIFIERS

The amplifier sits at the heart of the system, processing the outputs from all the various music sources as necessary and then driving the loudspeakers. These two (quite separate) functions are integrated into a single box at the low-to-middle price points; separated pre- and power amplifiers become increasingly common as one moves upmarket. At the upper end of the specialist market, valve amplifiers provide a popular alternative to the transistor types amongst enthusiasts.

There is a substantial difference between specialist (sound quality oriented) amplifiers and the consumer electronics style models. The

former are bleakly simple, avoiding all unnecessary features to provide the most direct signal path in the interests of best sound quality. The latter range from models with just basic tone controls and tape recorder switching, to those with elaborate facilities such as graphic equalisers, remote control (including volume), surround sound options etc. etc.

Lab measurement provides some useful data, particularly in regard to an amplifier's ability to drive a wide range of different types of loudspeakers, but this is only obliquely related to sound quality. We also include our measured power output (RMS, 8ohm load, 1 channel

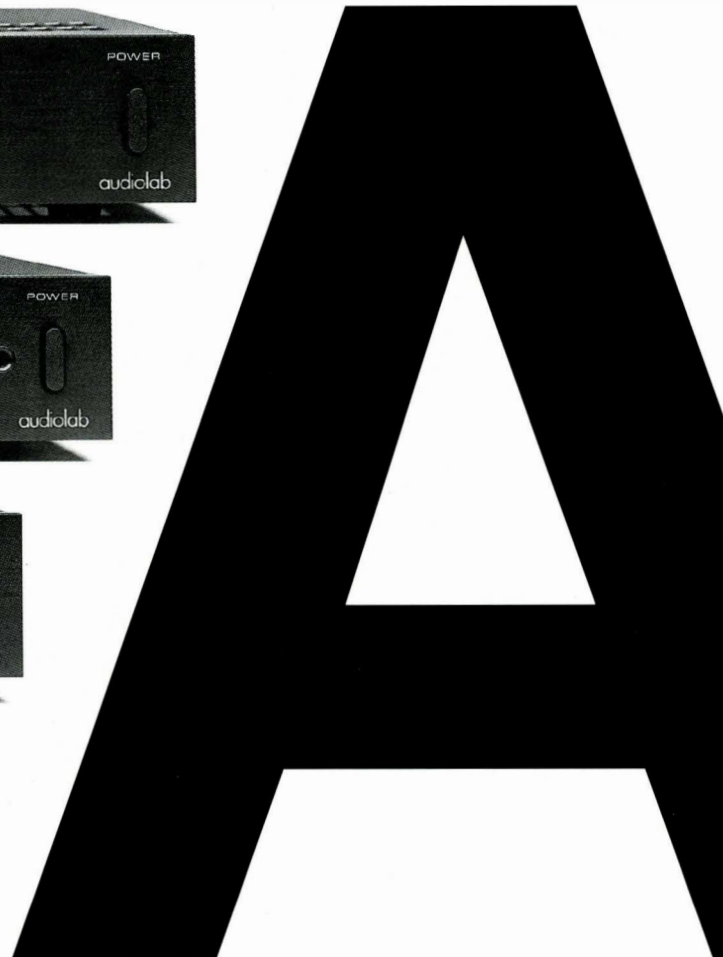
driven) – but again, paradoxically, this doesn't necessarily correspond to the loudness capability of the amplifier, which has as much to do with the elegance of the overload characteristics within a given system (valve amplifiers invariably sound more powerful than their rating would suggest). The listing of features provides some indication to the complexity of an amplifier; many users prefer to retain the option of tone controls to 'shape' the overall sound according to taste; many others have found living without tone controls surprisingly easy, with additional benefits in terms of transparency.

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
AMC CVT3030 £460	Average	A very well meaning and affordable attempt to mix transistors with valves, albeit one that only really shines with the simplest of musical styles.	35W, MM, 5 line and tape inputs 4 and 8 ohm speaker outlets		116
Acoustic Research A05 £200	Good + Good +	Capitalises on the strengths of the A-03 and A-07 but escapes the ignominy of their deficiencies. The amp for all AR-based systems	67W, 2 tape, 3 line and both MM/MC inputs. Tone defeat	R	97
Acoustic Research A07 £300	Very Good Average +	Relatively smooth but ineffectual sound quality that lacks some weight and impetus at very low frequencies	75W, 4 line, 2AV and MM/MC inputs		68
Aiwa XA-006 £135	Good Average	Competent enough performer with plenty of facilities. A gutsy sound though one that's rougher via CD than MM.	67W, MM and 5 line i/p's plus independent rec out.		92
Akai AM-47 £200	Very Good Good +	Something of a surprise from Akai: a made-for-Germany amp with plenty of widgets and an unexpectedly sharp, open and detailed sound. Looks ghastly but sounds strainfree.	104W, 3 tape, 4 line and MM disc inputs. 4mm speaker outlets.	R	104
Akai AM-52 £230	Average + Average -	Basically equipped, this amplifier offers a comfortable but hardly over-detailed sound	95W, MM/MC disc, 5 line inputs, loudness		74
Akai AM-65B £299	Good Average	On-board 18-Bit DAC's actually give better sound than standard CD inputs! Punchy via MM disc	101W, MM, 6 line, digital inputs		80
Akai AM-93 £550	Average Average -	Unfortunately Akai's on-board D/A convertors were less successful than its conventional analogue CD input.	112W, coax and optical dig inputs. MM/MC		68
Akai AM-95 £620	Average Average -	A revamped version of the older AM-93 with newer onboard bitstream DACs. Its sound is just too eager, however	110W, 3 tape, 3 line, MM/MC plus coax/opt digital inputs		109
Albarray AP4/S508 £350/500	Average - Average -	A very disappointing sound from a pre/power combination that's hamstrung by a variety of silly technical oversights. Albarray can and has done better.	46W, MM or MC, 4 line, tape and pre-out. +16dB boost in preamp		116
Albarray PP1 £400-£500	Average Good +	Available with or without various MM/MC disc options, the 'basic' PP1 has an attractively warm, earthy sound. The budget MM stage needs some further work, however.	48W, 4 inputs with extra gain available for low-level sources	R	104
Alchemist Kraken £444	Average Average	Class-A object d'art from the 'Chapel of Rest' that's far too sensitive to RF interference. Can sound cold and fierce as a result.	54W, 4 line and 1 tape inputs plus MM/MC option. Ext PSU		116
Alphason Apollo £300	Average - Average +	Our early production sample was beset with a variety of niggling problems. Laid-back though not unmusical sound.	54W, 5 line, tape and MM/MC inputs. Solid wood fascia		92
Alphason Apollo £295	Average - Average +	A year and a half later and Alphason's Apollo is still beset with technical problems. This sample buzzed like a distant bandsaw	38W, 5 line, tape and MM/MC inputs. Solid wood fascia		109
Amadeus Gold £360	Average - Good	There is some indication of instability but otherwise sounds very rich, warm and musical. High-ish IMD	56W, MM/MC plug-in cards, 3 line inputs	R	74
Amadeus Silver £270	Average - Good	Limited headroom via disc but still offers a sweet, lush sound. Limited current delivery	37W, MM/MC, 3 line inputs	R	80
Aragon 4004 £1795	Good Good	Despite its imposing bulk, the Aragon is something of a softy at heart. It can deliver oodles of power but its musical presentation is more laid-back	231W power amp		72
Arcam Alpha 3 £200	Good Average	After the enthusiastic reception earned by the older Alpha 2 the generally lacklustre and bland sound offered on this occasion met with (unexpected) disapproval.	53W, 3 line, tape and MM disc inputs. Direct option.		104
Arcam Delta 110/120 £720/£520	Good + Good	Overall performance is limited by the power amp - in isolation the PDM-preamp offers a remarkably open and detailed sound, particularly in 'digital' mode.	112W power amp, MM/MC + four line inputs + coax/opt digital inp	R/-	92
Arcam Delta 290 £450	Good + Very good	A new, remotely-controlled amplifier that combines the dryness and restraint of Arcam's older models with a refreshing sense of detail, dynamics and musical colour.	99W, 50 MM/MC phone option, 3 line/2 tape inputs, remote volume	R	116
Arcam Delta 60 £300	Good Good +	Very refined and highly detailed sound via MM and CD without any of the hardness noted via the MC stage	59W, 4 line, MM/MC inputs, no tone controls	R	68
Arcam Delta 90.2 £410	Average + Average +	Dark but slightly dead or conservative sounding version of the original Delta 90. Improved disc stage	73W, MM/MC, 4 line inputs, tone bypass, bi-wire	R	74
Art Audio Quintet £725	Average Very Good	Switchable triode/ultralinear output stage. There's 15W and 15W, but in triode mode these are 15 of the sweetest watts around. Surprisingly gutsy	15/25W, variable feedback	R	100
Audio Innovations Series 1000 2nd Audio Amp	Poor Excellent	This valve combination offers awesome dynamic range with superb transparency and power to match. Compatibility with other brands is unpredictable	15W, MM, 6 inputs, monoblocks	R	63
Audio Innovations Series 200 £349/£499	Poor + Good	Recently updated, this pre/power combo turns-in a fuller and more substantial performance via MM rather than CD. Otherwise its sound can seem slightly bleached and lacking expression.	10W, 3 line, 1 tape and MM or MC inputs. 'Isolate' switch		109
Audio Innovations Series 300II £500	Poor Good +	Under-powered and over-distorted yet capable of realising an open and captivatingly expressive sound. Sensitive speakers are a must	9W(!) integrated valve amp with tape, 3 line and MM disc inputs	R	97
Audio Innovations Series 700 £999	Average - Very Good	A line-only valve amp that has the ability to turn the roughest of digital sounds into music that's both understated and graceful. Sensitive speakers are a must, however.	24W, 4 line and 1 tape input, 4 and 8ohm speaker taps	R	116
Audio Note Ongaku £34,000	n/a Excellent	An out and out audiophile product, a single ended, zero negative feedback, triode, line level integrated amp. Probably the best amplifier in the world!	6 line inputs, 27W	R	Coll '90
Audiogram MB1 £500	Good Very Good	This amplifier may look positively boring but it'll successfully tackle the most difficult of speakers and still provide a very warm, rich and euphonic sound. Coloured but compelling.	46W, full remote control of vol, MM, 3 line and tape inputs	R	116
Audiolab 8000A £410	Very Good Very Good	Recent mods have cured the slightly glassy treble, replacing it with a smoother but richer and more solid style of music making	81W, 3 tape, 4 line and both MM/MC inputs. Tone defeat	R	97
Audiolab 8000C/8000P £375/£545	Very Good Good	Audiolab has revamped its pre/power combo though the very distinctive almost stark neutrality that results will not appeal to all listeners. Good value engineering, nevertheless	157W pow amp + bi-wire outputs. 3 Tape, 4 line + MM/MC on preamp		97
Audion CD-1 £399	Average + Very Good	Nicely presented valve (line-only) preamplifier with fine bandwidth and enjoyable, musical sound. Great if you can justify the cost. Well worth hearing	5 line inputs		77
Aura VA-100 Evolution £270 and £300	Average - Good +	This beefed-up VA50 might overheat when driving insensitive, low-impedance speakers but was applauded for its sense of scale and daram via CD	81W, 4 line, 1 tape and MM inputs. Bi-wire outputs	R	109

The new Audiolab 8000T Tuner



The Audiolab product range:
8000A Integrated amplifier
8000C Pre-amplifier
8000P Stereo power amplifier
8000T FM/AM tuner
8000M Monobloc power amplifier
8000DAC digital-analogue convertor
Winner of '92 *What Hi-Fi?* award for "Best CD upgrade"
Winner of '92 *Audiophile* award for excellence



AUDIOLAB

AMPLIFIERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Aura VA-40 £190	Average Average +	Based on ITL's earlier MA80, this amp sounded slightly withdrawn or 'dead' if inoffensive	55W, MM 4 line inputs, MOSFET output		80
Aura VA-50 £200	Good Very Good	Superficially similar to the cheaper VA-40 but with much more of the old MA-80's magic! Great sound from a slimline package	65W, one tape, 4 line and MM only. New tape monitor switch	BB	97
Beard 506 £1195	Good + Good +	A versatile valve preamp the bass sounded lively if a touch softened, while the treble was detailed but lacked a little sparkle and air.	4 inputs MM/MC		50
Beard Audio CA35/P35mkII £695/£895	Average + Very Good	Good build quality and a very smart finish combine with a characteristic valve sound to make a first class amplifier capable of giving hours of musical enjoyment	35W, MM/MC, 4 inputs	R	63
Beard M70 £1995 pair	Good Good +	A substantial British monoblok power amplifier, but not a great deal more impressive than the P35 at half the price	70W		50
Bryston 0.5B/2B £695/£695	Very Good Good	Very rugged Canadian pre/power combo that sounds cool, confident and punchy. Headamp available to suit MC cartridges	65W, MM and 4 line sources, overload LEDs on power amp	R	74
Bryston 12B/4B £1295/£1395	Good + Good	Bryston's massive 4B power amp stood out as the backbone of this combo, the preamp sounding a trifle unbalanced between MM and MC inputs	272W, bridgeable to 800W. 6 line, 2 disc inputs, subsonic filter		68
Carver CM-1090 £595	Average Average +	Looks very professional with its meters and handles but suffers from a loose and dirty sound that shies away from busy tracks	141W, 2 tape, 4 line and MM disc. Sonic Holography feature		97
Cello Audio Suite £1200	Excellent Excellent	Cello's preamp represents a whole new ball game in flexibility and sound quality (or war of attrition on your wallet)	Optional inputs MC etc	R	50
Chord SPM-900 £1850	Average + Good +	Technically very interesting, this mini-powerhouse uses a switched-mode supply to deliver a crisp and refined sound	236W with protection into lower loads	R	85
Concordant Excelsior £856	Very Good Excellent	Cottage industry styling might not inspire confidence, but sonically this preamp is tremendously vivid and detailed. Real high-end performance. We loved it!	MM plus 3 line inputs. External power supply	R	77
Concordant Exultant £700	Average + Very Good	Individual appearance of this valve pre contrasts with sonic invisibility. An extremely dynamic performer. Recommendation withheld pending more appropriate p.s. plug	3 line, MM, variable gain		100
Conrad-Johnson PV-10 £1100	Excellent Excellent	Pricey, yes, but a fabulous preamplifier which confirms C-J's high reputation in the States. Beautiful imaging, superb detail, plenty of gain on the phono stage classy build quality too.	MM plus 4 line inputs	R	78
Conrad-Johnson Premier 7A £8995	n/a Excellent	Price has increased since we tested it but at this price who cares? The 'Seven is designed without compromise, and it's clearly one of the finest (valve) preamplifiers money can buy.	MM, 4 line inputs, sep. Rec Out, versatile cartridge matching	R	Coll. 90
Creek CAS 4040s3 £200	Good Good	Now in mk3 guise the '4040 offers a dry but tidy sound via disc and one that's slightly leaner and better focussed on CD	41W, 3 line and one MM disc i/p. Tone controls.	R	92
Creek CAS-4140 S2 £230	Average Average +	Running production changes inspired us to re-review this amp which now sounds thicker and 'blurred' compared to the original	41W, 3 line and MM/MC inputs, mono and mute facilities		109
Creek CAS-6060 £470	Good Good	An amp that looks like the '5050 but employs the sort of big, confident and meaty-sounding electronics used in the earlier '4040. Dynamic and impressive.	81W, 3 line, 2 tape and MM/MC disc inputs. Bridge-mono facility		104
Croft Series 4S £850	Good Good	The original IV is still available now supplemented by the higher price and power (S); both are fine performers	40(60)W channel	R	57
Croft Series 4SA £1000	Good Very Good	Featuring tuned components chosen for their sound quality, the 'A' variant is an impressive example of Croft's technique in valve design	60W special supply regulation	R	57
Croft Super Micro A £549	Average + Very Good	The looks are somewhat improved, while this 'hot rod' version with tuned components performed very well indeed. There is still no gain on the line inputs. Now in mk.II form	4 inputs, MM, straight line	R	57
Croft Super Micro A OT/Series V £689/£555	Average + Good	Micro is still unashamedly 'cottage' but offers good performance. Combo is let down by the very low powered Series V	15W, valve, dual vol. control, 2 line, MM, tape out		100
Cyclone Catalyst £1995	Good + Very Good	Exceptionally load tolerant and very refined in delivery. Extra options available in future	74W, external MM or MC stages, 3 R line inputs	R	80
Cyrus I £230	Very Good Very Good	Crisp, meaty and exquisitely detailed, this latest Cyrus amp had us enthralled via CD. MM/MC enjoyed a lesser clarity	34W, 4 line + MM/MC i/p's with dual-conc vol.	R	85
Cyrus II £350	Very Good Very Good	Recently updated this popular favourite captured our attention, once again, with its robust and very convincing sound.	60W, 4 line and both MM/MC disc. R No tone controls	R	92
Cyrus PSX £250	Very Good Very Good	The PSX does make the Cyrus Two sound better; and also improves the PCM II CD player giving more wallop and clarity	Auxiliary power supply	R	62
DNM 3A £1590	Good + Very Good	The DNM3 in its acrylic case is a remarkably revealing and neutral state of the art preamp	5 inputs MM/MC twin vol controls	R	44
Deltec DPA 100S £2200	Very Good Very Good	A top-quality transistor power amp, sounding fast, articulate and well controlled, though maybe a touch clinical for some tastes	80W	R	50
Deltec DSP-50S/DPA-50S £725/£925	Excellent Excellent	Remarkable pre/power combo based around the highly linear DH-OA32 hybrid op-amp. Unmatched detail resolution, control and transparency	63W, external feedback wiring, 3 line, MM/MC no tone controls	R	68
Denon DAP-2500/POA-4400A £550/£600 pr.	Very Good Good	Denon's fully-fledged preamp also incorporates D/A converters that did not improve the sound of our £299 CD player. The power amps are brilliant!	172W, monobloks Opt/Coax dig + 2 tape, 4 line and MM/MC inputs		68
Denon PMA-250II £140	Good Good +	Spacious yet tactile and gutsy sound via all inputs. Worthwhile upgrade over original PMA-250	53W, MM 3 line inputs, source-direct	R	80
Denon PMA-350 £170	Average + Good	Bold claims were made at its launch but the sweet and inoffensive sound, though very pleasant, is not mould-breaking at the price.	88W, 5 line and MM disc inputs + source direct.	R	92
Denon PMA-450 £250	Very Good Good +	For once the hype has some basis in fact as Denon's latest integrated amp swept the board with its big, brassy if somewhat extravagant sound.	99W, MM, 3 line and 2 tape inputs, A/B speaker selection	BB	116
Denon POA-6600 £1000 p	Excellent Very Good	Delivers abundant high quality sound, solid engineering expertise and content clearly compensating for any compromising of purist audiophile principles - now in revised A form	250W monoblok, remote power	R	60
Dual CV600RC £150	Good + Good	The heart of Dual's latest budget range enjoys a very lively, open and vibrant sound. Slightly sanitised via CD perhaps, but still damn good for a features-first integrated amp!	63W, 3 line, 2 tape and MM inputs. Remote control	R	104
E. A. R. 549 £3628 pair	Very Good Very Good	A valve monoblok that measures like a solid state amp is itself an achievement, but exceptional power delivery and bass 'slam' is not fully matched by delicacy and transparency elsewhere	200W monoblok, bias setting		60
E. A. R. 802/509mkII £1098/£1868	Average Very Good	Extremely well made and combining the sonic strengths of both transistors and valves this EAR combo warrants attention	100W, MM, 6 inputs, monobloks	R	63
EMF Audio Sequel £349	Good - Good +	A fresh start for Mike Creek has resulted in the Sequel, a minimalist amp with a very refined but mildly restrained sound	47W, 3 line, 1 tape, MM or MC inputs.		109
Entire Sound EX50 £500	Average - Average +	A new and fairly costly Mosfet power amp of limited output. Resolution of detail is pretty good but sound is cold-hearted.	40W Power amp. Internal P/S included for ES preamp.		92
Exposure VII/VII*/VIII £1580	Good Very Good	An established company like Exposure could do more to improve the 'look' of these amps which, nevertheless, sounded confident, dry and musical. Dual version no longer available	63W, Super mod. 4 line and 2 disc inputs with full rec-out switching	R	68
Exposure VII/VIII £530/£580	Very Good Good	Supplied as a combination without the separate preamp power supply, this pre power combination performed satisfactorily especially on the moving coil input	50W, MM/MC, 3 inputs, straight line		62
Exposure XI/XII/VIII Super £1900	Good Very Good	New preamp and improved power amp led to a smooth and refined sound, MM/MC less transparent than CD	61W, MM/MC, 5 line inputs	R	80

AMPLIFIERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Goodmans GSA-600 £140	Good Poor	Designed to form the heart of a Goodmans separates system, the wishy-washy and faceless sound of this amp fails to slack up	76W, tape, 3 line and MM inputs. Remote control		97
Grant G60AMS £948 pr	Good Very Good	This neat and compact 60W valve monoblok gave good sound on the 8ohm tap, better still on 4ohms. The midrange was particularly natural	60W monobloks 8ohms	R	57
Hafner DH120 assembled £365	Very Good Average	Sound quality results were decent enough, but this power amp won't set the world on fire at this price	60W		44
Hafner SE-100/SE-120 £370/£380	Good + Good +	The smallest of Hafner's pre/power range but still imbued with the open, sparkling quality of their bigger models. Preamp sounds significantly better via CD than MM or MC	96W, bridging option. 2 Tape, 3 line + Aux or MM/MC	R	97
Hafner XL-600 £1200	Very Good Very Good	Sounds remarkably open, transparent and inherently 'musical'. XL-600 is tremendously powerful and very compatible	426W in stereo mode, 1.5kW in bridge	R	74
Harman Kardon Citation 25/22 £699/£899	Good Average +	Not as outrageous as previous Citation amplifiers but neither as punchy nor exciting in the sonic stakes. A good all-rounder but lacks sparkle	138W, MM/MC full range of input and record out		74
Harman Kardon HK6150 £160	Good Good +	Based on the older HK6100 but with a more solid, punchy and expressive performance that attracted considerable praise from our listeners	44W, 3 line, 2 tape and MM inputs, loudness, tone controls	BB	109
Harman Kardon HK6250 £250	Good Good +	Heavily based on the cheaper HK6 150, this version offers slightly more power with a similarly gutsy and expressive sound to match.	51W, MM, 3 line and 2 tape inputs, bass/treble + loudness	R	116
Harman Kardon HK6850 £700	Good + Good	This monster is derived from the HK6800 with a similarly deep and powerful sound but a rather steep price tag	101W, 4 line, 2 tape and MM/MC inputs. Preamp direct		109
Heybrook C3/P3 £479/£660	Average + Average	Since we last looked at this combo Heybrook has improved the manufacture of its power amp though flaws in the preamp's disc input remain unchecked	146W, oodles of current, passive line inputs		104
Heybrook Signature £649+£150/£92	Good + Very Good	Heybrook have re-boxed the best facets of the old C3/P3 to produce a stunningly powerful and vivid-sounding combination which is equally impressive via vinyl or CD	148W, 3 line, tape and MM/MC inputs. Outboard transformer	R	109
JVC AX-A342 £169	Very Good Average	A value-conscious budget amp offering plenty of power but a slightly untidy and inconsistent sound	77W, 3 line, 2 tape and MM inputs, tone, loudness controls		109
JVC AX-A3TN £140	Very Good Good	A true minimalist amp from the masters of mass-production! Offers a very comfortable, accessible sound yet with some loss of deep bass and extreme treble.	50W, 3 line, 1 tape and MM i/ps. CD DiRt and 'Bass Compensator'	R	92
JVC AX-A441 £210	Good+ Average	A return to the traditional style of mass-market design brought an inconclusive reaction from our panel. Blowing 'hot and cold', our listeners ultimately found its music uninteresting	93W, 3 line, 3 tape, MM/MC inputs. CD direct facility		104
JVC AX-Z1010 £650	Very good Good+	JVC's flagship amplifier also houses a couple of ancient 16-bit DACs for good measure! One of the best behemoths: a big amp with a big, boppy and unmuddled sound	124W, 6 line and MM/MC inputs plus opt/coax digital inputs	R	109
Jadis JP30/JA30 £4990/£4900	Average Excellent	Two-box preamp plus monoblok power amps, classic valve design gives stereotype valve sound. Beautiful build, nostalgic styling and delightful sounding midrange transcend limitations at	30W 2-box pre-, monoblok power, MM-only, 4 line inputs	R	60
Jeff Rowland Coherence One/Mod	Very Good Very Good	The technical design of these amps is very elaborate but ensures they achieve an extraordinarily transparent and potent sound. However, the CD i/p is clearly superior to the disc inputs	448W monoblok MM/MC with loading options. Balanced topology	R	72
Kelvin AZI £700	Average - Average	Now cooler than ever before, this latest Absolute Zero still sounds animated but also rather more synthetic and crude. It's also rather more expensive.	100W, 4 line and 2 tape inputs — no phono stage		116
Kelvin Digital Integrated £550	Good + Very Good	Not so Class A as before but now fitted with a PDM DAC which offers a smooth, detailed and naturally 'musical' sound	34W, digital, line and MM i/p's only	R	85
Kelvin Integrated £449	Good Good	Recent mods have reversed the Integrated's previous good fortune, this unit was just too syrupy.	21W with 10-12W in Class A. Four line + MM/MC.		92
Kelvin Labs Absolute Zero/M30 £395/295/595	Good + Average +	Latest versions of the M30 offers a true 30W Class A and a slightly muddled but very comfortable sound. MC preamp is a very linear design	33W monoblok MC only + 4 line inputs. Separate L/R balance	R	74
Kenwood KA-4040R £220	Good + Average +	In many respects this sophisticated amp is a 'digitised' version of the KA-4020 with relay-switched inputs and full remote control. Unusual looks but can seem insubstantial via CD.	82W, 3 line, 2 tape, MM/MC inputs. Full remote control		104
Kenwood KA-5040R £270	Good + Average	A flexible, remote-controlled amp that uses the old KA-5020 as a building-block. Unfortunately it lacks dynamics, sounding stifled and uninteresting	100W, 3 line, 2 tape and MM/MC inputs. Source Direct		109
Klyne SK5a £2590	Very Good Very Good	Beautifully made and presented, this American thoroughbred has a good lab performance, but although versatile, is rather expensive for the quality of sound offered	Balanced output, versatile cartridge loading		72
Lecsson Quattra £350	Average+ Good	Underpowered but with the flexibility of four independent power amps. Very deep, captivating sound with 3D soundstaging.	19W via all 4 channels. 5 line and MM/MC inputs.	R	92
Lecsson Stereo £200	Poor Very Good	Can reflect the full weight and ambience of a tense, classical performance. A genuinely deep, detailed and enthralling sound marred by unreliability of our sample. New stock will be cured.	76W, 4 line, 2 tape, MM/MC inputs.		104
Lectron JH50 £2300	Average Very Good	Sexily presented valve power amplifier from France. Lovely valve sound too, with delicate and airy top end. Not especially powerful and rather expensive but very desirable!	50W		78
Linn Intek £398	Good - Average +	Linn have slashed its price and made various internal revisions, but their no-nonsense Intek still lacks the authority and confidence to support its forward balance.	55W, 3 line, 2 tape, MM/MC inputs, rec-out, mono + mute		104
Linn LK1/LK280 £598/£763	Good Good -	A very modern, logic-controlled amp with distinctive and inoffensive sound quality. Its restrained sound could do with extra insight and zip.	84W, compact amp CMOS sw. for 2 tape, 2 line and MM/MC. xlr sockets		68
MFA Magus £1147	Good Very Good	Versatile valve preamp from USA, genuine MC compatibility and high class construction make the Magus a bargain	3 line, MC, tape out, variable gain	R	100
Magnum A-Class £599	Average Good +	Available with or without a phono stage this heavyweight Class A amp provides lashings of rich and compelling music, trading a hint of lushness for stark accuracy. An unexpected find	55W, 5 line and 2 tape inputs, optional MM/MC, pre-out	R	116
Magnum MP150/MF150 £320/£320	Average + Good	This is no technical masterpiece but the strain-free, fluid sound augers well for CD-based systems. Excellent value	89W, 3 line + MM/MC i/p's. No tone cont.	R	85
Marantz PM-30 £130	Good + Good +	The building-block for Marantz's popular budget 'SE' amplifier is no slouch, providing a lively and very expressive sound with plenty of strong bass. A good 'un.	49W, 3 line, 2 tape and MM inputs, source-direct	BB	104
Marantz PM-30SE £150	Very Good Good+	The breathed-on version of Marantz' PM-30 offers an engagingly detailed and spacious sound though one that's warmer via MM disc than CD.	50W, 3 line, 2 tape and MM disc. Source direct	R	92
Marantz PM-40SE £240	Very Good Good +	The improved version of their basic PM-40 model has itself been updated to provide a bigger and more exciting sound. A good 'un	61W, tape, 3 line + MM/MC disc. Source Direct	R	97
Marantz PM-50 £260	Good + Average +	One of Marantz's new breed, the PM-50 has a big and beefy sound yet one that lacks refinement	92W, MM/MC, 4 line inputs, source-direct		80
Marantz PM-62 £270	Very Good Average	A valiant attempt to introduce remote control into the audiophile sector has fallen on stoney ground if the rather flat and uninteresting sound of this amp is any guide.	101W, MM/MC, 4 line and 2 tape inputs, full remote control		116
Marantz PM-72 £300	Good + Average	This is a very neutral, pleasantly detailed and even-handed performer but one that lacks a sense of emotion or expression	155W, 3 line, 2 tape and MM/MC inputs		109
Marantz PM-75 £500	Good Average	More successful than most amps with on-board DACs but still not as balanced as other Marantz products	136W, opt/coax dig inputs, 6 line + MM/MC		68
Marantz PM-80 £400	Very Good Good +	Technically robust with an equally beefy and tactile sound. Great sense of power and control but spatially a little flat	133W, 3 tape, 4 line + MM/MC. Class A option	R	85
Meridian 201/205 £760/£525each	Very Good Good +	A fine preamp with additional luxury option of full system remote, plus competent and attractive monoblok power amplifiers with generally good performance	100W MM/MC 6 line inputs remote capable straight line	R/-	62

The Directory

AMPLIFIERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Moth Series 30 £132/£254 + £	Good Very Good	A modular system capable of cracking results. The passive preamp and power amp combination is especially good value and warrant a Best Buy in their own right.	35W, 4 line inputs on passive pre, MM/MC on phono eq unit	R/B	109
Musical Fidelity Preamp/Typhoon £200/£300	Good + Good +	The standard Preamp/Typhoon combination plays everything close to its chest but bridge the power amp and you'll witness an explosion of spacious, ambient detail.	62W, 4 line plus 2 tape inputs, XLR balanced connections.	R	116
Musical Fidelity Tempest £200	Good + Poor +	This basic but lusty line-only integrated amp has a disturbingly bright and forward sound, accentuating strings and percussive detail above all else	62W, 4 line and 2 tape inputs, MM option		116
NAD 302 £160	Very Good Good +	A spritely and uplifting performance from the latest in a long line of market-leading budget amplifiers. Sounds loud but never intrusive or fatiguing.	39W, MM, 3 line and 2 tape inputs, BB soft-clip option		116
NAD 3020i £150	Very Good	The most balanced and communicative of NAD's 3020 series. Great at revealing subtle musical clues without aggression	31W with tone controls, 3 line + MM inputs	BB	85
NAD 3225PE £160	Average + Average +	Light and detailed if not as rich or weighty sounding as others. MM input sounds warmer than CD	42W + 70W dyn. headroom; soft-clipping, MM only	R	68
NVA AP20 £260 or £290	Average - Good +	Available with or without a disc stage this utilitarian amplifier sounds gentle and restrained but is euphonic and utterly engaging	35W, 2 line, tape and either MM or MC inputs	R	109
Naim Separates £350/£180	Very Good Good	A consistent and coherent series of 'building blocks' for conventional passive or active operation. Sound quality ignores conventional audiophile standards of presentation, but	40-70W, MM/MC etc	R	60
Onix OA-21s/SOAP £350/£180	Average + Good -	Via MM disc this amp comes alive with a fresh and vibrant sound though its CD input sounds utterly dead by comparison.	60W, 1 tape, 3 line and either MM or MC. Outboard PSU option		97
Onix OA22L £300	Good + Average +	Nothing genuinely unpleasant about this line-only amplifier, simply that its hurried and lacklustre sound fails to spark the imagination.	39W, 4 line and 1 tape input, no-frills construction		116
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
Orell SA-040SE £400	Average Average +	Very natural, relaxing if not overly exciting via CD, the sound closed-in to become 'pinched' or fettered via disc	64W, 5 line + MM/MC i/p's. Tweak components.		71
Philips FA-930 £200	Average Average +	Radical styling hides a digital switching facility plus full remote control over what is Philips' best effort to date	99W, tape, analogue and digital inputs with ESI BUS	R	109
Philips FA890 £230	Good + Good -	Based on their FA880 model but tarted-up with a remote control facility. Inoffensive, civilised but unexciting sound is retained	120W, 6 line + MM/MC logic-controlled input switching		97
Pioneer A-229 £130	Average + Average	An unambitious amplifier that fights shy of tricky speakers with a sound that's equally unadventurous. Slightly soft and comfortably even-handed presentation	60W, 2 line, 2 tape and MM inputs, loudness and direct		104
Pioneer A-300 £160	Very Good Good	The cheapest of Pioneer's dynamic duo gives off its best with CD rather than MM disc which failed to shine quite so brightly.	55W, 3 line, 2 tape and MM. Independent rec out facility.	R	92
Pioneer A-300X £200	Good + Average +	This revamped version of the A-300 was also more confident sounding via CD than MM, yet our panel were still left unmoved.	55W, MM, 3 line and 2 tape inputs, dual-concentric volume.		116
Pioneer A-400 £240	Very Good Very Good	Pioneer's design concept snaps into focus with the A-400, an amp that seems to bubble with musical detail. A bench-mark that other manufacturers should strive for.	71W, 3 line, 2 tape, MM/MC. Independent R-out switching.	BB	92
Pioneer A-676 £280	Good + Average -	A lusty amplifier at a modest price yet one that failed to inspire our listeners with its bland, indifferent sound	98W, 4 line, 3 tape and MM/MC inputs + subsonic filter		109
Pioneer A-777 £400	Very Good Average -	A larger version (!) of the A-676 that offers more power but an equally sluggish and uninspiring sound	121W, 4 line, 3 tape and MM/MC inputs + muting facility		109
Proton 520 £115	Average Average	Very well equipped budget amp with a slightly flat and undynamic sound - acceptable at the price though	31W, MM/MC with variable MC gain, 4 line inputs	R	74
Proton AP-1000/AA-1150 £250/£395	Good + Average +	Bags of headroom available from this pre/power combo, but can seem bloated or unrefined via MM	67W, MM/MC, adjustable MC gain, 5 line inputs		80
QED A240 CD II £249	Good + Good	Latest 240CD is fine value for CD and has competent MM disc input as well	45W MM 5 line inputs straight line	BB	62
QED A270CD/PA £369/£429	Good Good +	Recent updates have bolstered the output of the A270 without adding to its colourations. The PA option is a touch expensive	61W, 2 tape, 3 line + MM or MM/MC from PA board	R/-	97
QED C300/P300 £329/£370	Good Good	A cost-effective combo, limited in its resolution but no less beguiling as a result. Disc stage is sweeter but samey	58W, 2 tape, 3 line, MM/MC + mono/biamp opt.	R	85
Quad 34 £366	Very Good Average	This well-built durable preamp has useful filtering and above average tone controls but was found lacking in sound quality (viz: detail/dynamics)	4 inputs MM/MC tone controls		44
Rational Audio £175	Average- Average+	This wacky newcomer from Czechoslovakia offers a very open and fluid sound via CD but its performance via MM depends very much on the cartridge's load impedance.	129W, caters for line and MM disc sources but has no i/p selector.		92
Ray Lumley Model 75 £1995 p	Average Good +	Monstrous valve monoblocks which represent good value. What they lack in musical subtlety they make up for in sheer muscle. And these are Lumley's small monoblocks!	75W monoblok		78

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AMPLIFIERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Rega Elex £298	Good Average	A minimalist amplifier from a UK specialist and one that sounds too forward, hard and unforgiving for its own good. Shows plenty of promise, however.	51W, MM, 3 line and 1 tape input		116
Revox B150 £1047	Very Good Average +	Beautifully constructed but hampered by Revox's convoluted logic control. Open and smooth sound. Still costly.	117W, CMOS sw. for 3 line, 2 tape and MM		68
Revox B250 £1467	Very Good Good	With much improved sound over its predecessors plus amazing remote control facilities, this could form the heart of a round-the-dream-house system	150W MM/MC system/house remote tone controls		56
Rose RV-23 £395	Good Very Good	Beautifully built classy British 'hybrid' preamplifier. You can spend more to get a more transparent sound but it's hard to criticise given the competitive price	MM plus 3 line inputs	R	77
Rotel RA-930AX £160	Good - Very Good	Based on the original RA-820AX but featuring a new look and a tweaked circuit design, this budget wonder captivated our listeners with its clean, vibrant and thoroughly involving sound	53W, 3 line, tape and MM inputs, tone bypass	BB	104
Rotel RA-940BX £200	Good Good	Rotel's cheapest 'BX' amplifier prompted a mixed reaction, some finding it muddled while others thought it 'exceedingly musical'	53W, 3 line, 2 tape plus MM/MC inputs. Tone defeat	R	109
Rotel RA-960BX £275	Very Good Good +	If you like your music to harbour a latent rather than blatant sense of power then the confident restraint of Rotel's RA-960BX could be just the ticket.	88W, MM/MC, 3 line and 2 tape inputs, tone defeat	R	116
Rotel RC-960BX/RB-960BX £150/£180	Very Good Good -	With excellent standards of construction, flexibility and plenty of power under the bonnet, this duo represents an ideal choice for the first-time buyer.	80W, bridge-mono facility. 3 line, 2 tape and MM/MC on preamp	R	104
Rotel RC-980BX/RB-980BX £275/£350	Excellent Average	Plenty of watts per pound sterling from a technically flawless combination. Its sound is equally expansive but lacks a sense of poise, of control and fine detail - a disappointment	143W (33A), 3 line, 2 tape and MM/MC inputs + headphone socket		109
SAE P102/A202 £499/£599	Average + Average +	Microprocessor-controlled pre and power amp that sounds much better at low rather than high volume levels. Pro-oriented aesthetics	151W, MM/MC + 2 liner and 2 tape, tone memory, spk switching		74
Sansui AU-X111 £100	Good Average	Sansui has engineered an amp that's both solid and flexible for the price, but its sound is rather bland compared to competition in the £110 sector	5 line inputs, MM, 52W		92
Sansui AU-X911DG £700	Very Good Good +	At its best when used with the on-board MASH/PWM DAC where it sounds technically neutral but still emotionally charged	112W, 4 dig, 3 line and MM/MC i/p's, Rec-out	R	85
Sony TA-F440E £180	Very Good Good	A new budget amp based on tried-and-tested circuits but free of spurious widgets like tone controls. It has a fresh and up-beat sound with plenty of detail, can sound smeared via CD	109W, 3 line, 2 tape and MM + rec out	R	104
Sony TA-F540E £230	Very Good Good -	An extra £50 buys you an MC input but little else over and above the TA-F440E. This version sounds more consistent from input to input but is still rather superficial or unconvincing	108W, 3 line, 2 tape, MM/MC + rec out		104
Sony TA-F670ES £400	Very Good Good	Nothing fancy, just a heavyweight amplifier that puts up 'a damn fine show'. Fresh and sharp-sounding but a little too expensive	133W, 3 line, 2 tape, direct and MM/MC inputs. Pre-out facility		109
Sony TA-F730ES £450	Very Good Good	A very stable and coherent amp but one that lacks a crucial sense of involvement	133W, MM/MC, 3 tape, 2 line, full rec-out		80
Sony TA-F770ES £600	Good + Average -	Another monster amp offering full remote control and buckets of power. It's also another monster amp that sounds appalling	125W, 3 line, 3 tape, direct and MM/MC inputs. Remote operation		109
Sound Audio VP3a/HBP60a £599/£599	Good Average ++	Hybrid power amp and valve line stage. Big 'n' beefy power amp is the stronger partner	4 line, 1tape 60W	R	100
Sugden A21a £395	Average+ Good	The modern-day relative of Sugden's original Class A amp and one that offers a smooth, easy-going sound. Best partnered with sensitive speakers.	25W power amp with a good 16W inPure Class A		92
TEAC A-X400 £115	Average Average	Sibilance and a lack of crisp vitality hamper the performance of this amp, as does the stringent protection circuitry	59W, 4 line + MM + tone + mic i/p level control		85
TEAC A-X5000 £229	Good Average -	This amplifier is compromised by a grey and muddled sound that taxed the concentration of our listeners. Better via MM disc	107W, 3 tape, 3 line + MM/MC Source Direct		97
Technics SU-810 £130	Average + Average	Our sample started off sounding fast, taut and well-integrated yet eventually failed on the MM disc input	66W, 2 tape + 3 line + MM. Tone + loudness		85
Technics SU-VX600 £200	Good + Good	What looks like a fairly ordinary mass-market offering is actually the first 'tweaked' amp from Technics, its solid and sharply focussed sound a taste of things to come.	90W, 3 line, 2 tape, MM/MC + power-amp inputs	R	104
Technics SU-VX720 £250	Good + Average +	This new MOSFET amplifier provoked a very mixed reaction, its big and spacious sound either appearing rough and blustery or impressively grand depending on the music at hand.	84W, MM/MC, 3 line plus 2 tape inputs, remote volume		116
Technics SU-VX800 £450	Very Good Average	On the other hand, this is a mass-market amp still hampered by over-enthusiastic protection circuits! It sounds raw and congested when the going gets tough - positive but raucous	148W, 3 line, 3 tape, balanced input + MM/MC		104
Technics SU-VZ220 £100	Good Average -	Cheap, cheerful and pretty flexible to boot yet the SU-VZ220 quickly sounds thin, splashy and relentless when the going gets tough	50W, 3 line, tape and MM inputs plus tone and loudness controls		109
Threshold FET 10e system/ £900	n/a Very Good	Almost valve-like limpidity and excellent soundstaging are star qualities of the Threshold amps. Line input resistive loading is too low	Component FET phono stage, line pre, FET power amp 100w		Coll. '9
Woodside ISA230 £900	Average + Average	Another smooth and inoffensive valve amplifier if one that lacks the sparkle and euphony required for a truly entertaining sound.	27W, 4 line and 1 tape input, MM version available.		116
Woodside SC26/STA35 Renaiss	Good Good+	Synergistic pairing with a cool, controlled sound, good focus and transparency. More about poise than grunt	35W, valve, 3 line, optional MM or MC, 2 tape outs		100
YBA 1 power amp £2995	Good Excellent	This equally well finished power amp offers front rank stereo staging and transparency, and is capable of driving the most difficult loads	85W	R	62
YBA 1 preamp £2895	Very Good Excellent	A front line French audiophile product. Great stereo and a fine Krell style finish	MM/MC, 3 inputs, straight line	R	62
YBA 2 pre & pwr £1395/£1695	Very Good Very Good	Superbly finished French separates, with very good space and transparency, slightly softened bass. Needs extra transformer (£300) for MC cartridges	70W MM (MC extra) straight line	R	56
YBA Model 3 £995/£995	Good Good	Suited to highish sens. loudspeakers this duo produced see-through, ethereal stereo images that were more convincing towards the centre of the soundstage than at the edges	56W stereo amp MM only with 3 line i/ p's.		72
Yamaha AX-330e £100	Average + Average +	An improvement on earlier efforts but still a little bland or lack-lustre. Very compatible though	48W, MM, 3 line inputs, source-direct option		80
Yamaha AX-550 £240	Very Good Good	neutral yet lacks the ability to involve on an emotional level	131W, 5 line + MM/MC. Pure Direct + remote control		97
Yamaha AX-750 £399	Very Good Average	Big and bulky with remotely-controlled input and volume. Impressive handling, but two samples split the opinion of our listeners, one sounded squashed the other fast and articulate	149W, 3 line, 2 tape, MM/MC inputs + remote control		104

TO GET THE FULL PICTURE WHY NOT ORDER A BACK ISSUE - TURN TO PAGE 35 FOR FURTHER DETAILS

CASSETTE DECKS

The bad odour of copyright theft hangs around the compact cassette, but there is no doubt it is the world's most versatile and ubiquitous music storage medium. Hi-fi buffs may wrinkle their noses pointedly, but are still happy to use cassette decks to make up tapes for the car or personal – at the same time complaining loudly about the quality of pre-recorded material. (In fact the very best decks can do a surprisingly good job with musicassettes.)

There is no problem in connecting a cassette deck to any normal amplifier, but some care needs to be taken in choosing the best tapes for a

specific machine. (Trial and error is one effective technique, but many decks have manual bias adjustment and some match up to the tape automatically.)

Lab performance and sound quality often go hand in hand, and are frequently somewhat dependent upon factory alignment. The mechanical integrity of the mechanism itself is another crucial factor, that is often reflected in the asking price.

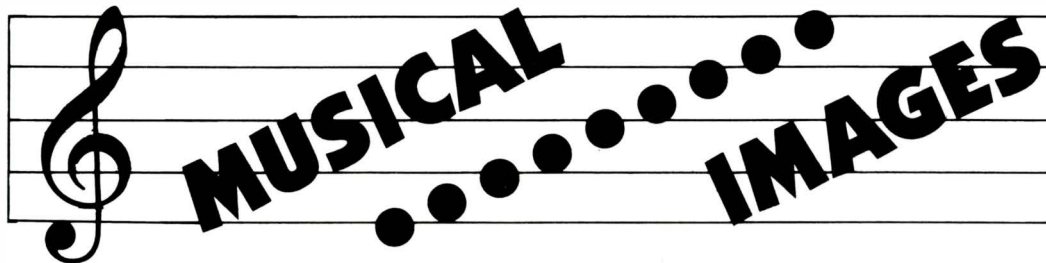
All modern hi-fi decks have Dolby B and the majority have Dolby C besides; the very worthwhile HX Pro system is becoming steadily

more widespread. Remote control remains rare, though sometimes it is available as a system option.

Three-head recorders allow simultaneous checking of the recording being made. Auto-reverse is a useful convenience feature, but usually with some mechanical compromise, while double-mechanism 'dubbing' decks of dubious quality are fashionable at the bottom end of the market. The welter of different 'music search' systems available is some indication of their frequent ineffectiveness.

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Acoustic Research RD-06 £300	Average	Acceptable middle market player with very simple facilities and cramped control section, but unusually good looks	Dolby B/C/HX Pro, fine bias, counter memory, repeat		69
Aiwa AD-F410 £100	Average	Comparable to AD-F500 but cheaper: Good all round performance, well adjusted, useful basic and not so basic features	2 head, Dolby B/C/HX Pro, bias adjust	BB	99
Aiwa AD-F500 £160	Average	Noise levels are a little higher than usual, but sound quality is otherwise very good - open, explicit and very neutral tonally.	Dolby B/C/HX Pro, cue/review, fine bias, record sensitivity adjust	R	93
Aiwa AD-F810 £200	Good	First class budget 3-head machine with a dual capstan transport that really works at reducing the 'fudge' factor	Dolby B, C, HX Pro, bias adjust, track search, variable hdph	BB	99
Aiwa AD-WX616 £160	Poor	Sonically sub-standard twin transport deck which has sensible range of well implemented features, yet which sounds compressed and uneven.	Twin full logic, 1 records, Dolby B/C track search	R	93
Aiwa XK-S9000 £700	Good +	Genuine state of the art in battleship pale gold/wood gloss clothes. Fabulous build, clunky transport and sharp, refined sound quality with Dolby S or B and metal tapes	Dolby B/C/S/HX Pro, built in DAC, tape alignment	R	105
Akai DX-57 £200	Good	Confident sounding price deck which eschews fancy gadgets for a good transport and decent electronics. Sound quality is firm and tidy under most conditions of use; avoid Dolby C.	3 heads, dual capstans, Dolby B/C/HX Pro, variable bias		105
Akai GX-32 £170	Average	Constrained and smeared sum up this deck well. It has poor bass and treble definition alike, though it proved well aligned for prerecorded cassettes	Dolby B/C, variable bias, headphone out, track search		69
Akai GX-52 £250	Very Good	Well finished and a pleasure to use, this well specified deck sounds clean and defined with all tape groups, with or without Dolby	Dolby B, C, HX Pro, track locate features	BB	57
Akai GX-65 £300	Average	Fine ungimmicky middle ranking deck with simple, purposeful controls, works best with metal tapes. Performance standards fair to good	3-head, dual capstan, Dolby C/HX Pro		87
Akai GX-95 £400	Good	Well designed and finished cassette deck with features well judged to please the audiophile. The calibration system is simple and effective, and the deck sounds great	Dolby B/C/HX Pro, 3 head, manual tape set-up	R	69
Akai GX-95II £400	Good	Sharp, clear and articulate sounding deck, with superb performance extending to frequency extremes	3 heads, dual capstans, tape calibration, Dolby B/C/HX Pro	R	99
Akai GX-R35 £200	Average	Middling sound quality at best with Dolby B; deteriorates with Dolby C and unsatisfactory anyway with testing material due to loss of low level information	Auto-reverse (optically triggered), Dolby B/C/HX Pro, bias adjust		99
Akai GX-W45 £299	Average	Costly but musical high-spec dual deck, doesn't like modern high energy Type IIs and IVs, but with careful tape matching it has all the key attributes, including stability and clarity	Dual auto reverse, record/play transports, Dolby B/C/HX Pro	R	111
Arcam Delta 100 £850	Excellent	Ambitious first cassette deck from Arcam has a superb transport and a ripe, spacious sound. The Dolby S installation more successful than most. Some replay incompatibility	3 heads, dual capstans, Dolby B/C/S, tape calibration	R	111
Denon DR-750A £250	Average	Workmanlike and simply equipped dual deck which is more appealing on audio grounds than most of its type	Dual transport, Dolby B, C & HX Pro	R	99
Denon DRM-510 £140	Good	An amnesic Dolby switch and lack of timer standby detract from an otherwise strikingly successful deck with a consistently good performance	2 heads, Dolby B/C/HX Pro	R	99
Denon DRM-710 £230	Average	Although this is a fair performing model, the design has lost some of the competitive edge of its predecessor, the DRM-700. Memo: must try harder - and where's the timer standby?	Dolby B/C/HX Pro, fine bias adjust, record return		105
Denon DRS-610 £200	Average+	Unique loading mechanism provides stability, and the deck has a crisp, clean quality. But has occasionally anaemic bass and a channel mismatch with metals	Drawer loading, Dolby B/C/HX Pro, R fine bias, track search		111
Denon DRS-810 £300	Poor	Basically good deck with non-stressful material let down by an inability to deal with high energy tapes properly. The horizontal loading mechanism is a success.	CD style loading drawer, real time remaining display, Dolby B/C/		105
Denon DRW-650 £200	Average	This simply equipped model is a little fiddly to operate at time, partly because of the way the single set of transport keys is assigned. But sound quality is generally workmanlike - good value	Twin transport, Dolby B/C/HX Pro	R	93
Dual CC800RS £150	Average -	Low(ish) cost auto-reverse deck has mic input but lacks some niceties. Delivers a punchy but ultimately rather crude impersonation of source material, and a thin, lightweight bass.	Auto reverse, Dolby B, C, HX Pro, microphone input.		105
JVC TD-R441 £170	Average -	This deck would make a good choice for those who need the unattended recording time to deal with absentee recording off air, but is a less than wholly convincing musical advocate.	Auto reverse transport, Dolby B/C/HX Pro, CD direct input		105
JVC TD-V1010 £400	Good+	Very high grade enthusiasts deck with almost-CD like resolution and stability, especially with Type IV tapes	3 heads, Dolby B/C/HX Pro, variable bias, sens, 3 line,	R	111
JVC TD-V541 £280	Very Good	Crisp, lively sounding deck with excellent timing and occasionally slightly thin tonal quality. Best with metals and Dolby B	Dolby B/C/HX Pro, 3 heads, fine bias, display off	BB	105
Kenwood KX-5030 £200	Good	confusing mishmash of listening impressions caused by poor set-up afflicting metal tapes and Dolby C in particular. Promising otherwise	2 head, Dolby B/C/HX Pro, auto-bias, track search		99
Kenwood KX-5530 £190	Average -	Neat looking and well equipped deck, adequately engineered but somewhat lacking musically. Worth considering if auto-reverse is the key to your happiness.	Dolby B/C/HX Pro, auto reverse, auto biasing, auto fader		105
Kenwood KX-7030 £260	Good	Fine, articulate middle price cassette deck whose only (mild) failing with some programme material is a just perceptibly synthetic glaze	3 heads, dual capstans, Dolby B/C/HX Pro, auto bias	R	99
Marantz CP230 £300	Average	This is a competitively priced portable recorder though not suited to replay of musicassettes	Dolby B, bias adjust	R	52
Marantz CP430 £400	Average	Uniquely flexible and compact package for outside work which at a pinch can double as a domestic cassette deck. dbx is useful for location work; results with Dolby B are acceptable	Portable, 3 head, dbx, fine bias charger/adaptor	R	87
Marantz SD315 £180	Average	Sound quality is promising, but somewhat offset by 'shut in' top end. Pitch integrity suspect. Dolby C sound quality and dubbing performance poor	Dolby B/C/HX Pro, twin transports, one rec/play, one play only. Mic i		93
Marantz SD40 £150	Average	Obstructive aesthetics are offset by apparently good build and sensible features, but sound quality is uneven or worse.	Dolby B/C/HX Pro, fine bias	R	93
Marantz SD50 £230	Good	Fine, exacting all-rounder offering good stereo, precision and focus. Good with prerecorded tapes too.	Dolby B/C/HX Pro, track & intro search, variable bias etc	R	81
Marantz SD515 £350	Poor	Good electronic design is let down by mediocre alignment and poor transport stability.	Twin auto-reverse, both transports record, HX Pro, parallel recording		93

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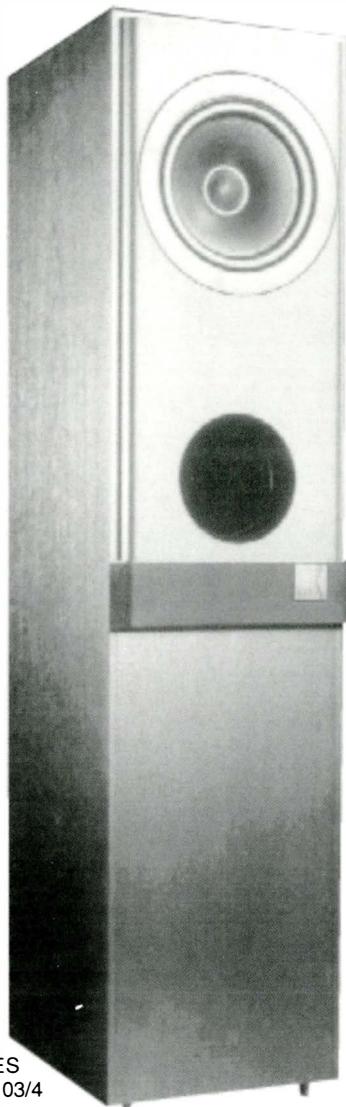
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The Directory

CASSETTE DECKS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Marantz SD60 £350	Good Very Good	A first rate, highly capable deck offering energetic yet refined sound largely due to good electronic design	3-head, Dolby B/C/HX Pro, variable bias & sensitivity	R	81
Memorex SCT-5 £150	Poor Poor	Poor example of a twin cassette deck where everything has been sacrificed on the altar of flexibility	1 rec/play, 1 play only transport, Dolby B/C		87
Nakamichi Cassette Deck 1 £ 700	Good Good	New modernised Nakamichi is still curiously old fashioned in many ways, but offers unusually articulate sound of great insight	Dolby B/C, 3 heads, dual capstans, var azimuth	R	99
Nakamichi Cassette Deck 1.5 £500	Good Very Good	High grade 3 head deck with minimal features but fine engineering and sweet, open though slightly coloured sound quality	Dolby B/C 3 heads, bias adjust	R	105
Nakamichi Cassette Deck Two £350	Very Good Very Good	Not completely neutral, this deck is assured, dynamic and quick, with abundant detail and some coarseness. Stable transport but rudimentary features accompany fine under the skin engineering	Dolby B/C, manual tape type selection, bias adjust	R	93
Nakamichi RX-202E £600	Good Very Good	Fine, clear and articulate sounding player. Excellent with prerecorded material, but idiosyncratic and sometimes obstructive control	Auto reverse, Dolby B, C, 2 head	R	63
Philips FC870 £250	Average Average	Disappointing at the price, this is a well equipped deck with off-tape monitoring, but a somewhat listless, smeared musical style	Dolby B/C/HX Pro, 3-heads, track/intro search etc		81
Pioneer CT-91a £550	Very Good Very Good	Superb, near state of the art recorder with an excellent dual capstan transport and very capable electronics. At the price, this one is a mould breaker	3-head, tape calibration, Dolby B/C/HX Pro	R	75
Pioneer CT-93 £800	Excellent Excellent	State of the art deck, built like something out of NASA's shuttle, with superb all round performance. Dolby S can muddle ambient information, but increases effective dynamic range	Dolby B/C/S/HX Pro, auto tape align, 3 heads, dual capstans	R	99
Pioneer CT-S410 £200	Average+ Average+	Powerful selection of features, excellent ergonomics and the fine, explicit sound with metals, though some instability was noted and the first test sample was faulty	3 heads, Dolby B/C/HX Pro, automatic tape alignment	BB	111
Pioneer CT-S610 £270	Good Very Good	Exactly engineered and highly articulate up-market cassette deck. Electronics are slightly coloured, but imagery and dynamics are finely resolved	3 heads, Dolby B/C/HX Pro, Super Auto BLE, CD Sync	R	111
Pioneer CT-W601R £200	Average- Average-	Mediocre performance attributable to flimsy build and less than stable transport. Frequency responses not wholly accurate even with Auto BLE. Not ideal ergonomics	Dual auto reverse, one records, Dolby B/C/HX Pro, Auto BLE		111
Pioneer CT-W650R £200	Average Average	There were some intermittent problems with the tape alignment system on the test sample, but the deck was otherwise good, despite a coloured bass and inability to exploit Type IV tape	Twin deck, both reverse, one records, auto align, B/C/HX Pro	R	105
Revox B215 £1727	Very Good Very Good	Fine, consistent and solid sound quality, with excellent under the skin engineering and many useful features — but you're also paying for the same	Dolby C/HX Pro, 3 heads, dual capstans, auto tape align	R	87
Revox B215-S £1826	Very Good Very Good	This is a superbly engineered deck with a classically fine performance that almost transcends the stereotypes. Ergonomics are flawed but the user interface is both powerful and flexible	3-head, dual capstan, Dolby B/C/HX Pro, auto calibration	R	75
Revox H1 £1,145	Very good Very good	Bare bones version of B215 is still a sophisticated piece of kit, and lacks for none of the 215's engineering prowess	3 heads, Dolby B/C, auto tape align, semi-auto record level set.		99
Revox H11 £938	Average + Average +	Costly and well engineered deck which boasts the bare minimum of facilities and which is primarily designed for the Revox multi-room H-Line system. Moderate performance.	3 head, Dolby B/C/HX Pro, manual tape alignment		105
Revox Pro Series C115 £843	Good Good	Not for the numbers freaks, it's unobtrusively musical, with a slightly wayward top and a very clean, extended bass	Professional 3 head, Dolby B/C/HX Pro, variable bias & sensitivity.		111
SAE C102 £549	Average Good	Looking most unlike a cassette deck designed in the States and proving competitive in its price group. Not sonically that outstanding, however	Real-time counter, track search, Dolby B & C		52
Sansui D-X111E £120	Poor Poor-	Very high levels of flutter, and a shabby, hollow sound with metallic colorations and a severe loss of detail - is it necessary to go on?	Dolby B/C/HX Pro, fine bias adjust		105
Sansui D-X117WR £220	Poor Poor	Bass is thin and coloured, and the sound lacks dynamics, pitch accuracy and overall stability - the sound is neither stable nor solid. Prerecorded cassette quality is also poor	Dual, one transport records, both auto reverse, Dolby B/C/HX Pro.		111
Sansui D-X211HXR £170	Good Good+	Clean, stable and open sounding recording quality distinguishes this player, - and auto-reverse too. A great improvement on earlier mid price Sansui models, and excellent value.	Auto reverse, Dolby B/C/HX Pro, bias adjust	BB	93
Sansui D-X311WR £250	Poor Poor+	Not wholly successful auto-reverse deck which suffers because it has tried to be all things to all people. Lack of clarity is the main limitation	Twin optically triggered auto-reverse, Dolby B, C & HX Pro		99
Sherwood DS-1135C £100	Average Average	Excellent value. There is a low level constant background drone, and Dolby C recordings sound flat and coloured. Elsewhere sound quality exceeds expectations	Dolby B/C/HX Pro	R	87
Sherwood DS-7000R £230	Average Poor	Rough and ready cassette deck in which sound engineering has been sacrificed on the altar of extra selling features, namely three heads for real time off-tape monitoring	3-head Dolby B/C/HX Pro		87
Sony (WMD6C) Pro Walkman £249	Good Very Good	One of the finest sounding cassette decks on the market today. A mandatory Best Buy, which also fits in your pocket	Dolby B, & C	BB	60
Sony K870ES £350	Average+ Average+	Good but not outstanding deck which proved slightly disappointing on audition. This model is no standard setter	3 heads, dual capstan transport, Dolby B/C/HX Pro, tape calibration		99
Sony TC-K520 £170	Average Good	Fine, assured and detailed performer with a very well designed and straightforward user interface	Dolby C/HX Pro, variable bias, display on/off	BB	87
Sony TC-K570 £200	Good Average+	Good if slightly untransparent sounding recorder, comfortable with all noise reduction circuits and all tape groups	3 heads, Dolby B/C/HX Pro, bias adjust	R	99
TEAC V-5000 £300	Average+ Good-	Fine middle ranking heavyweight with blemish free overall performance, beaten only on subtleties by the best at the price	3 heads, dual capstans, bias/sensitivity adjust, Dolby B/C/HX Pr		99
TEAC V-7000 £400	Good Good	Intrinsically sharp, clear and solid sound spoiled by exaggerated detail with prerecorded material and losses imposed by Dolby circuits	3 heads, quartz locked dual capstans, tape align, Dolby B/C/HX		99
Teac R-9000 £450	Good + Good	Much better than average auto-reverse deck, well worth considering, though short of the special qualities required for formal endorsement at this price. Nicely engineered too.	Auto-reverse, 3-head, tape calibration, Dolby B, C, HX Pro		105
Teac V-8000S £700	Good + Good	Superb stability and real subtlety from a cassette deck, this must be the best Teac yet. The only disappointment was the Dolby C circuit which was coloured and lacking in transparency.	3 heads, dual capstans, Dolby B/C/S/HX Pro, tape calibration	R	105
Technics RS-BX626 II £180	Good Good	First rate deck at a bargain price. Losses when recording are low and mostly benign, and dynamic range with high energy tapes is excellent. An all-round achiever	3-heads, Dolby B/C/HX Pro, optional remote control	BB	111
Technics RS-BX707 £220	Average Average -	Uneven but ultimately messy sounding deck with a number of oddities, including a tape calibration system lacking in accuracy and poor Dolby alignment	3 heads, Dolby B/C/HX Pro, bias & level calibration		105
Technics RS-BX828 II £300	Good + Good	Fine middle ranking deck, with explicit detail and stability, but which in the final analysis doesn't go much further musically than the cheaper RS-BX626	3 heads, Dolby B/C/HX Pro, tape bias/sensitivity lineup,		111
Yamaha KX-260 £150	Average Average	Lively, entertaining deck that trades gadgets for a convincing performance at an attractive price point	Dolby B/C/HX Pro, Play Trim, bias adjust	BB	111
Yamaha KX-360 £179	Average Average	Updated KX330, performance has a very KX-260 like dryness and precision. Good - but doesn't 'breathe,' and occasionally sounds unstable	2 heads, Dolby B/C/HX Pro, bias, Play Trim, intro scan,		111
Yamaha KX-650 £300	Average+ Good	Fine audio manners, especially in the midband and treble, mark this high class deck out from the crowd	3 heads, dual capstans, Dolby B/C/HX Pro, play trim, bias adjust	R	99
Yamaha KX-W362 £250	Average- Average-	Almost a good deck, it is let down by audible levels of wow & flutter, apparent even with prerecorded material. The audio circuits are good	Two auto reverse, 1 records. Dolby B/C/HX, Play Trim		111

CD PLAYERS

Now nearly a decade old, this all digital music source is well established despite high disc prices and the opposition of many hi-fi enthusiasts. Compact Disc's strengths over conventional vinyl are complete freedom from surface noise, ease of use, and more robust software. Remote control is just about standard on all new players.

However, many vinyl enthusiasts find CDs

sound less involving than top quality vinyl.

Prices average out at a little over £200, although entry level models are now available for little more than £100. Even the most basic models can sound very good indeed and employ state of the art decoding chips and the most useful play features. Extra money can buy remote volume control, audio 'tweaks', plus improved build and component quality control.

Digital outputs facilitate an easy upgrade path

Machines can be split into bitstream and multi-bit with each school having its adherents. Bitstream is the newer technology and will probably win in the end, although the development time spent on multi-bit systems means that excellent results can still be obtained.

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Acoustic Research CD-06SE £450	Average- Average-	Basic Philips machine with beefed-up chassis and a revised analogue board. Distortion is higher than normal while the sound lacks both immediacy and clarity.	Remote control, programming but no direct track access, 16bit 4x		95
Acoustic Research CD-07 £300	Good Good	AR's first Bit Stream CD player relies heavily on Rotel know-how to produce a smooth, detailed but undemanding sound	Few features on player, remote, dig o/p. SAA7321 PDM DAC	R	100
Aiwa XC-300 £130	Average + Average +	Cheap, cheerful and gratifyingly free of digital 'nasties', this new bitstreamer is well-equipped but safe rather than thrilling on the sonic front.	Remote control, optical output, Toshiba bitstream DAC.	R	107
Aiwa XC-700 £180	Good+ Very Good	Generously equipped player that harbours a top Philips' Bit Stream DAC. Offers a characteristically smooth and effortless 'bitstream sound'. Exceptional value	Remote control plus index skip, midship transport and 7350 PDM DAC	BB	95
Aiwa XC-900 £210	Good + Good -	The loss of transparency and general awkwardness of this player comes as a surprise after the XC-700. Extra features have taken their toll	Remote control with variable o/p, midship transport, 7350 PDM DAC	R	100
Akai CD-52 £249	Good Good	A nice surprise from Akai, genuinely good sound from this mid-priced model. Better linearity will help further	Remote, digital output, headphone socket	BB	64
Akai CD-55 £230	Good Average -	Budget model which fails to compare with the CD52	Remote, hdph, Good programming		83
Akai CD-57 £180	Average + Average +	A very flexible machine with a slightly lumpy but fullsome bass, no model of clarity but very entertaining!	Remote control, motorised volume, hybrid PWM DAC.	R	107
Akai CD-62 £330	Average Very Good	Looks, build quality and the technical specification are right up to date. As it stands it sounds ve good but if the indifferent lab performance is improved, it would probably sound even better	Remote, programme, hdph, comprehensive display etc	BB	70
Akai CD-73 £450	Good Average	A little uneven musically, the Akai tends to smother fine detail, but has first class dynamics and stereo imagery. Worth auditioning	Track entry keypad remote, menu display (switchable)		62
Akai CD-93 £700	Good Very Good	Undoubtedly a CD player of real class in build, presentation, lab performance and sound quality, but also a shade expensive for formal Recommendation though that's not to dissuade lovers of	Track entry remote, menu display etc.		58
Arcam Alpha Plus £420	Good - Good +	As its name suggests, this is the 1992-version of a classic 16-bit player with an all-round smoother sound!	Remote control, 20-track memory, digital o/p, 16-bit DAC	R	112
Arcam Delta 70.3 £650	Good Good+	Latest in a line of Delta 70 CD players and one that offers a distinctly rugged, beefy sound. Plenty of power behind individual instruments but lacks a feeling of involvement	Remote control, display dimmer, variable and dig outputs. 7350 PDM		95
CEC 880CD £230	Poor Average	The dynamic and spritely sound of this machine is gratifying in the light of its primitive design but is otherwise poor value	Remote control, direct track access, dig o/p, hybrid PWM DAC		100
Carver TL-3220 £495	Good Average	A lightweight player with primitive display. We thought it sounded rather sparse and dry, and though Carver's DTL feature certainly fleshed-out the bass it also softened the stereo focus	Remote control with volume keys, 'Digital Time Lens', 18bit 8x		95
Carver TL-3300 £595	Good + Poor	Carver needs to listen critically to CD sounds; in our opinion, DTL does not improve the recipe	DTL, remote, programming, digital output		83
Cary Audio Design CAD-955 £899	Average Average +	Rotel's latest 16-bit wonder with an add-on valve processor to filter-out any residual RF garbage. Nice idea but the player sounds very dry and taut, lacking warmth and body.	Remote control, triode-output stage, Philips 16-bit chipset.		107
Creek CD60 £500	Good + Good	A big and confident sound from a player that's stuck with a green display, green lettering and green-fronted drawer. So it looks ghastly even if the internal design is very thoughtful.	Remote, spring-loaded buttons, coaxial digital output, 16-bit.		107
Denon DCD-1290 £319	Good Good -	This player certainly looks the business but its sound is a real five-minute wonder. Its compelling fizz lasts about as long as your average firework.	Remote, pitch control, index skip, variable output, 18-bit		107
Denon DCD-1460 £400	Good+ Average+	Here's a player that benefits from solid casework and decent features yet the overly complex electronics knock the stuffing from its sound	Remote control, volume, index search. 18+2-bit DACs		100
Denon DCD-2560 £570	Very Good Good	Beautifully built and generously equipped yet with a sound that's decidedly sluggish, particularly through the bass. Vocals are more forward but can sound a little glassy	Remote, pitch, tape edit features, opt/coax digital output, 20bit 16		95
Denon DCD-860 £250	Average+ Good+	This is a well designed and generously equipped budget player that offers a very spacious and appealing sound. There's a hint of treble emphasis but it still sounds great at high volumes!	Remote, pitch and full tape edit facilities. 18bit 8x.	R	95
Denon DCD-890 £270	Good + Good -	Similar to the DCD-1290 in its execution though manages a better technical performance. Sounds lively and powerful but lacks subtlety.	Remote control, 20-track memory, tape edit, 18-bit DACs		112
Dual CD1080RC £200	Very Good Average -	A rather strange-sounding player with a top-heavy treble that does little to redress its lack of vibrancy and emotion. The back-lit LC display and clean digital output are plus points	Remote, coaxial digital output, digital volume, MASH/PWM DAC.		107
Ferguson CD008 £150	Average Average	Not as strong as its relatives, sample fault perhaps? Though performance is fair enough overall	Remote, midi digital output, 2X O/s, timeshare 16 bit		64
Goodmans GCD-435 £140	Poor Average -	Goodmans has the power to source with more care than this, music centre quality!	multibit, remote, basic facilities		88
Harman Kardon HD7450 £260	Poor Average +	This player looks little different to other HKs but its performance is dominated by a budget decoder/oversampling IC. Good bass nonetheless but pop tracks can sound fizzy and tiring.	Remote control, display-off, timed-shared mono 18-bit DAC		107
Harman Kardon HD7500II £300	Good+ Good+	An update of the original HD7500 but featuring superior analogue electronics to the HD7450. Tonal integration is much improved, packed with detail that's expressed with enthusiasm.	Remote, variable, digital and headphone outputs. MASH/PWM	R	95
Harman Kardon HD7600II £400	Good+ Average+	Based on the HD7500II but with a motorised volume control and extra-heavy casework. Either way it lacks the transparency and sparkle of the cheaper machine	Remote, variable and digital outputs, MASH/PWM DAC		100
Harman Kardon HK7300 £200	Average Average -	Budget low bit technology, does not deliver enough for a recommendation	No remote, no digital out; basic control features		83
JVC XL-V152 £130	Very Good Average	Based on earlier budget designs but minus a remote control. The voluminous but vague sound is equally familiar.	Tape edit, DDRP, PEM bitstream DAC		112
JVC XL-V241 £160	Good Average	Even with its mkII PEM DAC this new machine sounds pleasant but not especially interesting. Stereo imaging is a trifle suspect	Remote control, slim centralised drawer, PEM bitstream DAC		100
JVC XL-Z1011 £520	Very Good Good+	JVC's current flagship combines old K2 technology with PEM bitstream to deliver a full, beefy and engagingly dynamic sound	Remote control, variable and digital outputs, PEM bitstream	R	100
JVC XL-Z431 £200	Very Good Average-	This is a player that started life off the back of the successful XL-V231 but whose performance fails to come up to scratch. The sound is weak and uninspiring - poor use of JVC's PEM DAC.	Remote operation, motorised volume + tape edit. PEM bitstream		95
JVC XL-Z441 £200	Very Good Good	The smoothest-sounding of JVC's budget machines - clear and bold but also very even-handed. One if not their best sub-£500 players to date and strongly recommended.	Remote control, tape edit, index skip, PEM bitstream DAC	R	107
JVC XL-Z452 £180	Very Good Good +	Another lightweight player but graced with a surprisingly bold and detailed sound. Impressive stuff for the money.	Remote control, 32-track memory, volume control, PEM DAC	R	112

The Directory

CD PLAYERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Kenwood DP-3040 £180	Good + Good +	The sophisticated sound of this budget player could teach Kenwood's costlier offerings a thing or two!	Remote control, 20-track memory, R volume, NPC bitstream DAC	R	112
Kenwood DP-4030 £180	Good+ Good+	Kenwood's first and cheapest bitstream player enjoys a deceptively detailed and refined sound but one that is mildly veiled right across the spectrum. Excellent value nonetheless.	Remote, variable and opt digital outputs. NPC bitstream DAC	R	95
Kenwood DP-5030 £200	Good+ Good+	This looks like the DP-4030 but has more in common with the DP-7030 inside. Either way its neutral, uncluttered and intimately detailed sound is better than both	Remote control, motorised volume, R disc file. Sony PLM DAC.	R	100
Kenwood DP-5040 £200	Very Good Average	Better built and technically superior to the older DP-5030 but its untidy, detached treble quality proved a real disappointment in our listening tests.	Remote, display control, tape edit, peak search, Sony PLM DAC	R	107
Kenwood DP-7030 £300	Good+ Good+	By adapting established Sony bitstream technology Kenwood has moulded its own exceptionally smooth and polite sound. Very nicely built machine with midship transport mechanism.	Remote, index scan, variable and optical outputs. Sony PLM bitstream	R	95
Kenwood DP-7040 £300	Very Good Good	A classy, polished sound from a decidedly refined piece of engineering. Close to the older DP-7030 in terms of performance but better value in construction and technology.	Remote control, Disc File memory, R display control, Sony PLM DAC.	R	107
Kenwood L-1000D £830	Very Good Good	A beautifully constructed and very stylish player that really only gives off its best when teamed-up in balanced-mode with Kenwood's matching pre/power combination	Remote control, balanced XLR's, 16-bit integrating DACs	R	100
Luxman D105u £699	Average Average	Visible valves are essentially for show in this rather ordinary player - both sound and lab	"valves", remote inc vol, hdph, well equipped	R	88
Marantz CD-42 £180	Average + Good +	Not as warm or rugged-sounding as the CD-52 but still wonderfully spacious and intimately detailed. Currently the best player under £200, plus it's got a decent coaxial digital output.	Remote control with direct track access, SAA7350 Bit Stream DAC	BB	107
Marantz CD-52 £200	Average+ Good+	Hardly the most neutral player on the planet but its rich, full and very generous sound cannot fail but warm the coldest of hearts	Remote control, FTS and dig outputs. SAA7350 PDM DAC	BB	100
Marantz CD-52SE £280	Average + Very Good	A similarly dramatic yet far more neutral sound than the basic CD-52. Either way, its engaging and believable performance was a real hit with our listeners.	Remote, FTS memory, switchable digital output, Bit Stream DAC	BB	107
Marantz CD-62 £300	Good Good-	Basically this is a Philips CD850II with Signetics op-amps all plonked into an old CD-50 chassis. Something of a range-filler	Remote control, index, 8-step volume and FTS. SAA7350 PDM	R	100
Marantz CD-72 £400	Good - Good +	A heavily-constructed player based on the same digital electronics as the CD-42 and CD-52. This implementation sounds astonishingly solid and immediate but also rather too 'clean'.	Remote, variable and digital outputs, FTS, Bit Stream	R	107
Marantz CD-72SE £500	Good Good +	A recommendation just eluded the grasp of this superbly built player thanks to its very polished but restrained sound.	Remote control, 20-track memory, FTS, volume, BS DAC	R	112
Marantz CD-80 £560	Very Good Good	A dynamic and bold sound from a machine that is equally bold in appearance. It betrays no fear of the most thundering crescendos yet can sound a little hard or glassy with pop CD's.	Remote, motorised volume + FTS programming, 16bit 4x.	R	95
Memorex CD1650 £200	Poor Poor	An overpriced music entre player. Surely the giant Tandy corp. can get a better standard than this?	remote, keypad, multi bit, midi	R	88
Meridian 206B (DAC7) £971	Good + Very Good	Plenty of tight, strong bass but a little mechanical or even sparse at times. Its technical presentation of music is spot-on, only the sense of drama or anticipation needs working on.	Remote control, novel direct-loading transport, DAC7	R	107
Meridian 208 £1,550	Excellent Excellent	State of the art CD sound combined with a decent preamp and full remote control	Hdph + remote level. Programming, R phase invert, various outputs	R	83
Micro Seiki CD-M100 £5541	Very Good Good	One of the hernia inducing bricks of hi-fi, the Micro is extravagantly styled, finished and built. The good lab performance led to an 'only good' sonic display when the price demanded excellent	Balanced output, remote, display blanking	R	72
Micromega Logic £500	Good- Good	A rather expensive version of Philips CD624 with new op-amps and CD tray. Still, it does sound rather meatier, better integrated and more purposeful	Remote control, no FTS but switchable digital output, SAA7321	R	100
Mission DAD5 £300	Good Average +	Similar-sounding to Philips' 600-series players: lively, plenty of space and full of 'bounce' but a little too eager to impress in the short term.	Stylised remote, no 'stop' key on player, digital out, Bit Stream	R	107
Musical Fidelity CD1 £400	Average + Good -	Put together in Taiwan to MF's specifications, the main PCB and digital electronics are also used by Rotel's RCD-965BX! This version lacks the creamy, engaging quality of the latter.	Simple remote, index and track skip, digital out, SAA7323 DAC	R	107
Musical Fidelity CDT £500	Poor - Good +	An oddball player equipped with a cheap top-loading transport and appalling digital gubbins yet saved by the euphony of its valves!	No remote, no memory, hybrid DACR with valve output stage	R	112
NAD 5425 £200	Very Good Very Good	Not much in the way of facilities on offer but a sound that is both wonderfully open, detailed and appealing. This is a very communicative player that sounds positive without being brash	Worthless remote control, track skip/scan. MASH/PWM bitstream DAC	BB	95
NAD 5440 £300	Very Good Good+	The 'no compromise' version of NAD's 5425 but still rather lacking in facilities. Its sound is smoother and richer than the 5425, preferring to seduce with subtlety rather than have one in play. Nevertheless its digital electronics are flawed and its sound powerful but blunt	Remote with direct track access, variable output, MASH/PWM	R	95
Nakamichi CD Player 2 £625	Average+ Average+	This may look like a CD Player 4 but features a special transport able to store 7 CD's with one in play. Nevertheless its digital electronics are flawed and its sound powerful but blunt	Music bank, remote, volume control, digital o/p, 18 bit DACs	R	100
Nakamichi CD Player 4 £300	Average+ Good-	Attractively styled but suffers high-ish distortion for a modern CD player. Best suited to up-beat pop rather than complex classical works which seem to lack focus and secure soundstaging	Remote with track access, coax dig. output. 18bit 8x	R	95

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CD PLAYERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Philips CD930 £180	Good + Good -	Featuring new 900-series livery and digital circuitry similar to Marantz's players but a sound that's a little too ripe and soft.	Remote control, Personal Presets, FTS, 30-trk memory, BS DAC		112
Philips CD950 £350	Very Good Good +	Philips' top 900-series player is the first to employ its advanced DAC7 chipset. Sounds very crisp, clear and confident.	Remote control, FTS, volume, display off, DAC7 Bit Stream	R	112
Pioneer PD-201 £150	Good + Good	A budget player with a genuinely fizzy and exciting sound. Hardly neutral but audacious and entertaining nonetheless.	Remote control, 24-track memory, R volume, PFM Bit Stream DAC	R	112
Pioneer PD-75 £800	Very Good Very Good	A confident yet beautifully poised and relaxing sound from an equally luxurious package. Oodles of refinement plus Pioneer's hi-tech Stable Platter transport, but still expensive.	Remote, index and track skip, display off, PDM Bit Stream DACs		107
Pioneer PD-93 £1430	Very Good Good+	The extremely civil, understated feel of its music contrasts markedly with the over-engineered construction of this unit. It will not offend anyone but then neither will it spark much excitement.	Remote with fader and index facilities. Two dig o/p's. 20bit 8x		95
Pioneer PD-S501 £190	Good + Average +	This is the cheapest player thus far to be equipped with a Stable Platter mech, but compromises elsewhere have suffocated its flair.	Remote control, 24-track memory, hi-lite scanning, Bit Stream DAC		112
Pioneer PD-S801 £300	Unusual! Good	Pioneer's version of Wadia's Digimaster digital filtering provides odd technical results with an equally unpredictable sound. Capable of poor or superb results, depending on system.	Remote control, stable platter mech, Legato Link + bitstream DAC		112
Proton AC-120 £180	Average Average -	Fine styling, low price but barely average performance	15 track memory, simple design, remote, hdph		76
Revox B126 £649	Very Good Good	Made in Switzerland so the build quality and technical performance is high, but then so is the price and the sound quality is only good	Programming, Revox system compatible		70
Revox B226S £840	Good Average	Top quality build and finish for the Revox system enthusiast. For high value sound look elsewhere	Remote vol, hdph, 19 track memory, digital op		76
Rotel RCD-955AX £260	Good + Average	Touted as a repackaged version of the evergreen RCD-855. In practice, however, our sample disappointed on several visits lacking the clean, cohesive quality of the original.	Remote control, digital output, repeat, scan, Philips 16-bit		107
Rotel RCD-965BX £320	Average + Excellent	Two years on and the 865's replacement turns out to be an exceptionally refined bitstreamer: transparent, exquisitely detailed and powerfully emotive. A landmark player	Remote control, index skip, digital out. SAA7323 PDM DAC	BB	100
SAE D102 £700	Good Good	Considering the high price of this player, most of the innards seem fairly prosaic. Sound quality and lab performance are both respectable enough, but hardly justify the price premium involved	Remote (inc volume), skip, scan etc.		58
Sansui CD-X311mkII £250	Good+ Good	Sansui's mid-ranked player uses Technics' technology but provides a warm and cuddly sound that's atypical of the breed	Remote control, variable and digital out, MASH/PWM DAC	R	100
Sansui CD-X317 £300	Good + Average	Not in the same class as Sansui's older CD-X311mkII. Same technology and a similar appearance but the sound is neither as responsive or engaging.	Remote, fixed, variable and digital outputs, MASH/PWM DAC		107
Sansui CD-X617 £300	Good + Average	This 'double-DAC' version of the CD-X317 is no more impressive, sounding light and tizzy with pop but dull with classical CD's	Remote control, 24-track memory, display dim, MASH/PWM DACs		112
Sansui CD-X711 £600	Excellent Very Good	Luxury features, finish and sound from this classy Sansui; no excuses required here	Hdph + vol, remote full programming	R	83
Sharp DX150 £129	Average Average	This is one oversampled player which is rather outclassed for technical and sonic merit by the vast majority of the competition. Pretty enough but would you want to put discs in it?	Programmable, skip, search, repeat		70
Sharp DX750 £179	Average Average	It has a remote control but it's too like the 150 which is rather outclassed for technical and sonic merit by the vast majority of the competition	Remote, programmable, skip, search, repeat		70
Sony CDP-397 £140	Very Good Good	The first CD player to be almost entirely composed of miniature surface-mount components. Unsophisticated but enthusiastic sound	Remote control, 24-track memory, BB fade, tape edit, PLM DAC	BB	112
Sony CDP-591 £160	Good+ Average+	Tons of features at a highly affordable price but let down by its lacklustre if inoffensive sound quality. The sound of these new Sony players lacks the grip and purpose of the last generation	Remote control, variable and optical digital out, PLM bitstream		100
Sony CDP-797 £200	Good + Good -	Another day, another DAC. This new budget player succeeds with its taut imaging, clean and impressive soundstaging. Can seem a little too lean or dry, however.	Remote, motorised volume, edit and scan facilities, PLM DAC	R	107
Sony CDP-991 £230	Good+ Average+	Another well-equipped and well-specified machine and one that can sound very up-beat and detailed with simple material. Tends to loose its way with complex stuff, however	Remote control, Custom File programming, variable out. PLM DAC		100
Sony CDP-X229ES £300	Excellent Good -	Built to the same standards as the CDP-X339ES but with a colder and less forgiving sound. Lacks a sense of integration and warmth	Remote control, Custom Edit and Custom File, PLM bitstream		112
Sony CDP-X333ES £400	Very Good Good-	This beautifully built player has a very tidy and well-ordered style of music-making, but in the long run it lacks the ability both to excite and involve	Remote control, Custom File programming, Complementary PLM		100
Sony CDP-X339ES £430	Excellent Very Good	Superbly constructed, this tour-de-force of features and technology offers a tightly detailed almost cavernous sense of acoustic. The mid and treble can sound positively magnetic	Comprehensive remote, Custom Navigation System, new PLM DAC	R	107
Sony CDP-X77ES £1000	Excellent Good+	Rather like Pioneer's PD-93 this flagship player is beautifully put together but simply lacks the thrill or conviction of cheaper and perhaps more ragged-sounding machines. Still,	Remote, everything but Custom File titling, Complementary PLM		95
Stax Quattro £2995	Very Good Very Good	Now in mkII guise this substantial player recreated exceptionally strong and convincing bass lines together with a beguilingly musical midband	18-bit DACs, 20-track memory, full IR remote, variable o/p	R	72
TEAC CD-P3500 £170	Good + Average	A well-meaning attempt to pare-down the CD-P4500 results in a similar looking player with a thoroughly uninspiring sound	Remote control, volume, cue-lock, index skip, Philips BS DAC		112
TEAC CD-P4500 £250	Good + Good	TEAC's first genuine 1-bit player uses Philips BS DAC to great effect, its sound described as having a certain 'organic warmth', very composed and easy-going.	Remote, pitch control, variable out, SAA7350 Bistream	R	107

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CD PLAYERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Technics SL-PG320A £140	Good + Good +	A cheaper and remote-less version of the '420A with an equally dry but vivid, spacious and astringent sound. A good 'un	No remote, synchro-edit, auto-cue, 20-track memory, MASM	R	112
Technics SL-PG420A £160	Good + Good +	No repackaged version of the SL-PG200A but a new player in familiar clothes. Still offers an open, transparent and uncommonly fresh sound but a little of the 'magic' is missing.	Remote, digital volume, synchro edit, auto cue, MASH/PWM DAC	R	107
Technics SL-PG520A £200	Good + Very Good	A cracking player that builds upon the astonishing out-of-the-box sound of earlier budget players. Superb clarity and dynamics, thrilling but musically involving too.	Remote, shuttle search dial, edit mode, peak search, MASH/PWM DAC	BB	107
Technics SL-PS620A £230	Good + Very Good	A costlier, tarted-up version of the SL-PG520A that loses very little in the way of clarity, sparkle or in compelling dynamics	Remote control, synchro-edit, 20-trk memory, MASH/PWM DAC	BB	112
Technics SL-PS900 £350	Very Good Good-	Just about the quietest transport in existence and a sound that is equally unobtrusive, polite and refined. There's plenty of detail too but the overall result won't set your pulse racing	Huge remote control, function manager MASH/PWM DAC		100
Wadia WT-2000/Digimaster 2000 £	n/a Very Good	Very high grade player which provides state of the art in believable music making from CD, and promises a degree of upgradeability	Transport/multi bit DAC - 32, 44.1, 48kHz o/s		Coll'91
Woodside WS2 £1095	Good Good+	Prompted a mixed reaction on audition, responding well to our jazz and classical selection but sounding bright and grainy with the pop CD's. RF emission is very high	Remote control, display defeat, variable and digital outputs, 16bit		95
Yamaha CDX-450 £170	Average+ Good	A contentious player this and one that prompted a range of reactions from enthusiasm to disinterest among our listeners. It could prove too safe-sounding but worth a try at the price.	Remote control, track access, variable out. 18-bit hybrid DAC	R	100
Yamaha CDX-560 £180	Good Good	A real advance on the old CDX-450 though the light, up-front if not entirely welcoming sound of this newcomer could shock the timid listener	Remote control, volume, tape edit, 18-bit hybrid DAC		112
Yamaha CDX-750 £250	Good Average+	A sleek machine that can sound rich and vibrant with simple material but seems to lack expressiveness and subtlety when dealing with more complex passages	Remote control, variable and digital out, LC display. PDM DAC		100
Yamaha CDX-860 £280	Very Good Good +	A strong recommendation for what is probably Yamaha's best CD player to date: powerful and confident yet delicate and nimble when the occasion demands.	Remote control, variable o/p, dimmer, 25-trk memory, PDM DAC	R	112

CD TRANSPORTS AND DACS

A CD player can be split into two basic components, the mechanism which reads the information from the disc, known as the transport, and the device which turns the digital numbers contained on the disc into the music that comes out of your speakers, this device being referred to as a digital to analogue convertor or DAC. Although at the lower end of the market both of these are contained in a single box, at the top end of the market two box machines consisting of a CD transport and a separate DAC become more common.

Although many of these units will be purchased as two box machines, which are generally considered to sound better than a one box equivalent, a DAC can also be used to upgrade an existing CD player. A good example is where an early machine with a satisfactory drive unit but a rather dated DAC can be brought up to the latest spec by the addition of a new DAC.

When upgrading an existing player best results are usually obtained using the electrical digital output rather than optical, and obviously

to be upgradeable your CD player must have a digital output in the first place.

The choice of interconnect is crucial in linking drives and DACs and conventional interconnects used for analogue signals should be avoided, a dedicated 75ohm digital cable will give far better results.

Mixing and matching transports and DACs from different manufacturers can be a bit of a lottery and readers are referred to the full reviews where this subject is discussed in more detail.

CD TRANSPORTS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Arcam Delta 170.2 £620	Very Good Good	An upgraded Delta transport, it sounds different but not really better. More research is required here	Transport only, display off, usual programming		88
Kenwood DP-X9010 £500	Average Average +	Compromised by jitter, RF noise and poor clock selection this transport generally encourages a dynamic but bright and edgy sound with most DACs	CD transport, optical + coax outputs, Class 2		96
Marantz CD-95DR £1500	Very Good Good	At its best with Philips-based DACs, this transport sounds confident if not totally pure, sparkling or fresh	CD transport, optical + coax digital, Class 1		96
Meridian 200 £895	Very Good Very Good	Broadly compatible with most DACs and offering a light, fresh and very bubbly sound that is both natural, engaging and unflagging	CD transport, optical + coax outputs, Class 1	R	96
Meridian 602 £1,750	Very Good Good	This dedicated CD transport teams-up most successfully with the 606 DAC. Otherwise it lacks the life and pizzaz of the 200	CD transport, optical + coax outputs, Class 1		96
TEAC P-10 £1499	Good Very Good	A chunkier and altogether more successful transport than the P-500 with an especially beefy and compelling sound. TEAC's best	CD transport, coax + optical outputs, Class 1	R	96
TEAC P-2 £2849	Very Good Good	TEAC's flagship CD transport is beautifully styled and constructed but its sound is bleached and generally less inspiring than that of the P-10	CD transport, coax + optical outputs, Class 1		96
TEAC P-500 £649	Good Good +	Provides a smooth and very sympathetic sound with most DACs yet is also rather vague, lacking the crispness and resolution of its peers	CD transport, coaxial and optical outputs, Class 2	R	96
Technics SL-PA10 £470	Good + Good	Built to partner the SU-MA10 upmarket integrated amp/DAC, this transport has the unusual limitation of only optical output. Reassuringly solid and more immune to vibration than most	CD transport, optical output only, remote		88
Wadia WT2000 £5614	Very Good Good +	Based on TEAC's P-2 with outboard mains transformers, active digital output and solid alloy casework. Dynamic and crisp sound best realised with Wadia DACs, otherwise less impressive	CD transport, AT&T opt + direct -coupled coax outputs, Class 1		96
Wadia WT3200 £1800	Excellent Very Good	Based on Marantz's CD-95DR with new casework, active digital output and revised grounding. Very clean, clear and authoritative sound with Wadia and Philips-based DACs	CD transport, AT&T opt + direct -coupled coax outputs, Class 1	R	96

DIGITAL TO ANALOGUE CONVERTORS (DACs)

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Arcam Black Box 3 £360	Good + Very Good	Top of a series of three decoders it can offer a high sonic standard with top class transports	Bitsream, auto input switching,	R	88
Arcam Black Box 5 £450	Good Good	Equipped with a Sync Lock for connection to Arcam's D170.3 CD transport. Nevertheless it still gives off its best with a standard 75ohm transport like the TEAC P-10.	Coaxial and optical inputs, Sync Lock, phase invert, hybrid DAC		113
Audio Alchemy Digital Decodin	Good Very Good	A very sweet and seductive sounding unit that gives good results with a wide range of CD players/transports	Coaxial and optical inputs, phase invert, Bit Stream DAC	BB	101
Audio Research DAC1-20 £3898	Very Good Good	This expensive DAC works surprisingly well with Meridian's cheaper 200 transport, an impressively weighty and engaging combo that proved entertaining on audition.	BNC, Toslink and AT&T optical inputs, phase invert, 20-bit DACs		103
Audio Synthesis DSM-M £1234	Good + Good +	A weighty but neutral and highly calculated performer best suited to transports like the P-10, despite AS's application of Arcam's Sync Lock facility.	Coaxial and AT&T optical (option), Sync Lock, 20-bit DAC		113
Audiolab 8000DAC £695	Very Good Good	Needs to be used with a genuine Class 1 digital drive. At its best with the Wadia WT3200 where it sounds vivid and alive. Otherwise can sound a little antiseptic.	Coax and opt inputs, phase invert, crystal lock, Bit Stream		103

DIGITAL TO ANALOGUE CONVERTORS (DACs)

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Beard DAP-1 £975	Poor	Attractively clad in a wooden case this marriage of digital technology and valves has hit the rocks, technically flawed with a disappointingly flat sound to match.	Coaxial and optical inputs, phase invert, three 16-bit DACs		113
ds/d Decode-1 £495	Good + Good	An elegantly designed bitstreamer with plenty of inputs though one that can sound too bright, immediate or artificial for its own good.	Three BNC + one Toslink optical input, phase invert, BS DAC		113
DPA Digital Bigger Bit £650 + £98	Good Very Good	Partnered with either TEAC P-10 or Meridian 200 transports, the Bigger Bit delivers a very taut and dynamic sound, bathed in an open acoustic. DPA's RF mains filter is a must.	Coax and opt. inputs, Deltran sync facility, DAC7 Bit Stream	R	103
DPA Digital Little Bit (Optical) £400	Very Good Good	Our sample suffered from radiated RF interference but new LB's are now cured. Works especially well with Meridian's 200 transport but does require the services of DPA's 'Power' mains filter.	Coaxial and optical inputs, SAA7350 Bit Stream DAC		101
DPA Digital PDM1 Series 3 £1195 + £196	Very Good Good +	Hailed as a budget version of the PDM2, it bears technical comparison with both the PDM2 and Bigger Bit but - in terms of sound quality - is no great advance on its cheaper relative.	Coax and opt inputs, two-box construction, DAC7 Bit Stream		103
DPA Digital PDM2 £2000	Excellent Excellent	State-of-the-art technical performance with a pristine sound to match. Repertoire includes a solid,	Coaxial and optical inputs, phase invert, two-box DAC7	R	101
Forte Audio Model 50 £950	Good Very Good	The first American DAC7 design and one that offers a typically big and full-blooded sound, infiltrated by a slightly euphonic quality but never hard or gritty.	2 Coax and 2 optical inputs, DAC7 Bit Stream technology	R	103
Kelvin PDM DAC £200	Average + Average +	Don't disregard this DAC-in-a-matchbox for though it can sound a little unconvincing it is capable of developing a surprisingly lyrical and natural sound with the right transport.	Single coaxial input, low analogue outputs, SAA7320	R	103
Meridian 203 DAC7 £510	Good Very Good	This is another broadly compatible DAC that's free of fatiguing nasties yet remains bubbly and exciting. If you find the 606 too sober then the 203 will undoubtedly suit	Coaxial and optical inputs, single-box DAC7 Bit Stream	R	101
Meridian 606 DAC7 £1220	Very Good Good	Extra cash buys you a better standard of construction and finish over the 203 yet by refining its sound further Meridian have also tempered its vibrancy and 'life'. Fickle with other transports	Two coaxial and optical inputs, phase invert, DAC7 chipset		101
Micromega Duo BSI £500	Average Good	This DAC has a tendency to sound light, airy and 'fast' but it can also become a little hard or - fatiguing with some digital outputs. At its best with Meridian's 200	Coaxial and optical inputs, phase invert, SAA7321 Bit Stream		101
Micromega Microdac £325	Average - Average +	Described as a modest but entertaining performer, achieving its sweetest balance with Arcam's D170.3 transport.	Coaxial and optical inputs, SAA7321 Bit Stream DAC		113
Mission DAC5 £299	Very Good Good +	Another modest DAC but one capable of a lean but clean and detailed sound that's typical of the DAC7 breed.	Coaxial input only, phase invert, Philips DAC7 converter	R	113
NVA DAC-ON £730-£960	Very Good Very Good	The subject of much controversy at the time, NVA's DAC-ON actually turns out to be a QED Digit linked to substantial external supplies. A ruse that undoubtedly improves its sound	Coaxial input only, SAA7323 Bit Stream DAC	R	113
PS Audio Superlink £1498	Average Good -	Another transport-fussy DAC that, once again, does the business with Meridian's 200 but can sound bloated, smeared and even vaguely electronic with standard 75ohm digital outputs.	Touch-sensitive coax and optical inputs, phase invert, 18-bit		103
Proceed PDP2 £1595	Average Good -	The PDP2 has a wobbly input impedance that's suited to specific drives, ie Meridian 200, or Proceed's own. At its best expressive and enticing, otherwise it can seem gutless and smeared.	Coax and XLR inputs, balanced outputs, 18-bit DACs		103
QED Digit £125	Very Good Good +	Bearing in mind its expressive but very forgiving performance the Digit is almost embarrassingly cheap. Virtually bomb-proof and will deal with the doggiest of digital outputs!	Coaxial input only, SAA7323 Bit Stream DAC	BB	113
Roksan ROK-DA1/ROK-DS4 £495/£495	Good Good +	Roksan's first dabbling in digital audio is a creditable affair, both expansive and expressive in character but rather also lean in balance.	Coaxial input, optional outboard PSU, Crystal Bit Stream DAC		113
Stax DAC-Talent £1400	Excellent Good +	Natural, refined and never over-zealous, the DAC Talent is also capable of sounding very spicy and dynamic. Capable of wielding a maturing influence over a light or bright-sounding system	Coaxial and optical inputs, phase invert, mute, 20-bit DACs		101
Sugden SDA-1 £650	Good + Very Good	Something of a surprise from the fuddy-duddies of audio but a very pleasant one judging by its 'masses of high resolution detail and tremendous dynamics'	Coaxial input, TDA1541 Crown 16-bit DAC	R	113
Sugden Stemfoort PDA-10 £1200	Good + Good +	Unfortunately this 'upgraded' SDA-1 is less impressive than the original, losing out on dynamics, airiness and subtle detailing	BNC and coaxial inputs, phase invert is inactive, 16-bit DAC		113
TEAC D-500 £399	Good + Good +	An unusual combination of NPC oversampling filter and no less than two Philips' DACs. Its reliable 75ohm input infers broad compatibility. A dynamic and 'interesting' sound	Coax and optical inputs, complementary 16-bit DACs.	R	103
Threshold DAC 1/e £3150	Very Good Very Good	The DAC 1/e can sound beautifully detailed with a marvellous sense of scale and sharp, solid images. Its unpredictable behaviour with unknown transports precludes recommendation.	Coax and opt inputs, balanced outputs, phase invert, MASH/PWM DA		103
Wadia DigiMaster X-32 £2000	Average - Good -	Wadia's freaky input circuit gives unpredictable results with non-Wadia transports. Otherwise it can sound bold, dynamic and crisp but lacks the warmth to bind its music together	BNC and optical(TOSLINK & HP) inputs, 18bit, 32x		101
Wadia DigiMaster X-64.4 £5000	Average Good*	The X-64.4 positively buzzed with vibrant, sharply-etched detail. An exciting sound	BNC + Toslink/AT&T optical inputs, phase invert, 18-bit 64x		101
Woodside DAC 1 £895	Good Good	Fine but slightly dated and costly package in performance terms - but flexible, musical and t well built	2 electrical + optical i/p. tape ou		87
Woodside DAC2 £510	Good Good +	Based on Woodside's earlier 16-bit CD player and offering a similarly sharp and dynamic sound, all the more captivating for its lack of graininess and 'tizz'. Should be a reliable upgrade	BNC coaxial input (no optical), 16-bit 4x	R	101

DIGITAL AUDIO TAPE

DAT, or digital audio tape, has been on the market for quite some time now but has never really 'made it' as a consumer medium, probably due to the fact that very little prerecorded software has been made available.

In the last year or so it has begun to carve itself a niche at the top end of the market replacing reel to reel tape recorders as the audiophile's tape based medium.

The DAT standard specifies a 48kHz sampling rate, which is higher than CD, so direct copying in the digital domain is only possible on those machines with dual sampling frequencies, ie 48kHz and 44.1kHz. Some machines also record at 32kHz to give a longer recording time for a given length of tape.

To try and get around the copying problem many machines incorporate SCMS, the Serial

Copy Management System, a device which enables you to record from a CD but not to 'clone' one digital tape from another.

Portable machines are now entering the market but make sure the price you are quoted includes an analogue to digital converter, with some portables these have to be purchased separately and increase the price considerably.

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Aiwa HD-S100 £450	Average - Average -	Largely bulletproof in non-critical and semi-critical applications. Despite the usual limitations of DAT as a hi-fi medium, the HD-S100 is a practical and well built tool.	Portable, ADC, mic in, phone/line sockets (3.5mm), 70 min battery	R	105
Aiwa XD-S1100 £550	Poor Average -	A muddled fascia detracts from the appeal of this inexpensive deck, but the real no no is a significant loss of the finer virtues: detail, imagery etc	SCMS, analogue, coaxial & optical in/outputs, full subcode editing		99
Aiwa XD-S260 £500	Poor Poor	Unlovely sounding deck lacks weight, clarity and presence. Low pricing and mini dimensions excuse many sins however	SCMS, optical/coaxial and analogue in, optical/analogue out		99
Casio DA-7 £400	Average Poor	Below average notebook size portable, and in some ways inferior to Casio's own DA-R100 pocketable due to high noise floor, flat dynamics and poor soundstaging	Portable DAT with case. SP record mode, basic editing		111
Casio DA-R100 £410	Average Average-	Somewhat flat sounding and lacking differentiation through the analogue inputs but good via the digital ones, a masterpiece of miniaturisation, wonderful tool where size is important	SP/LP record, optical/electrical in/out, 2.5hr battery life	R	111
Denon DTR-2000 £700	Good Very Good	Not cheap, but first rate DAT recorder, good to excellent fidelity in all modes, with a slightly cool detached quality when differences are detectable.	Digital LP/digital & analogue SP rec/play, LP analogue play only	R	93
JVC XD-X1010TN £1050	Good Average-	Ambitious but ultimately disappointing deck which marries poor ergonomics and an opaque musical delivery to a feature roll call longer than the weekly shopping list	SP/LP record, mic input, remote control, display off, auto fade		111

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DIGITAL AUDIO TAPE

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
JVC XD-Z505 £620	Good Good	Competent middle market DAT with uncomplicated (but still flawed) user interface, but good basic sound quality. A fine CD dubbing machine.	DAT SP/LP en/decode, low bit conversion, remote control	R	105
Kenwood DX-7 £500	n/a Average	Sound quality is pretty fair, but a little rougher than the best of the breed. Controls are good, the display however is poor - and most users will require the accessory pack	Mains recorder, LP mode. Optional accessory packs adds battery/ADC		94 Supp
Kenwood DX-7030 £700	Average Average-	Bland sounding deck that lacks low level clarity and imaging. No analogue LP mode. Build quality is good however and ease of use ranks highly	Remote control, stand-alone DAC facility, optical/coaxial in/out		99
Panasonic SV-3700 £1111	Good Average	Slick, powerfully equipped and reasonably priced, this pro DAT has a clear, quick and colourful sound somewhat lacking in weight and substance	Professional DAT, infra-red remote, S/PDIF & AES/EBU I/O		111
Pioneer D-500 £600	Good - Average	Looks extremely good. Fascia design is complex yet accomplished, and offers very slick tape handling. Musically however it is on the messy side compared to others in this price area.	SP/LP en/decode 1-bit converters, many search/display aids		105
Sony DTC-750 £450	Good Good	Superb value for money: the lowest price full size DAT on the market, fine features, build, measurements and sound approaching the best DAT has to offer at any price.	SP/LP record, real time/date recording	BB	105
Sony DTC-77ES £1000	Excellent Average	Superb engineering, many well implemented features (including off tape monitoring) and technical near perfection (!) don't offset perceptibly slowed, thickened sound	4-head, tape monitor, many search/display options, SP/LP		105
Sony DTC-M100 £799	Very Good Very Good	Only available from professional outlets. Clean clear sounding second generation model with most of the features and sound of the DTC-1000ES	Mid-width, alpha-numeric display, remote, optical interfaces	R	63
Sony TCD-D3 £500	n/a Very Good	At the time of writing, this model represents the state of the art, and beats all comers.	DAT recorder, detachable rechargeable power pack, LP/SP	BB	94 Supp.
Tascam DA-30 £1199	Good Average+	Interesting pro DAT deck with solid, tangible sound quality which is nevertheless lacking in analysis	Wired remote control, S/PDIF, AES/EBU and standard analogue I/O		111

HEADPHONES

There are a variety of different approaches to headphone design, and examples of each turn up in this group. Amongst the more expensive esoteric models, electrostatic drivers are used in square open-backed phones such as the Jecklin and Stax models.

The majority of these come with some form of transformer which takes the signal initially from the speaker terminals on the amplifier. The actual speaker cables then travel from this unit

bypass switch to the loudspeakers.

The more down to earth models feature dynamic drivers in circular open-backed designs. The advantage of open backs seems to be a correspondingly open sound and a less claustrophobic feel to the music.

One can also of course hear external noises, as well as irritating the hell out of people on public transport.

The third category are closed-back designs,

which are useful in situations where it is necessary to block out background noise. Another means of distinguishing different types is the way they sit on your head.

There are three styles: circumaural models enclose the ear and rest on the side of the head; supra-aural designs press on the outer ear (pinna); and intra-aural types rest inside the ear and are popular amongst users of personal stereos.

HEADPHONES

MODEL PRICE	FIT SOUND	COMMENTS	TYPE	VALUE	ISSUE
AKG K1000 £500	Very Good Excellent	One of the best moving coil headphones on the market, hooks directly to speaker outputs and makes much of the competition sound lame. Looks a tad weird	Extra-aural, open-back, dynamic	R	99
AKG K135 £33	Poor Average	Despite a very appealing design the K135s don't live up to the usual AKG standards, though they do have the ability to reproduce rhythm well	Supra-aural, semi-open, dynamic		63
AKG K145/S £60	Good + Good +	Electrostatic tweeters combine with a dynamic mid/bass unit to create very confident sounds in a comfortable headphone. Balance is on the bright side	Supra-aural, semi-open, electrostatic/ dynamic	R	75
AKG K240 Monitor £60	Very Good Good	Something of a classic, these AKGs are very user friendly in all respects; sonically on the warm side of neutral	Circumaural, semi-open, dynamic	R	63
AKG K280 Parabolic £90	Good Very Good	A very revealing and unusual twin driver design that uses the same principle as a satellite dish to beam sound into the ear	Circumaural, open-backed, dynamic	R	63
AKG K340 £140	Good Excellent	Heavyweight cans in most respects, the K340 with its electrostatic tweeter is a very revealing headphone. Gives the total electrostatics a good run for their money	Circumaural, closed-back, electrostatic/dynamic	R	75
AKG K44 £40	Good+ Average	Good quality personal oriented phone, could have a better sense of space but is musically quite communicative	Supra-aural, open-back, dynamic		99
AKG K500 £119	Good Very Good	Distinctively open and clear, they reproduced music with impressive definition, balance is on the light side but transparency is high for the price	Circumaural, open-back, dynamic	R	111
Aiwa HP-X30 £31	Good Good -	A flashy personal stereo phone which alternatively could be used at home. A slight LF tonal preference slightly colours the response, but it ain't a bad can	Supra-aural, closed-back, dynamic		75
Audio-Technica ATH-308 £26	Good- Average-	These small cans have a fairly forward balance which helps perceived clarity but they can become wearing over time, good for personals	Supra-aural, semi-open, dynamic	R	111
Audio-Technica ATH-609 £31	Average Average-	Warm feeling and sounding with impressive physical substance for the price, could be more relaxed and open	Circumaural, open-back, dynamic	R	99
Audio-Technica ATH-611 £51	Average Good	Same basic design as 609 but bigger thinner diaphragm makes this a more relaxed and informative headphone	Circumaural, open-back, dynamic		99
Audio-Technica ATH-9000 £246	Very Good Good	These electret cans connect up to the amps speaker outputs via an adaptor, it sounds a little too smooth and relaxed but would suit aggressive amps	Circumaural, open-back, electret		111
Audio-Technica ATH-909 £60	Average Average	Quite impressive in the treble though a bit bass shy, the 909s worked well at highish levels	Circumaural, semi-open, dynamic		55
Audio-Technica ATH-910 £70	Average Good	The closed-back 910s are an improvement on the 909s with a nice rhythmic quality rarely found with headphones	Circumaural, closed-back, dynamic	R	55
Audio-Technica ATH-911 £80	Very Good Very Good	Nicely finished dynamic headphones with all the trimmings, plus a very clean and subtle sound	Circumaural, open-backed, dynamic	R	63
Beyer DT 325 £32	Very Good Average	Lightweight in more ways than one, the 325s may be a little bright for some systems and tastes but will suit duller sources	Supra-aural, open-back, dynamic	R	63
Beyer DT330 Mk II £50	Good Poor	Not the most revealing 'phones encountered, the 330s were nevertheless enjoyable and rarely offended	Circumaural, semi-open, dynamic		55
Beyer DT411 £49	Good Good	A reasonable but not very thrilling headphone that doesn't really offer enough at the price	Supra-aural, open-back, dynamic		111
Beyer DT550 £61	Good Good	On their own the 550s sound articulate with a slightly 'gritty' treble and 'keen' midrange; not suitable for headbangers!	Circumaural, semi-open, dynamic		55
Beyer DT880 £80	Good Good	Well made cans with a warmish sound but fairly solid midrange, though they're not that informative for the price	Circumaural, semi-open, dynamic		63
Beyer DT911 £179	Good Very Good	Probably too revealing for many headphone amps these are very subtle and fine if expensive cans	Circumaural, open-back, dynamic	R	111

HEADPHONES

MODEL PRICE	FIT SOUND	COMMENTS	TYPE	VALUE	ISSUE
Beyer DT990 £102	Very Good	The 990s are definitely a significant pair of dynamic headphones; they have a smooth and yet revealing neutral sound that is hard to criticise	Circumaural, open-back, dynamic	R	55
Beyer IRS690 £203	Good + Very Good	High quality infra-red headphones with soft comfy earpads and mellow but informative sound quality which is hard to dislike	Circumaural, open-back, dynamic	R	75
JVC HA-D690 £40	Average	Competent but rather undistinctive cans, a bit middle of the road and well suited to aggressive sources	Supra-aural, closed-back, dynamic		111
JVC HA-D990 £65	Good + Good +	Good looking well made cans that offer good sound quality for the money. Sonic nature is of the easy-going, laid-back variety	Supra-aural, closed-back, dynamic	R	75
Jecklin Float Electrostatic £399	Good Excellent	One version of the state-of-the-art, these electrostatics have an openness of sound rarely found in the breed, with good dynamic range to boot	Circumaural-ish, open-back, electrostatic	R	55
Jecklin Float Model One £79	Good Very Good	Whilst very unusual in appearance, the Floats give remarkable sound quality and openness at a reasonable price	Circumaural-ish, open-back, dynamic	BB	55
Jecklin Float Model Two £99	Good Very Good	Helmet shaped and pretty unflattering but open sounding and comfortable in the long term. Note lack of adjustment means you should try before you buy	Circumaural-ish, open-backed, dynamic	R	63
Koss TD/60 £20	Good Average	Although they're devoid of channel identification and have a decidedly Stateside approach to sound, these are very listenable phones for the price	Supra-aural, closed-back, dynamic		75
Pioneer SE-72 £30	Good + Average -	Neat, very nicely made personal stereo phones along the lines of Sony V3s. Sound is on the veiled side, good for aggressive sources	Supra-aural, closed-back dynamic		75
Quart Phone 30 X £40	Good Average	Slightly dark character makes these more suitable for some sources/material than others, specifically music that needs bass weight	Supra-aural, open-back, dynamic		99
Quart Phone 70 £70	Good Good	Competent performers that were hard to criticise but lacked the life and sparkle of which some of the competition are capable	Circumaural, closed-back, dynamic		63
Quart Phone 95 X £100	Good+ Good+	Can sound even handed, relaxed and open with a good drive system but may be a bit too transparent for lesser headphone outputs	Circumaural, open back, dynamic	R	99
Realistic Pro-X £25	Poor Average -	Robust, unanimously uncomfortable and heavily veiled in sonic terms not a great success	Supra-aural, closed-back, dynamic		75
Ross RE2530 CD £20	Average Average	Rather an 'average' £20 phone that some found uncomfortable due to high pressure on the ears. Sonic balance is on the bright side	Supra-aural, closed-back, dynamic		75
Ross RE2560 CD £25	Good Average +	If you're not too fussy about quality of finish and don't have an elfin head then these British phones warrant attention. Sound could be smoother	Supra-aural, semi-open, dynamic		75
Sennheiser HD 480II £50	Good+ Good	Not the most accurate cans on the market but amongst the most enjoyable	supra-aural, open-back, dynamic	BB	111
Sennheiser HD 540II £100	Good+ Good+	A good but not great headphone that due to its high impedance and efficiency should work well with most sources	circumaural, open-back, dynamic		111
Sennheiser HD40 £20	Very Good Good -	Very light and comfortable headphones with an even sonic balance that will suit most sources, but jack is 6.3mm and not suited to personals	Supra-aural, semi-open, dynamic	BB	75
Sennheiser HD450II £40	Good+ Good-	A neat looking supra that makes quite acceptable noises with a variety of outputs, could sound more spacious but is pleasantly relaxed	Supra-aural, open-back, dynamic		99
Sennheiser HD480 Classic II £60	Good+ Good	The same basic design as the 450 but improved sound quality as a result of aluminium coil and extra damping, natural with good bass	Supra-aural, open-back, dynamic	R	99
Sennheiser HD520 £65	Good + Good +	A very comfortable and musically capable headphone. If you've got this sort of bread to blow on cans, give 'em a blast	Circumaural, semi-open, dynamic	R	75
Sennheiser HD530 £75	Very Good Good +	One of the better dynamics in its group, the 530s create a sense of space that eludes most sub £100 cans, and they're dead comfy to boot	Circumaural, semi-open, dynamic	R	75
Sennheiser HD540 Ref Gold £160	Good Very Good	The 540 Golds prove that dynamic headphones can be subtle, informative and capable of creating a remarkable sense of space	Circumaural, open-back, dynamic	R	55
Sennheiser HD560 Ovation II £120	Very Good Good+	A comfortable and nicely styled headphone that could be more natural sounding at HF, but is detailed and open with good power	Circumaural, open-back, dynamic		99
Sony A21EX £20	Good - Good -	Forward facing in-ear drivers on a folding plastic band provide exceptional clarity for such an inexpensive phone. However, no bass, and fit isn't to everyone's taste	Intra-aural, semi-open, dynamic	BB	75
Sony MDR-CD1000 £150	Very Good Very Good	A fine sounding and comfortable headphone that's likely to work well with most sources	circumaural, closed back, dynamic	R	111
Sony MDR-CD3000 £300	Very Good Very Good	Better than most of the headphone outputs around so hard to make the most of, potentially up there with the electrostatics	Circumaural, closed-back, dynamic	R	99
Sony MDR-CD350 £32	Good+ Good	Very impressive for the price the 350 is possibly the most open sounding cheap closed back can around, lightweight in balance but transparent	Circumaural, closed-back, dynamic	BB	99
Sony MDR-CD550 £50	Good+ Good+	A very competent headphone for the price, creates a remarkable sense of space for a closed back design and sounds natural to boot	Circumaural, closed-back, dynamic	BB	99
Sony MDR-CD750 £73	Good+ Good+	Reasonably comfortable and eminently listenable these Sonys have characteristically good bass power and relaxed hf	Circumaural, closed-back, dynamic	R	111
Sony MDR-R10 £2500	Excellent Excellent	Costly state of the art sealed moving coil design built to the highest standards using the finest materials. Sound quality reflects this care, being big, clear, sweet and refined	Circumaural, closed-back, dynamic	R	72
Stax Gamma pro/SRD-X pro £296/£2	Very Good Excellent	The Gamma pros are like a stethoscope for your hi-fi, revealing subtleties that many loudspeakers fail to resolve	Circumaural, open-backed, electrostatic	R	63
Stax Lambda Signature/SRM-T1 £470/£8	Very Good Excellent	The Signature when combined with the SRM-T1 valve driver must be the most transparent headphone available	Circumaural, open-backed, electrostatic	R	72
Stax SR Gamma £299 (i)	Very Good Very Good	The next model down the Stax range from the Lambda, the Gamma is an excellent headphone with little to criticise but the price	Circumaural, open back, electrostatic	R	55
Stax SR Lambda Pro/SRD-7SB	Very Good Very Good	A bit of an industry reference, the Pros are frighteningly revealing, bringing across more information than loudspeakers costing twice as much	Circumaural, open-back, electrostatic	R	55
Stax SR Lambda Pro/SRM-1 Energis	Very Good Excellent	This combination extracts layers of information that other headphones only hint at. The SRM-1 has more edge than the SRM-T1, but it's good	Circumaural, open-back, electrostatic	R	75
Stax SR34 £140	Average Very Good	The least expensive Stax headphones around, the SR34s are lively and rhythmic with good tight bass and a sweet midrange	Supra-aural, open-back, electret		55
Stax SR84 £210	Very Good Very Good	The stepping stone between dynamics and full electrostatics, these electret phones are revealing, open and highly enjoyable	Supra-aural, open-backed, electret	R	63
Technics RP-F3 £100	Poor Average	Robocop styling coupled with a turbo bass switch and an uncomfortable fit, rhythmically OK but not up to the price	Supra-aural, closed back, dynamic		111
Yamaha YHD-1 £46	Good+ Good	Stylish semi-folding design with a slightly forward balance that very nearly scraped a recommendation	supra-aural, open-back, dynamic		111
Yamaha YHL-006 £30	Average Average	Unusual personal stereo oriented phones that curl up when not in use. Earphones are like golf balls and balance is well suited to Walkmans	Supra-aural, open-back, dynamic		75

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LOUDSPEAKERS

Last item in the hi-fi chain, to some extent the loudspeaker is merely the slave of what has gone before, capable only of reproducing a signal as good as it is fed. Nevertheless the distortions (colorations and stereo effects) introduced by loudspeakers (and rooms) tend to be more immediately obvious than those anywhere else in the chain, so careful choosing according to taste is very important.

The average loudspeaker consists of a smallish enclosure, much of which may have begun life as part of a tree, plus a couple of drive

units hidden behind a removable grille. Inside the box lurks a simple electrical circuit known as a crossover, which divides the incoming (full range) signal into the right bits for the drivers to handle. Variations on the above formula are specifically identified in the entries. The designer's primary task is to balance the sensitivity of the loudspeaker (how loud it goes for a given electrical input) against the bass extension (how low does it go) for the given box size. After that such subtleties as coloration and dispersion come into the equation.

Careful placement of the loudspeakers within the room is as important as the initial choice of model.

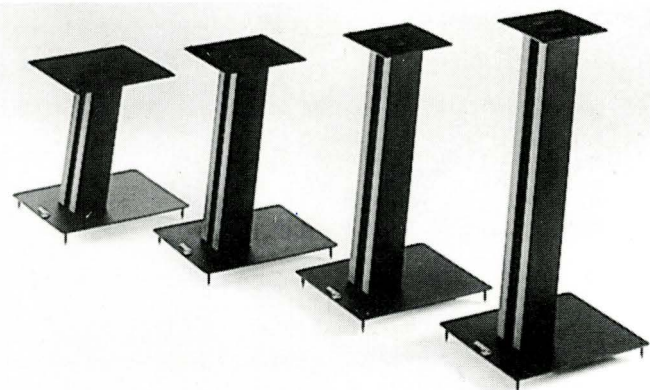
For good stereo they need to be more or less the same distance from nearby walls, and preferably on rigid stands. The listener should be about the same distance from and listening angle to each loudspeaker. The ideal placement depends on the way a particular model has been balanced (not to mention a number of other factors), and our recommendation is given in the entries.

■ MODEL ■ PRICE	■ LAB ■ SOUND	■ COMMENTS	■ SIZE ■ PLACEMENT	■ SENSITIVITY ■ BASS FROM	■ VALUE	■ ISSUE
ATC SCM20 £1419	Very Good Good +	Massively built to no-compromise Pro monitoring standards, the SCM20 is invariably informative but the rather forward presentation can be uncomfortable	44 x 24 x 31cm stands close to rear wall	82dB 28Hz (in room)		86
Acoustic Energy AE1 £767	Good Good	Amongst the best miniatures around, this metal driver pioneer shows exceptional mid focus and coherence, but is pricey and could be faster and more agile.	29.5x18x25cm stands clear of wall	84dB 48Hz (in room)		102
Acoustic Energy AE2 £950	Good Very Good	Dynamic, solid and lively, a great allrounder if a bit small considering the price. AE proves that metal cone/dome drivers really work	39 x 23.5 x 29.5cm heavy stands, free	88dB 45Hz	R	66
Acoustic Energy AE3 £1650	Very Good Very Good	Solid, authoritative and impressively accurate – if a shade ponderous and slow – AE's latest 'big one' is a much better bet than the earlier '4, combining	63 x 26.5 x 37cm low stands in free space	85dB 23Hz (in room)	R	86
Acoustic Research Red Box £100	Average Average	Lively and balanced if a bit crude and uneven, this econobox succeeds partly because of its simplicity, and works well with some rear wall assistance	32 x 19.5 x 17cm close to rear wall	87dB 85Hz	R	74
Acoustic Research AR-112 £125	Average Average -	Nicely presented and engineered, but sounds a bit small and boxy without true coherence	36 x 19 x 18.5cm stands near rear wall	87dB 75Hz		66
Acoustic Research AR M.5 £140	Average- Average-	Pretty enough but a bit too tiny for its own good, it's better suited to auxiliary surround sound duties	22 x 16 x 23cm quite close to wall	88dB 50Hz (in room)		114
Acoustic Research AR-122 £150	Average Average	Despite a promising enough list of ingredients, the 122 failed to excite real enthusiasm amongst the listening panel	38.5 x 19 x 22cm stands near rear wall	87dB 68Hz		68
Acoustic Research AR M1 £199	Good Good	Cute shaped miniature delivers splendidly unboxy bass and midrange, but is a little marred by a rather bright treble	27 x 20 x 26cm close to wall	85dB 30Hz (in room)	BB	110
Acoustic Research AR-132 £200	Average + Average -	Good presentation and detail engineering was not sufficient to counter bass heavy balance problems on auditioning	44.5 x 23 x 25.5cm stands 1ft from rear	87dB 50Hz		66
Acoustic Research Pi 3 £219	Average- Average	Lively good value box has extra bass driver to give plenty of thump, but lacks refinement and extension	51.5 x 21 x 23cm close to wall	88dB 50Hz (in room)		110
Acoustic Research AR-152 £373	Good Good-	Large bookshelf size model with luxury finish has a slightly thin overall balance, but fine coherence and agility makes it well worth considering	44 x 23.5 x 28cm stand 1-2ft wall	87dB 25Hz in room		98
Alexander SE11 £299 (s)	Good Good	Clearly better than its cheaper stablemates, the metal jacket delivers a different – and in some respects superior – sound than the wood-based	52 x 14 x 17.5cm stands close to wall	86dB 25Hz (in room)	R	82
Alexander SE5 £199	Average Average	Particularly well suited to surround sound A/V applications, the SE5 can give any miniature a run for its money on bass performance; hardness and coloration	40.5 x 12 x 15cm ALS stands near wall	82dB 50Hz (in room)		78
Allison AL100 £120	Average- Average	Loud and lively budget wall-mount is bigger and beefier than most of the competition, if lacking some subtlety and refinement	33.5 x 24 x 21.5cm stands against wall	87dB 30Hz (in room)	BB	94
Allison AL105 £150	Average Average -	Pretty enough in appearance, sonically the AL105 doesn't really make the grade at the £150 asking price	37 x 24 x 21cm high stands against wall	87dB 45Hz (in room)		78
Allison AL110 £220	Good+ Good-	Compact bookshelf model is a little dry and mid forward, but bass is extended and solid. Free space balance is good, though build quality could be improved.	40x24.5x22.5cm stands 1-2ft from wa	86dB 28Hz (in room)	R	102
Allison MS 200 £220	Average- Average-	Built as small and solid as a brick, this micro-miniature has limited bass and bright balance, but sounds agile and communicative	25.5 x 14.5 x 15cm 50Hz (in room)	85dB close to wall		106
Allison CD6 £290	Average Good -	An unusual cube-shaped model designed for wall mounting gives exceptional bass extension from a small box, though it's also a bit heavy, coloured and slow	28.5 x 28.5 x 28.5cm stands against rear	88dB 45Hz	R	71
Allison AL120 £429	Good Average	Cleverly engineered compact floorstander is pretty well balanced if slightly mid forward, but sound quality is a little disappointing for the price	63 x 28 x 27cm floor, clear of walls	88dB 30Hz (in room)		98
Alphason Artemis £299	Average Average+	Pretty little miniature sounds nicely unboxy but is also a bit short of punch and balanced rather too bright.	27 x 17.5 x 22cm stands 1ft from wall	86dB 50Hz (in room)		94

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MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	ISSUE
Alphason Amphion £695	Good Good	This fine-sounding, nicely finished compact wall-mount is just a little too expensive for formal Recommendation, but is a good performer for all that	44 x 23 x 27.5cm high stands against wall	88dB 47Hz (in room)		78
Alphason Orpheus £1070	Good Good +	Large hi-tech two-way features unusual, sweet-sounding isodynamic tweeter; well engineered and balanced if a shade odd in appearance	65.5 x 28 x 34cm stands near rear wall	87dB 43Hz	R	71
Apogee Caliper Signature £3998	Good + Very Good	Pretty but power hungry full range panels have remarkable transparency and delicacy, though loudness and bass 'grunt' are both a bit lacking	122 x 59-70 x 6.5-28cm floor, free space	81dB 30Hz (in room)	R	81
Arcam Alpha £200	Good Good	It has its own colorations to be sure, but delivers a fine room balance with unusually good dynamics, timing and 'life', and is fine material value	46 x 26.5 x 26cm stands close to wall	89dB 30Hz (in room)	BB	82
Arcam Delta Two £340	Average+ Good	Pretty luxury compact sounds a shade forward and coloured but has dynamic and lively bass for its size	37.5 x 22.5 x 27.5cm stands 1-2ft from wa	87dB 40Hz (in room)	R	94
Ariston Image £180	Average - Average -	Despite a sweet treble character, the Image fails to impress with a 'lumpy' over-rich balance that has room integration problems	42 x 22 x 27.5cm stands in free space	89dB 28Hz (in room)		82
Ariston Q £395	Average + Average	The prettily shaped Q delivers a good impression of scale from a small box, but a rather laid back, ponderous and over-rich overall sound	35 x 16.5-25 x 20-27cm high stands in free	85dB 30Hz (in room)		86
Audio Electronics TC10 II £599	Good - Good +	Oddball appearance is rescued by a respectable technical performance, interesting and impressive engineering and fine sound quality	70 x 33.5 x 33.5cm low stands in free space	87dB 40Hz	R	68
Audio Note AN-J £799	Very Good Very Good	Light damping and local unevenness adds some coloration, but doesn't spoil the very lively, dynamic and coherent sound. Fine sensitivity and balance.	58.5 x 33 x 24.5cm heavy stands, free s	90dB 25Hz (in room)	R	110
Audio Note AN-E £1300	Very Good Very Good	Lovely coherence, great midband dynamics and transparency, extended bass and high sensitivity — pity it's so darn ugly!	80 x 36 x 28cm 20Hz (in room)	90dB low stands, free space	R	106
Audioplan Kontrapunkt £799	Good Good +	Cute little German miniature sounds as sweet as it looks, dressed expensively in real wood with matching stands. Not for bass or loudness freaks	31 x 24 x 13cm free space, matching stan	83dB 48Hz (in room)	R	86
B&W DM600 £160	Good+ Average+	Attractive hi-tech appearance and clever engineering makes for an impressively smooth overall balance, but sound is a touch bland with it	35 x 20.5 x 25cm stands 1-2ft from wa	85dB 30Hz (in room)	R	98
B&W 610 £200	Good Average	Fine presentation and good perceived value, with good in-room bass extension and impressive loudness credentials too, but rather indifferent integration and coherence	49x23.5x30cm stands clear o	89dB 25Hz (in room)		102
B&W 620 £320	Good Good	Good value floorstander has well balanced, laid back and slightly lazy sound that is pleasantly easy on the ears; could do with its own spikes	74 x 23.5 x 30cm floor, free space	89dB 25Hz (in room)	BB	94
B&W Matrix 805 £795	Very Good Good	A genuine compact monitor, stylish, with remarkable imaging properties, good balance and low coloration, though less successful at communicating musical	42(max) x 26 x 22.5cm Slate stands in free	87dB 30Hz (in room)		98
B&W Matrix 801 £3295	Good + Good +	Lacks the transparency of the best panels, and the drama of the best dynamics, but is something of an acoustic tour de force, with low coloration and fine imaging	77/99 x 56 x 43cm floor or stands, fre	86dB <20Hz (in room)	R	81
Bose Interaudio 3000XL £160	Average Average -	Lots of perceived value and well enough balanced, but low cost cabinet and driver engineering results in a crude and unsubtle sound	46.5 x 29 x 23cm stands in free space	89dB 45Hz		71
Bose 305 £360	Average Good -	A bit of an oddball, fine dynamic liveliness and a good room match more than make up for the strange stereo imaging and treble	28 x 45 x 23cm high stands near wall	88dB 40Hz (in room)	R	78
Bose 401 £430	Average - Average	Cheaply built but distinctively styled semi-omni floorstander suffers from heavy midbass but still manages to sound lively and open	78.5 x 30 x 28.5cm clear of walls	89dB 28Hz (in room)		110
Bose 901 MK6 £1650	Good Average	Still controversial after all these years, the pre-equalised multi-driver 901 is cleverly engineered to deliver exceptional loudness.	33 x 54 x 32cm rigid stands in free space	(9dB mid band) 28Hz (in room)		86
Boston HD5 £115	Average Average	Tiny and prettily shaped miniature has an attractive lack of boxiness, but is a little short of drama and dynamic drive	25 x 16 x 18.5cm close to wall	86dB 30Hz (in room)		110
Boston A40II £120	Average Average -	Competent performance for size and price but below average relative to the UK competition	34 X 21 x 20cm on stands near wall	88dB 63Hz		41
Boston A120 £349	Average + Good -	Ugly but cleverly engineered, the 120 combines a tiny main driver with much larger ABR to give a generous, bighearted and lively sound despite little bass	62.5 x 31.5 x 25cm stands in free space	89dB 48Hz	R	86
Boston Acoustics T830 £399	Good Good	A lot of speaker for the money, the T830 is a smooth and accomplished performer with a big and easy - or alternatively a lazy and laid back - sound	82.5 x 25.5 x 24cm floor, away from wal	87dB 30Hz (in room)	R	82
Brinkmann Endymion £395	Average- Average+	Omnidirectional design with rococo styled urn-shaped ceramic enclosure. Distinctly bass light, but sounds impressively coherent and solid	48 x 29 (diam)cm 50/150Hz (in room)	85dB stands in free space		106
C-J Synthesis LM210 £895	Good Good+	Elegant compact US floorstander is eminently relaxing and listenable, with open and coherent midband, if a bit short on welly and drive	90 x 26 x 27cm 28Hz (in room)	86dB clear of walls	R	106
Cabasse Bisquine £600	Good+ Good+	Classy French large bookshelf speaker has great coherence and dynamic grip, but a rather mid-forward overall character	48 x 26 x 30.5cm 20-30cm from wall	91dB 30Hz (in room)	R	110
Cambridge SoundWorks Ambianc	Average Poor	Attractively styled sub-miniature sacrifices sensitivity in the interests of bass extension, but manages to lose dynamics along the way too	28 x 18 x 14cm close to wall	83dB 45Hz (in room)		94
Canon S-30 £150	Average Average+	Clever and unusual moulded design has attractive lively coherence, along with 'wide imaging stereo' effect. Neat matching stand	27 x 22.5 x 23.5cm quite close to wall	88dB 50Hz (in room)	R	114
Canon S-50 £349	Average Average+	Though only a small cone miniature at heart, the fascinating styling and extended stereo listening area feature make it utterly original and unique.	30x24(diam)cm stands in free space	84dB 48Hz (in room)	R	102
Castle SG Trent £129	Average Average	The grey paint finish looks much more modern than black vinyl woodprint, and this miniature wall-mount sounds lively and engaging, if a bit rough at the top.	33.5x18x20cm stands close to wall	88dB 50Hz (in room)	R	102
Castle Warwick £229	Good Average -	Excellent presentation and fine engineering with overload protection, but a sonic disappointment in bass and dynamic qualities	46.5 x 25 x 23cm stands 1ft from rear	88dB 50Hz		66
Castle Durham £259	Average + Average	Listening results were encouraging, well engineered and finished, but lean on treble and a bit weak on bass; still recommended	41 x 21.5 x 25cm near rear wall	89dB 67Hz	R	46
Castle York £340	Good Average+	Pretty little real wood compact has an engaging transparency, good balance and fine timing, but could do with more authority and welly	43 x 22 x 26cm clear of walls	86dB 30Hz (in room)		110
Castle Pembroke £379	Good Average +	Comfortably recommended, a sweet smooth sound with good overall balance of engineering-based performance	55 x 37.5 x 30.5cm open space on stands	88dB 46Hz	R	31
Castle Chester £599	Good Very Good	A brilliant throwback, using horn-type approach to provide startling midrange dynamics and coherence.	94 x 23 x 27cm floor, experiment	87dB 45Hz	BB	98
Castle Winchester £1400	Very Good Very Good	This unconventional and beautifully crafted model is physically large for its bass extension but is engagingly agile and sounds attractively open and airy	114 x 24 x 47cm in free space	87dB 25Hz	R	90
Celef Cirrus £180	Average Good	It's nice to see Celef back in the UK, with this decent sounding small reflex box that seems unusually tolerant of siting	39 x 20.5 x 23cm stands in free space	84dB 60Hz	R	66
Celef CF2 Nimbus £230	Good - Good -	Nicely balanced overall but a little uneven with it, this lively and dynamic largebookshelf model came close recommendation	46 x 25.5 x 24cm stands in free space	88dB 55Hz		71
Celestion 1 £100	Average Average	Pretty basic performance but at a very basic price — it all sounds a bit scrappy and untidy, but its heart's in the right place	27.5 x 16 x 21cm quite close to wall	87dB 50Hz (in room)	BB	114
Celestion 3 £115	Average + Average	This attractive little wall-mount gives good balance and stereo imagery, with a character which leans more towards inoffensiveness than excitement	31 x 18.5 x 21cm high stands against wall	86dB 55Hz (in room)	R	78
Celestion 5 £155	Good Average	Cunningly conceived and balanced, the 5 may be a little slow for some tastes, but is well suited to CD-oriented budget systems	35 x 20.5 x 26cm heavy stands close to wall	89dB 30Hz		90

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MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	ISSUE
Celestion 7 £200	Average Average+	Good value, good looking large bookshelf size wall-mount has lively up front presentation. Can sound a bit coarse and stand selection is critical.	45 x 24.5 x 32cm heavy stands close to wall	87dB 30Hz (in room)	R	98
Celestion DL8 Series II £205	Very Good Good	A refined middle market speaker has a smooth but slightly dull quality, with good definition and deep, if slightly boxy bass	50 x 27.5 x 27.8cm open, stands	87dB 60Hz	R	59
Celestion 9 £249	Good Average	Nicely presented and fair material value, with impressively flat bass-to-mid balance, the 9 doesn't really make a convincing case for the return of the three-way.	49.5x20.5x24cm stands clear of wall	89dB 30Hz (in room)		102
Celestion 15 £350	Average Good	Big box and bang for your bucks, short on subtlety and control, but long on both enthusiasm and perceived vinyl woodgrain	103 x 20.5 x 25.5cm clear of walls	90dB 28Hz (in room)	R	114
Celestion SL6Si £409	Average+ Average+	This stereotype luxury compact can sound a bit dull and congested, but really opens up on Slate Audio stands; favours CD	37.5 x 20 x 25cm stands 1-2ft from wa	86dB 30Hz (in room)		94
Celestion SL12Si £615	Average Average	Careful setting up does reveal elements of fine sound quality, but this 'grown up' SL6 variation has a lumpy response alongside its improved power handling	53 x 20 x 27cm matching stands clea	85dB 50Hz		66
Celestion SL600Si £820	Good + Good	This Aerolam high tech miniature has certain remarkable qualities that some will find irresistible, but needs careful system and room matching	27 x 20 x 23cm free air on tall stands	82dB 52Hz		68
Celestion 6000 £1510	Very Good Very Good	A genuine fullrange audiophile quality speaker system – with Star Wars styling to suit a high tech environment	Complex, on floor in free space	82dB	R	60
Creek CLS 10 £119	Average+ Average	Almost identical to the Goodmans Maxim 3, this neat miniature is very competently engineered, but not desperately exciting	26 x 17 x 21cm close to wall	85dB 50Hz		114
OCM Timeframe TF250 £350	Average + Average	Neat and unusual floorstanding presentation, marred by indifferent build and cuddly but rather coloured sound, especially on spoken word	86 x 32 x 16cm close to rear wall	88dB 45Hz		90
Oali 102 £219	Good Average	Attractive bookshelf model has fine midband focus and bass extension, but treble's a bit restrained and bass a bit detached	37 x 21 x 25cm away from walls	86dB 30Hz		114
Dali 700 £600	Very Good Average	Good material value and fine bass extension for size and price, but overall sound is disappointing, perhaps due to complexity of driver array	110 x 28 x 35cm clear of walls	88dB 20Hz		90
Dawn Chorus FS £698	Good Good	Compact floorstander with superb coherence but rather forward midband. Would suit smaller rooms best	91 x 26 x 21cm 1ft from wall	86dB 30Hz		114
Diamond Acoustics RefIII £895	Average Good+	Lovely freestander suffers from indifferent bass alignment, but is fast, coherent, solid and very informative indeed.	87 x 27.5 x 28cm 30Hz (in room)	90dB well clear of walls	R	106
Eitax Linear Response 8 £399	Average- Average+	Good material value Danish floorstander suffers from 'loudness contour' balance due to twin main drivers, but nevertheless has pleasing coherence	97 x 21 x 33cm floor, free space	88dB 22Hz		98
Epos ES11 £330	Good Good+	Pretty luxury compact uses integral baffle/driver to give a remarkable combination of low coloration, transparency and speed; bass is a bit shy	37.5 x 20 x 25cm stands 1ft from wall	86dB 45Hz (in room)	BB	94
Epos ES14 £485	Good Very Good	Substantial stand mount model delivers delightful midrange focus and delicacy with good bass control. Tends to be system sensitive	49 x 22.5 x 29cm own stands 1-2ft from wa	85dB 25Hz (in room)	R	98
Equation 0 £1290	Average + Very Good	Expensive but most attractive floorstanding miniature. Bass is limited and mid tends to shout but sound is fast and lively with fine dynamics and timing	85 x 20 x 35.5cm floor, c1ft from wal	85dB 45Hz	R	90
Faraday FS1 from £225	Average+ Average+	Concrete box on a budget, works surprisingly well despite cheap drivers, no wood veneers here. Direct sale only	47 x 27 x 28cm 1ft from wall	86dB 45Hz	R	114
Faraday Siren £330	Average- Average-	Interesting if ugly high mass concrete cabinet is let down by imbalance of ageing driver combination	46 x 27 x 27cm stands, free space	87dB 48Hz (in room)		94
Faraday FS5 £589	Good Good	Priced and ugly, but with its own sonic charm nonetheless, thanks to the substantial (largely positive) influence of the concrete enclosure has upon the sound	46x27x26cm stands in free space	90dB 28Hz (in room)		102
Genexxa SE100 £150	Average Average	Pretty little Tandy-stocked miniature is attractively lively, coherent and communicative, but could do with more grunt and welly and lower coloration	28 x 15.5 x 19cm close to wall	84dB 50Hz (in room)		110
Goodmans B-Max/Maxim 2 £100/£9	Poor Average -	Stick with the Maxims on their own until you can afford some real grown up loudspeakers	60 x 21 x 26 see above, suck and see	89dB 55Hz (in room)		78
Goodmans M100 £80	Average + Average -	Effectively a Maxim on the cheap, the M100 measures more smoothly but sounds somehow less involving than its more famous stablemate.	20 x 17 x 26cm close to rear wall	85dB 50Hz (in room)	R	86
Goodmans M300 £110	Average Average -	Conveying much of the charm and life which has made the Maxim 2 so popular, the M300 is sensitive, but hampered by upper bass cabinet coloration	38.5 x 21.5 x 17cm stands close to rear	89dB 50Hz (in room)	R	82
Goodmans Maxim 3 £110	Good Average	Smooth and accomplished wall-mount miniature makes a worthy replacement for the bestselling Maxim 2	26 x 17 x 21cm 50Hz (in room)	85dB stands against wall	R	106
Goodmans M500 £130	Average Average-	Large 'bookshelf' size means plenty of speaker for the money plus good sensitivity, let down by unruly mid/bass performance and indifferent build	47 x 24.5 x 21.5cm stands, free space	89dB 50Hz (in room)		94
Harbeth LS3/5A £379	Good Average	Still a classic miniature, though not to every taste, and none the better for the recent update under our listening conditions. Limited dynamic range	30.5 x 19 x 16cm stands in free space	81dB 60Hz		66
Harbeth HL Compact £584	Very Good Average	The clean and neutral sound lacks resolution and gives rather unobtrusive though well differentiated stereo. Can be bi-wired to advantage	52 x 27.2 x 28.1cm open space, on high	87dB 65Hz		59
Heco Reflex 10 £160	Average+ Average	This nicely balanced and well mannered small bookshelf wall-mount is a competent rather than exceptional package for the price, thanks to indifferent build.	32x21x23cm stands up to 1ft fro	90dB 30Hz (in room)		102
Heco Superior 740 £599	Good Good -	A similar sonic package to the cheaper Interior 530, these Superior clothes are very pretty indeed, though spikes are still awaited	84.5 x 22 x 25cm on floor in free space	88dB 30Hz (in room)		78
Heco Presto Superior 750 £600	Good+ Average	Tall slim and attractive floorstander delivers a fine, even in-room balance but lacks transparency, coherence and dynamic drive	95 x 24 x 27cm 22Hz (in room)	87dB clear of walls		106
Heco Superior 940 £999	Good Good	This large and beautifully finished floorstander has an impressively smooth and transparent midband. Bass is well extended but follows rather than drives the music	110 x 26 x 31.5cm free space	88dB 20Hz		86
Heybrook Prima £120	Average+ Average+	Neat and discreet miniature delivers fine coherence, pace and timing, though balance is a trifle forward and bass a bit light	29 x 19.5 x 18cm close to wall	86dB 50Hz (in room)	R	110
Heybrook Solo £159	Average + Average +	Discreetly styled wallmount sounds a little untidy in both bass and treble but handles complex rhythmic material much better than most	36 x 23 x 22cm HBS1 stands close to wall	87dB 28Hz	R	90
Heybrook HB1 S3 £250	Average+ Good	Latest version of long established favourite delivers good liveliness and fine coherence for the price, even though the shape looks a bit dated	47 x 29 x 24cm HBS1 stands close(ish) to	88dB 30Hz (in room)	BB	98
Heybrook HB100 £300	Average + Good	Well matched for wall siting, the HB100 is a lively and informative performer in the tradition of the popular HB1	47 x 26 x 28cm stands near rear wall	86dB 50Hz	BB	66
Heybrook Sextet £1079	Good Very Good	Elegant floorstanding 3-way is engagingly coherent and a highly analytical, partly due to distinct and not always comfortable upper-mid forwardness.	96x27x20cm close to wall	85dB 25Hz (in room)	R	102
Infinity Reference 10 £149	Average Average	Follows the Infinity tradition in providing an engaging and lively sound from a prettily finished and substantial small bookshelf size model	36 x 23 x 23cm stands in free space	87dB 50Hz (in room)	R	98
Infinity RS2001 £180	Average Average +	A little coloured and unruly in the treble, the 2001 nevertheless retains the lively dynamic bounce of its predecessor; pity the price has gone up	36.5 x 22.5 x 20cm lightweight stands	87dB 50Hz (in room)	R	78
Infinity Reference 20 £220	Good Average	Large bookshelf size model is well presented and balanced with good bass control, but somehow lacks convincing cohesion and agility; build was slightly suspect too	46x27x24cm stands 1-2ft from wa	88dB 27Hz (in room)		102
Infinity Reference 30 £330	Good Good	Drivers from Ref 20 in box from Ref 50 creates a well balanced and extended floorstander at a very competitive price	85 x 26.5 x 25cm 25Hz (in room)	87dB clear of walls	R	106

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MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	ISSUE
Infinity Reference 50 £499	Average Average-	Despite hi-tech drivers, attractive presentation, good bass extension and sensitivity, this three-way floorstander suffers from a forward, coloured sound	86 x 26.5 x 25cm floor in free space	89dB 25Hz (in room)		98
Infinity Modulus £695	Good Average +	Luxury high-tech miniature, carefully conceived and beautifully built. Undeniably attractive in the mid and treble, it failed to handle the bass as successfully	30 x 18 x 26cm high stands 1ft from wall	84dB 45Hz (in room)		86
Infinity Kappa 6 £795	Good Good	Interestingly styled US loudspeaker has unusual high tech drivers and good neutrality, but the sound seriously lacks excitement	63 x 38 x 24cm stands, free space	85dB 35Hz		66
Infinity Kappa 8 £1850	n/a Very Good	Very nicely made and unobtrusive but large four-way speakers which have a tendency to sound bass heavy unless used with solid core cables	118 x 51.5 x 17.5cm floor standing, open	89dB 33Hz		72
JBL XE2 £160	Average- Average-	Budget Danish-built 'bookshelf' model has anomalous 'laid back' balance and lacks the genuine JBL spirit	38 x 23 x 23cm stands in free space	88dB 48Hz (in room)		98
JBL Control 1 Plus £206	Average Average	Sub-minature with forward midrange and no real bass; highish price partly justified by cute, near-indestructible Pro styling and build	23 x 15.5 x 14cm close to rear wall	89dB 50Hz		90
JBL LX33 £270	Average + Good	A bit of a cheat, but a lot of speaker for the money, which manages a better room balance than many 'large bookshelf' rivals, and delivers a fine acoustic	80 x 25 x 21cm floor, 1ft from wall	89dB 48Hz	R	82
JBL LX44 £350	Good - Average	This generously built model offers good power handling, bass extension and dynamic range, but suffers from the 'three-way syndrome', with middle muddle	58.5 x 30 x 29cm stands in free space	89dB 40Hz		71
JBL LX55 £400	Good Average	This big bluff three-way provides lots of speaker, bandwidth and loudness for the asking price, but is ultimately a bit of a dinosaur	66x34.5x29cm stands clear of wall	91dB below 20Hz (in room)		102
JPW Minim £79	Average + Average -	Very civilised but dynamically limited, the Minim is well suited to the smaller room and where limited loudness is acceptable	27.5 x 18 x 19.5cm stands against wall	85dB 28Hz (in room)	R	82
JPW Sonata £115	Good Average +	Well balanced and integrated, this near-miniature offers fine sound if limited bass and dynamic range, plus real tree wood at a nearly silly price	32 x 23 x 20cm stands near rear wall	86dB 55Hz	BB	71
JPW P1 Vinyl £135	Good Average	Not particularly pretty, this is still a lot of highly competent loudspeaker for the price, with a safe and middle-of-the-road sound that's unlikely to disappoint.	43.5x25.5x26cm stands 1-2ft from wa	87dB 32Hz (in room)	BB	102
JPW Sonata Plus £135	Average Average -	This luxury variation on the redoubtable Sonata theme features a metal dome tweeter, and is not the better for it	32 x 23 x 21cm about 1ft from wall	87dB 30Hz		90
JPW P1 £155	Good Average +	Honest and basically articulate if not very sophisticated, resolution is good but it can sound a little wearing in bright systems	44 x 25.9 x 26.1cm free space on stands	89dB 60Hz	R	59
JPW AP2 £175	Good Good	Few grounds for criticism but purchasers should check out the treble qualities to avoid hammering the ear anvils	46 x 26 x 25cm 40cm from wall on 45cm	89dB 65Hz	R	53
JPW AP2 £180	Good Average	Good size bookshelf model offers real wood veneer at a bargain price; performance is cleaner but broadly comparable to P1 Vinyl overall	43.5 x 25.5 x 26cm 45Hz (in room)	86dB stands in free space	R	106
JPW AP3 £225	Good Average +	Pretty good stereo and well balanced overall it had its own character which is well suited to vinyl replay	52 x 25 x 29.5cm near wall on stands	90dB 57Hz	R	46
JRT AD1 £500 (s)	Average + Good +	A most auspicious Choice debut for relative newcomers JRT. A fair share of cosmetic deficiencies do little to spoil the impressive coherence and timing	59.5 x 28 x 36cm own stands close to rear	86dB 28Hz (in room)	R	86
JRT AD1 Micro £389	Average Good	Beautiful bijou miniature has delightful life and coherence and gives surprising impression of scale; some aggressive tendencies but very open to system tuning	28 x 17 x 21cm stands against wall	87dB 50Hz (in room)	R	94
Jamo Cornet 40 £110	Average- Average	Pretty little Danish-built miniature with respectable rather than exceptional sound quality for the price	32 x 20 x 22cm stands 1-2ft from wall	86dB 48Hz (in room)		98
Jamo Cornet 50 £150	Average Average+	Good value bookshelf size speaker has a rough and ready sound but good heart, engaging liveliness and fair timing	42 x 23 x 22.5cm away from wall	87dB 28Hz (in room)	R	110
Jamo Concert II £300	Good Average -	A thoroughly respectable 'bookshelf' performer that needs free space siting but includes attractive cabinetwork and a neat grille	41 x 24 x 25cm stands in free space	85dB 48Hz		66
Jamo Silhouette £400	Average Average+	Tall, slim and rather elegant in its way, doesn't sound bad for a styling exercise, just a bit rich and polite	122.4 x 24.7 x 16.8cm clear of walls	88dB 45Hz		114
Jamo Concert V £500	Average Average	Compact, solid, nicely finished floorstander delivers unusually extended bass at the expense of lowish sensitivity; midband is smooth but laid back.	86x24x28cm well clear of walls	85dB below 20Hz (in room)		102
Jamo Concert VII £800	Average+ Average	Beautifully built large floorstander uses unusual double reflex bass system, unsuccessfully as far as low frequency resolution is concerned	96 x 28 x 31.5cm floor, free standing	87dB 25Hz (in room)		94
Jordan JH400 £504	Average- Average+	Beautiful piano finish hexagon has single full range driver and controversial sound, with uneven balance but delightful mid coherence	33 x 24 x 30.5cm 50Hz (in room)	83dB 1-2ft from wall	R	106
KEF K120 £159	Good Average	Physically pretty and sonically competent but undistinguished medium bookshelf size model has good sensitivity but limited extension	34 x 20.5 x 26cm 45Hz (in room)	87dB 1ft from wall		106
KEF Q60 £379	Good Good	Uni-Q co-axial driver provides fine imaging and mid coherence, while magnet decoupling reduces cabinet coloration. Bass not entirely convincing	48x25x27cm stands close to wall	90dB 25Hz (in room)	R	102
KEF 101/2 £495	Good Good-	Small high class wall-mount has a beautifully even, slightly dull balance, fine freedom from boxiness, but not much bass drive	33 x 26.5 x 26cm close to wall	86dB 50Hz		114
KEF Q80 £499	Good Average+	Uni-Q floorstander has good stereo and fine midband coherence, but bass lacks extension, drive and resolution	85 x 24.5 x 26.5cm 45Hz (in room)	87dB free space		106
KEF 104/2 £1,295	Very Good Very Good	A reference point for dynamics, preferred without KUBE, suited to many rooms. Good stereo, high sound level	90 x 28 x 41.5cm floor standing in free spa	92dB 50Hz	R	60
Kammerzelt Reference Mini Monitor	Average+ Good	Lovely miniature has a beguilingly sweet sound with good pace and drive, but scale is restricted and presence a little dulled considering the high price	27x17x24cm stands 1-2ft from wa	85dB 50Hz (in room)		94
Kenwood LS-770E £260	Good Good	Impressively communicative made-in-Japan large bookshelf size model has fine vigour, scale and dynamics, if not the smoothest sound around	48 x 27 x 25cm 25Hz (in room)	89dB stands in free space	R	106
Lindley New Age £1100	Average - Average +	Attractively different presentation with classy finish, this tall cylindrical floorstander has fine bass extension but a rather uneven overall balance	105 x 23 x 23cm clear of walls	86dB 25Hz		90
Linn Helix II £357 (s)	Good Good+	Ku-Stone supported, this is one of the best 'large bookshelf' size models around. Dry, controlled bass and very open, if slightly aggressive balance.	57x24x30cm KuStones 1-2ft from	88dB 33Hz (in room)	R	102
Linn Index II/KuStone £110	Good Good	Stand and speaker looks and sounds very good for the price, good bass extension and control, fine dynamic range. Clean, clear if a shade slow	44 x 21 x 23.5cm (box only) close to rear	86dB 28Hz	BB	90
Linn Nexus LS250 £458	Good Average	Good features include a solid, meaty bass plus good imagery and tonal balance. The catch is that Nexus lacks resolution and timing	49 x 23.5 x 30.4cm near rear wall	89dB 60Hz		59
Linn Keilidh £492	Very Good Very Good	Compact floorstander, stunning timing and coherence and awesome bass drive, especially with ceramic plinth; sounds a bit shut in	83 x 20 x 27.5cm clear of walls	87dB 22Hz	R	114
Linn Kan II £495	Average + Average +	A niche product for those prepared to tolerate its strong character for the sake of its fine bass performance and near invisibility	30.5 x 18.5 x 16.5cm Kan stands against	82dB 35Hz (in room)		78
Linn Kaber LS500 £1198	Average Good +	Wall-mount package trades sensitivity for fine bass extension and midbass performance; little relentless but has prodigious dynamic capabilities	93 x 19 x 28cm floor against rear wall	86dB 28Hz (in room)	R	82
Magneplanar SMGa £688	Average - Average	Tonally 'rich', in the right room it proved a satisfactory musical experience	122 x 48 x 4.5cm on floor clear of wall	85dB 56Hz		46
Magneplanar MG1.4 £1090	Good + Good +	Replaces the stalwart MG1c with a revised panel layout. Offers a very crisp and articulate sound, particularly revealing of upper mid vocal details	155 x 8 x 57cm open space	88dB 40Hz	R	72

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MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	ISSUE
Marantz DS110 £200	Average- Average+	Pretty near-miniature trades bass extension for sensitivity, delivering fine midband dynamics but little grunt	33 x 19.5 x 20.5cm close to wall	88dB 55Hz		114
Marantz LD-50DMS £230	Very Good Good	Well behaved larger two-way has fine balance, stereo and integration with good bass extension, albeit with mild boxy, chesty and fizzy effects	106 x 22 x 32cm floor, free space	88dB 30Hz (in room)	R	71
Martin Logan CLS II £3998	n/a Very Good	Much improved high resolution design, fussy about system set-up and demanding of ancillaries and software alike. It rewards the efforts though	60 x 28 x 7.5cm open space	86dB 45Hz	R	72
Meridian Argent 2 £875	Good+ Good	Beautiful but pricey high-tech 'large compact' delivers extended, smooth and neutral sound with fair speed. Slate Audio stands are almost essential	48.5 x 21 x 29.5cm stands free space	85dB 23Hz (in room)		94
Meridian M30 £950	Average + Average	Pricey but easy on the ears and worth considering especially where space is at a premium	38.5 x 18 x 32cm free space on stands	AcDb 40Hz		46
Meridian Argent 1 £995	Good+ Good+	Beautifully built, finished and shaped but pricey compact has fine bass extension and virtual absence of 'boxiness'; needs a big amplifier	33 x 27(max) x 27(max)cm Slate stan	83dB 28Hz (in room)		98
Mission 760i £120	Average+ Average+	Attractively styled little wall-mount miniature has livelier dynamics and bass drive than most of its type, but sounds as little shut in	29.5 x 18 x 20cm close to wall	87dB 48Hz	R	110
Mission 761i £170	Good Average	760 theme adds an extra main driver for easier amp loading and power handling. Sound judged slightly inferior to its simpler, cheaper stablemate.	38x19x24cm stands close to wall	88dB 48Hz (in room)		102
Mission Cyrus 780 £180	Good Average +	Pricey but very pretty miniature based on Mission 760 but with beefed up box and crossover network to enhance sound quality still further	29 x 18 x 26cm light stands close to wall	88dB 50Hz	R	90
Mission Cyrus 781 £250	Average + Good	Properly run in, the pretty little 781 delivers a fast, dynamic and informative sound which more than justifies its price.	43 x 22.5 x 28cm matching stands 1ft	88dB 28Hz (in room)	R	86
Mission Cyrus 782 £350	Good - Good -	Lively, articulate and beautifully finished, this compact wall-mount model with twin main drivers has good integration but a rather rich, 'Loudness' balance	50 x 25 x 32.5cm Cyrus stands near wall	90dB 50Hz		71
Mission 764i £450	Good Average	Despite improvements, this large floorstander still lacks low frequency authority, which is probably a function of its comparatively modest price	88.5x25x32.5 1ft from wall	87dB 20Hz		94
Mission 753 £600	Very Good Good+	Gorgeous presentation and potential for open transparency. Floorstander with lots of drivers that gives lots of loudness	90 x 22 x 30.5cm try 1ft from wall	88dB 45Hz	R	114
Mission 765i £700	Good Average+	Big heavyweight floorstander has good sensitivity and bandwidth, but somehow lacks agility, authority and dynamic grip	102 x 25 x 33cm clear of walls	91dB 22Hz		110
Monitor Audio Monitor One £150ewoo	Average+ Average+	Pricey but very cute little micro-miniature just about gets away with it sonically, though performance envelope is inevitably limited	24 x 15 x 16cm stands against wall	85dB 55Hz (in room)	R	106
Monitor Audio Monitor 7 £180	Average - Average	This lively and punchy near-miniature looks pretty enough and is good value but is let down by an unruly and indifferently integrated tweeter	34 x 16.5 x 17cm stands 1ft from wall	84dB 70Hz		74
Monitor Audio Monitor 9 £220	Good Average	Despite a much better treble balance than the 7, the Monitor 9 is less engaging and lively at low frequencies than its smaller sibling	37 x 20 x 21cm high stands near wall	85dB 30Hz		78
Monitor Audio Monitor 11 £330	Average Good	This tall and slim and attractive free space compact has an extra driver to help out in the bass, giving extra urge at some price in delicacy	52 x 20 x 24cm stands free space	87dB 48Hz (in room)	R	94
Monitor Audio Monitor 14 £400	Average Average	Floorstanding version of M11 suffers from excess upper bass, giving a thick, chesty coloration beneath a quite lively and well focused mid and treble	78 x 20 x 24cm floor well clear of walls	86dB 30Hz (in room)		98
Monitor Audio MA700 Gold £400	Good Average	Lovely luxury compact does a good job of voice reproduction, but sounds a bit lazy and off the tempo with faster, busier material	35 x 21.5 x 25cm clear of walls	85dB 50Hz		110
Monitor Audio MA800 £600	Very Good Good	Beautifully finished compact has a delightfully even and uncoloured midband transparency, sensitivity and bandwidth are limited	51.5 x 20 x 27.5cm clear of walls	85dB 45Hz		114
Monitor Audio Studio 5 £700	Average+ Average+	All metal diaphragm luxury miniature has splendid presence coherence but sound can be aggressive and lacks welly.	32 x 18 x 20cm stands close to wall	83dB 28Hz (in room)		98
Monitor Audio Studio 10 £1200	Average Average +	Expensive, luxury build/finish and all-metal driver diaphragms provide engagingly transparent midrange and treble, spoiled by over-strong mid-bass.	40 x 20 x 25cm heavy stands clear of wall	87dB 45Hz		90
Monitor Audio MA1800 £1400	Good Average +	Attractive and beautifully finished, even when ballasted with lead shot the 1800 inclines towards upper bass richness and lacks genuine extension	106 x 22 x 32cm floor, free space	88dB 30Hz (in room)		81
Monitor Audio Studio 15 £1,600	Average+ Good	A little slow and lazy but better balanced than the smaller Studio models, the midband coherence and focus is superb, but it aint cheap	51x20x26cm free space	87dB 45Hz (in room)	R	102
Mordaunt - Short 5.10 £119	Good Average	Plenty of well engineered speaker for the money, and smoother than most of the competition, but lacks timing and enthusiasm	30.5 x 18.5 x 21.5cm c20cm from wall	85dB 50Hz		110
Mordaunt - Short 5.20 £150	Average- Average	Lots of speaker for your money, but not as smooth or well balanced as other M-S 5-series models	36 x 21.5 x 21.5cm clear of walls	87dB 45Hz		114
Mordaunt - Short 5.30 £200	Average+ Average-	Good hi-tech material value for money, but a disappointingly dull and rather bland sound. Safe but uninspiring.	42.5 x 25 x 28cm 28Hz (in room)	86dB stands clear of walls		106
Mordaunt - Short 5.40 £299	Average+ Good	Elegant near-floorstander has an even balance that makes it very easy on the ears, yet also inviting and informative	64 x 21.5 x 26.5cm low stand clear of w	85dB 28Hz	R	110
Mordaunt-Short Classic 20 £395	Average+ Average+	Luxuriously finished compact delivers beguiling mid transparency but bass is altogether less convincing — one for the carpet slippers generation perhaps	37x22x27cm stands in free space	86dB 45Hz (in room)		102
Morel Bassmaster 602 from £1095	Average- Good+	Superbly built compact stand-mount, did well in listening tests but suffers (enjoys?) upper midband peak	24.5 x 40 x 22.5cm clear of walls	84dB 25Hz		114
NAD 8225 £150	Good Average +	Notwithstanding lacklustre styling and an unprepossessing appearance, this NAD miniature has a smooth and even midband plus an appealing overall jauntiness.	34 x 20 x 18cm stands close to wall	87dB 45Hz (in room)	R	86
NAD 8100 £300	Average+ Average+	Floorstanding variation on attractive 8225 miniature adds some half convincing extra bass thump and saves the price of stands - very cost effective	75 x 20 x 25cm floor clear of walls	88dB 25Hz (in room)	R	98
NVA Cube 1 £600 (s)	Good - Good +	Attractive, cube-shaped semi-omni is very sturdily built, and gives an idiosyncratic but unusually open, spacious and informative sound	33 x 32 x 32cm own stands c0.5m from wa	85dB 52Hz	R	71
NVA Cube 2 £380	Average Good	A rude but exciting miniature, with unusually accomplished bass capabilities for its size	28.5 x 27 x 28.5cm NVA stands against wall	85dB 48Hz (in room)	R	82
NVA Cubix £1100	Average Good	Too idiosyncratic for formal recommendation, the Cubix possesses remarkable bass extension for its size, but is tricky to optimise	60 x 32.5 x 32.5cm	84dB 28Hz (in room)		78
Naim NA IBL £798	Average+ Good	This tiny floorstanding wall mount delivers outstanding dynamics, speed and detail, marred by pronounced upper mid forwardness	80x18x15-20 against wall	84dB 30Hz		94
Naim SBL £1475	Good Very Good	Impressive scale full bandwidth coheren an attractively discrete floor standing wall-mount coloured midband very well balanced and agile with it.	88x26.5x17-27cm close to wall	86dB 25Hz (in room)	R	102
Neat Petite £525	Average Good+	Pricey and far from perfect, this near miniature is nevertheless one of the most entertaining and enjoyable speakers around, colorations notwithstanding.	30.5x20x18cm stands close to wall	86dB 33Hz (in room)	R	102
Nobis DM7 £560	Average+ Good	Pretty but pricey US boosshelf size model has more than enough speed, timing and coherence to make up for a measure of coloration	38 x 21.5 x 28.5cm 30-60cm from wall	85dB 25Hz		110
Opus 3 Credo £399	Average Average	Credo's odd-shaped silicate-based cabinet confers good box and bass performance, but the sound could be more neutral for the price	32 x 28 x 32cm stands in free space	88dB 65Hz		74
Opus 3 Capella £599	Good Good	The sound of this Scandinavian curiosity certainly benefits from the crushed marble enclosure, though presentation is strictly DIY	32 x 40.5 x 26(ave)cm amongst books in	86dB 45Hz		66

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MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	ISSUE
Origin Live QL1 £499	Very Good Good	Luxury miniature has very good overall balance, sacrificing sensitivity to achieve remarkable bass extension for the box size	30.5 x 19 x 21cm 25Hz (in room)	82dB stands close to wall		106
Pearl & Oakley Victoria 200 £1099	Average - Average -	Extraordinary – and to many very attractive – ‘ginger jar’ presentation in Staffordshire ceramics, but let down by need for further acoustic development	93 x 33 x 33cm on floor in free space	87dB 30Hz (in room)		78
Professional Monitor Co LB1 £998	Good+ Good+	Delightful smoothness and transparency distinguishes this classy compact, though bass extension and sensitivity are both limited	53.5 x 18 x 26cm high stand well clear	86dB 33Hz	R	110
Professional Monitor Co AB1 £1600	Good Good	Bulky stand-mount transmission line has lovely panel-like transparency, slightly shut in balance, and needs a big room	79 x 27 x 43cm well clear of walls	89dB 22Hz		114
QLN Model One £700	Good Average	Similar to Signature at two thirds the price, Model One exaggerates the latter's rich and heavy midbass and lacks its velvet smoothness	35 x (16-25) x (21-27)cm pillar	85dB 28Hz (in room)		82
QLN Signature £1100	Good Good	Beautiful but expensive luxury compact has a rather laid back and ‘heavy’ sound, but coloration is low and stereo imaging very good	37 x 18 x 36cm heavy stands in free space	83dB 30Hz (in room)		78
Quad ESL-63 £2072	Good + Very Good	With its unusual but subtle characteristics this classic electrostatic may not be punchy in the bass, but has strengths that some cannot live without	92 x 66 x 27cm open stand well clear of	84dB 34Hz	R	60
RAM Hermes £425	Average- Average+	Slim small floorstander is a bit tall for its footprint. Good sensitivity is combined with an attractively lively sound, but it's uneven and not truly coherent	70 x 21.5 x 23cm floor, freestanding	91dB 45Hz (in room)		94
Rega Kyte £198	Good Good	Stylish near-miniature has splendid timing and coherence, sounds very explicit and informative, if a bit bright and short of grunt	31 x 19 x 20cm close to wall	87dB 50Hz	BB	114
Rega ELA £405	Average+ Good	Very compact floorstander with integral stand has serious coherence and dynamics, but a measure of brightness and untidiness	84.5 x 20 x 30cm c20cm from wall	86dB 30Hz	R	110
Richard Allan C05 £176	Average - Average -	This neatly presented small reflex design can sound engagingly communicative, but is flawed sonically and technically and quite expensive too	38 x 19 x 23cm on rigid stands	88dB 80Hz		68
Rogers LS2a/2 £220	Good+ Good	Balance is a bit warm and rich but 2a/2 has delightful mid-to-treble coherence and transparency, and more welly than Mk1	35.5 x 23 x 22cm 30Hz (in room)	84dB stands clear of walls	BB	106
Rogers LS4a/2 £300	Good Average+	Very civilised but a trifle lazy with it, this large bookshelf size model hasn't quite the timing or agility to be particularly engrossing or exciting	43 x 25.5 x 25.5cm clear of walls	86dB 25Hz		110
Rogers LS6a/2 £350	Good Good	Slightly old-fashioned largish stand-mount is well built, measures well, good material value, but sounds a bit heavy and lacklustre	51 x 28 x 29.5cm well clear of walls	87dB 22Hz		114
Rogers LS8a £450	Average + Average +	This modestly priced floorstander is a mixed bag, with plenty of scale and welly but lacking the subtlety, clarity and agility delivered by some rivals	89x25.5x25cm clear of walls	91dB 48Hz (in room)		102
Rogers Studio 1a £599	Very Good Good -	The classic BBC monitor style sound sensitively updated – transparent and natural with fine stereo, but a touch ‘heavy’ in balance	63.5 x 30.5 x 30.5cm stands in free space	87dB 36Hz	R	66
Roksan Oarius £1569	Good Very Good	Now totally realigned, the current Darius provides an exceptionally impressive combination of transparency and delicacy with fine information retrieval and speed	47 x 27 x 40cm own stands angled in spa	82dB 20Hz	R	86
Royd Topaz £173	Average Average+	Cheerful, articulate and essentially communicative miniature can also sound a trifle scrappy and shut in; well worth trying	30.5 x 20.5 x 19cm 1ft from wall	87dB 50Hz		114
Royd Sapphire £200	Average+ Good-	Neat little miniature sounds a touch cold and thin but unusual main driver delivers remarkable speed and coherence for such a reasonably priced model	30.5 x 20.5 x 21cm frame stands 1ft fro	86dB 28Hz (in room)	R	98
Royd Eden £245	Average Average +	Delightful mid/treble speed and transparency but determinedly bass light, this oddball miniature threatens cult status but could use a sweeter tweeter	31 x 20.5 x 18.5cm stands close to wall	87dB 85Hz	R	66
Royd Sintra £330	Average + Good	Balance is bass light and a little bright, but superb dynamics, speed and timing make this luxury miniature musically very informative and satisfying	30.5 x 20.5 x 19cm stands close to wall	88dB 50Hz	R	90
Royd Apex £500	Average + Good	Not the smoothest sound around, it more than compensates with an impressively communicative and informative musical presentation	85.5 x 20 x 30cm on floor close to wall	87dB 33Hz (in room)	R	78
Ruark Swordsman £219	Good Average	Very attractively styled and finished, the Swordsman is a well built ‘small bookshelf’ model that delivered better test than listening results	38.5 x 20 x 27.5cm stands 0.5m from wal	84dB 50Hz		71
Ruark Swordsman Plus £269	Good Average	This real wood variation on the established Swordsman theme looks and measures rather better than it sounds, probably due to rather prosaic drivers	38 x 20 x 28cm stands 1-2ft from wall	84dB 27Hz (in room)		98
Ruark Talisman £629	Average Good	Clever and beautifully finished compact floorstander has some coloration but is impressively informative and communicative, with fine pace and timing	83.5 x 21.5 x 31 (max) cm close to rear wall	86dB 30Hz	R	90
SO Acoustics OBS £865]	Average Good	Recent changes have added some refinement to a seductive midrange, good timing and fine sensitivity, though bass extension is limited and coloration obvious	102 x 35 x 25cm floor, angled, away from	92dB 30Hz (in room)	R	82
SD Acoustics SD3 £399	Good Good	Port firmly blocked, the new SD3 has the agility and charm of a quality miniature, with good bass extension but low sensitivity	38 x 19.5 x 29cm 25Hz (in room)	83dB stands 1ft from wall	R	106
SO Acoustics SD4 £699	Very Good Good	Tall slim floorstander has fine balance, good bass extension and lovely open midband transparency; sounds particularly good at modest levels	100.5 x 20 x 30.5cm clear of walls	85dB 25Hz		114
SO Acoustics SD1 £1650	Average Very Good	A large scale, airy and unusually detailed system with excellent dynamics. Current model has more civilised top-end and warmer balance than original model	123.5 x 38.2 x 31.9cm free space	90dB 50Hz	R	60
SO Acoustics Ribbon £2295	Average Good +	A little underdeveloped and rather amplifier sensitive, Ribbon is a lively and loud hybrid marred by some colorations; some like it, others don't	152 x 30 x (15-30)cm floor, angled, away	91dB 30Hz (in room)		81
Sequence 30 £200	Average Average	Radical slimline hang-it-on-the-wall design has performance comparable to a typical miniature, with reasonable overall balance	87 x 25 x 7cm close to wall	85dB 50Hz		114
Shahinian Arc £1062	Average Good	Unusual and occasionally wonderful small floorstanding omni; too bright but exceptionally coherent and revealing	69 x 35 x 25cm well clear of walls	85dB 24Hz		110
Shan Shimna £315	Average+ Good-	Pretty little miniature with resin-based enclosure has a bright, thin but sweet and communicative sound; loudness and welly are both limited	31 x 21 x 17cm own stands 1ft from wall	84dB 48Hz (in room)	R	98
Sony APM-101ES £100	Good Average	Big hearted sound from small bookshelf successor to BB '10ES, sounds a little untidy at frequency extremes, so suits CD better than vinyl	39.5 x 22.5 x 23.5cm stands, free space	86dB 52Hz	R	71
Sony APM-121ES £150	Average Average -	Good perceived high tech value, but the balance has an artificial ‘loudness’ character, too rich in the bass and too strong in the treble	43 x 25 x 28cm stands, free space	86dB 25Hz (in room)		86
Sony APM-141ES £200	Average Average	A great deal of loudspeaker for the money, the rich sounding ‘141 needs a big room and still shows significant ‘loudness’ (boom'n'tizz) tendencies	61.5 x 26 x 32cm stands in plenty of	88dB 30Hz (in room)	R	78
Sony APM-181ES £300	Very Good Average	Big and beely but equally fat and bass heavy, this well engineered 3-way has notable strengths but lacks transparency and sounds better at lower levels	57.5 x 29 x 36cm low stands, free space	87dB 40Hz		71
Spendor S20 £510	Very Good Good	This solid and elegant luxury compact maintains Spendor's tradition for peerless mid-to-treble coherence and perspectives. Bass is rather unconvincing.	38x22x26cm stands 1-2ft from wa	83dB 25Hz (in room)	R	102
Spica TC50 £599	Good - Good	This triangular-profile ‘grown up’ miniature is a shade boxy and laid back but has good rhythmic and musical integrity	40.5 x 33 x 29cm stands in open space	88dB 55Hz		71
Spica TC50SE £799	Good - Good	A heavily UK-modified TC50, the SE sounds less boxy and more spacious, but lacks some of the urgency of the standard model	40.5 x 33 x 29cm stands in open space	88dB 55Hz		71
Spica Angelus £1295	Good Average	A little bass shy and soft in the bass and lower mid, the free standing Angelus is otherwise tidy, extremely lively and fluid, if uneven overall	116.8 x 53.3 x 26cm away from walls	86dB 50Hz		60

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MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY BASS FROM	VALUE	ISSUE
Studio Power DMS100 £249	Average + Average +	Close to a BB rating, and in many respects remarkable value for money. Delivers an impressively smooth and large sound, but sheer ugliness will limit its appeal	51 x 26 x 32cm open stands 1ft from wall	86dB 25Hz (in room)	R	82
TDL Studio 0.5 £450	Average Good	This tiny floorstanding transmission line has good agility but doesn't provide the coherence or even balance of the slightly bigger Studio 1	55 x 20 x 30cm own stand, free space	85dB 40Hz (in room)		94
TDL Studio 1 £650	Average + Good	Delivering genuinely extended bass from a compact floorstanding enclosure, the Studio is very detailed but a shade clinical and detached in presentation	76 x 23 x 33cm Free space	84dB 25Hz (in room)	R	78
TDL Monitor £1999	Very Good Very Good	Fine solidity and good accuracy, with enough bass extension to satisfy even organ freaks. Needs a big room and can sound a bit lazy and a shade tinkly	118.5 x 30 x 47cm 0.5m from walls	85dB 28Hz	R	66
Tannoy 603 £120	Average+ Average+	Pretty hexagonal cabinet miniature is optimised for free space siting and delivers fine imaging with little boxiness, but little in the way of welly and power either.	33.5x22(max)x16cm high stands in free	85dB 45Hz (in room)	R	102
Tannoy 605 £150	Good Average+	Largish bookshelf size hexagon is potentially fine performer, though unusual stand sensitivity makes optimisation difficult	40 x 27.5 x 18cm 25Hz (in room)	85dB stands 1-2ft from wall	R	106
Tannoy 605LE £189	Average- Good	Mass-loaded audiophile variation of 605 sounds lively, with decent weight and timing	40 x 27.5 x 18cm 1-2ft from wall	87dB 30Hz		114
Tannoy 609 £250	Good Good	Distinctive hexagonal cabinet reduces box colorations, and new dual concentric driver is sweeter than its predecessors, making this one very superior speaker	50x32(max)x22cm stands clear of wall	90dB 25Hz (in room)	BB	102
Tannoy 611 £399	Good Average	This compact floorstander would seem to have plenty going for it, but somehow failed to gel musically under our listening conditions	72 x 32 x 24cm clear of walls	92dB 25Hz		110
Tannoy Westminster £3600	n/a Good +	These awesome horn loaded speakers are remarkably controlled and impressive, if only suited to a few pockets and rooms	Huge, flat against rear wall, away from	96dB	R	Coll '87
Technics SB-EX2 £180	Average- Average	Nicely presented, well built and decent size enclosure sounds solid but somewhat dull, thanks presumably to rather ordinary, low cost drivers	48 x 23.5 x 27cm stands clear of wall	86dB 20Hz (in room)		98
Technics SB-RX50 £650	Very Good Average +	With its unique coaxial drive unit the RX50 proved a smooth and well balanced loudspeaker, its minor weakness being a mildly excessive low bass	48 x 30 x 26cm free space on 40cm stands	86dB 40Hz	R	46
Thiel SCS £975	Good Good+	Luxury piano-gloss compact sets class-leading standards for coherence and communication, can sound a shade dark and shut in	40 x 22 x 23cm 1-2ft from wall	87dB 45Hz	R	114
Townshend Glastonbury Tor £1495	Average - Very Good	Prodigious bass extension, stunning stereo focus and low cabinet coloration, but limited loudness from low sensitivity and power handling	99 x 26.5 x 33cm well clear of walls	82dB below 20Hz	R	90
Vandersteen Model One £1000	Average + Average +	This compact American floorstander's elegant staggered baffle arrangement contributes to a refreshing freedom from boxiness, but the price is quite high	100 x 30.7 x 25.6cm floor clear of walls	87dB 23Hz (in room)		86
Vecteur Premiere £695	Average Good	Expensive for its material content, this pretty French compact nevertheless has a beguiling sound quality that indicates painstaking development	34 x 19.5 x 25cm light stands clear of wall	88dB 48Hz (in room)		98
Videotone Minimax 2 £80	Poor Average -	Cheap in build and QC as well as price, but cheerful (if coarse) with it -- if a little too cheerful after extended listening	27.5 x 17 x 20cm near rear wall	84dB 90Hz	R	74
Visonik David 6001 £173	Average - Poor	Sharp styling a classy looking miniature makes, but the complex grillework worsens a sound which starts off with too much top and not enough bottom	20 x 12 x 13cm against rear wall	87dB 130Hz		74
Wharfedale Delta 30.2 £100	Average- Average	This hundred pounder has a bigger main driver than many of its rivals, and so packs a bit more welly and loudness. Coloration is rather obvious, but timing is good	38 x 22 x 17cm stands close to wall	88dB 48Hz (in room)	BB	98
Wharfedale 410 £130	Good Average-	One step up from the Diamond, this attractive and sensitive small bookshelf model sounds smoother but is also rather bland and uninvolving	34.5 x 22 x 22.5cm stand against wall	89dB 45Hz (in room)		94
Wharfedale Diamond V £130	Average+ Average	This miniature is smoother than most, but rather stodgy with it, inspiring little enthusiasm among our listeners.	27x18x20cm quite close to wall	86dB 50Hz		114
Wharfedale 515 £260	Good Good	Effectively a technical update on the continueing 505 theme, this is still more evenhanded, with better bass extension and smoother treble.	40 x 25.5 x 30cm 28Hz (in room)	85dB stands clear of walls	R	106
Wharfedale 517 £400	Good Average	Similar to the 515 but half as big again, the hefty 517 should offer an improvement, but somehow has a less effective overall subjective balance	53 x 26.5 x 34 stands clear of wall	86dB 25Hz		110
Wharfedale Coleridge C £600	Good Good	Very prettily dressed and sounds pretty good as well, though whether enough to justify the £600 pricetag is open to debate. Well balanced, smooth and a little dull.	48x25.5x25.5cm stands clear of wall	86dB 30Hz (in room)		102
Yamaha NS 1000M £900	Good Good +	Living up to its monitor label, and tonally well suited to digital material, the NS 1000M is superbly crafted and capable of high levels	67.5 x 37.5 x 32.5cm 30cm from wall, stan	90dB 40Hz	R	46
Zyp A1 £199	Average Average+	Cute metal cased micro-miniature is quite coloured but great fun, with surprising dynamics and fine wall-loaded room balance	22.5 x 14.5 x 13 close to wall	85dB 30Hz	R	110

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LOUDSPEAKERS - SATELLITE AND SUBWOOFER SYSTEMS

Satellite and subwoofer systems, sometimes referred to as three way systems, consist of a small pair of speakers (the satellites) and an extra box (or two) to handle the low frequencies.

By freeing the main speakers of the necessity of generating deep bass they can be made much smaller than a standard design and as a result sat and sub systems are usually visually unobtrusive.

Positioning of the sub-woofer is usually not as critical as the positioning of a conventional speaker and as a result the largest part of the system can be hidden away entirely, although please refer to the placement notes below as this does not apply to every system.

In general the sonic performance of these systems will fall below the performance of a good, comparably priced, conventional speaker. The value ratings given below are judged in the

context of sat and sub woofer systems only and are not judged by the same criteria as the main speakers, thus a Recommended sat and sub system probably won't sound as good as a Recommended traditional speaker.

If you are prepared to compromise slightly in terms of sound quality then a sat and sub-woofer system might represent a good solution for those situations where the loudspeaker should be heard but not seen.

LOUDSPEAKERS - SATELLITE AND SUBWOOFER SYSTEMS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE (cm) PLACEMENT	SENSITIVITY BASS FROM	VALUE	ISSUE
Allison MS 205 £420	Average Good -	Tasty high quality satellites give this quite pricey 3-box system a touch of class. Subwoofer is very compact and only slightly boomy.	25.5x14.5x15 + 29x29x36 stands close to wall	86dB 30Hz	R	104
Bose Acoustimass AM3 £289	Average Average	Ultra compact 3-box is well balanced though limited in loudness and bass. Tiny satellites are a bit fierce, and grilles unhelpful	9x11x11 + 20x37x19 close to wall	85dB 48Hz		104
Bose Acoustimass AM5 £569	Average + Average +	Pricey but cleverly engineered 3-box system is well balanced and uses tiny twin-driver satellites to good effect	16x7.7x12 + 36x19x48 sats at wall, sub 2ft from wall	85dB 40Hz	R	104
Heco Libero £375	Average Average	Attractive 3-box package uses neat metal satellites with versatile mounting accessories, but subwoofer is boomy in the midbass	18x11x12 + 21x55x 31.5 uncritical	85dB 45Hz		104
Jamo SW/SAT300 £300	Average Average	Attractively finished 3-box package has 'tunable' subwoofer that allows boom to be minimised and a good balance achieved	21x15x8 + 21x48x34.5 uncritical	85dB 40Hz	R	104
RSS Solid/Bass Station £550	Average Average	Multi-driver macho subwoofer adds mucho muscle to Solid satellites, but it's much more midbass than serious extension	24x12x12 + 47x 4& x 20 sub at wall, sats in free space	91dB 45Hz		104
Wharfedale 2130 £300	Average Average +	3-box system marred by indifferent boomy subwoofer but rescued by novel wide-dispersion satellites that give an open sound	14x24x11 + 19x32x 50 sub away from wall	86dB 48Hz	R	104

PERSONAL CDS

MODEL PRICE	SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Aiwa XP-6 £150	Good	Punchy sound both via headphones and when used in a system but transport lets the side down a bit - not one to take out jogging	Digital output, mains adaptor, remote, headphones	R	106
Kenwood DPC-41 £130	Average -	Lightweight, not very walkable but nice control layout. Sound through the phones is on the thin side, through the line output it's pretty average for a portable	Mains adaptor, rechargeable batts headphones		94 Supp.
Kenwood DPC-81 £200	Good +	Chunky metal cased player that makes pretty confident sounds through a system but sounds dry via earphones and ain't exactly walkable	Remote control, mains charger and batts, digital output		94 Supp.
Philips AZ6897 £200	Good +	Unusually designed and equipped with a radio the Philips is almost joggable, it sounds remarkably good via a system and a little cautious through the phones	Mains adaptor with built in plug, wired remote, clock, headphones	BB	94 Supp.
Philips AZ6819 £300	Excellent	Unusual looking machine with interesting radio headphones. Excellent sound quality but not one to walk with, superb styling	Radio headphones, rechargeables, plinth, infra-red remote	BB	106
Sanyo CP-12 £260	Good +	Sonically amongst the more enjoyable CD players and capable of revealing the musical aspects of a disc in an interesting and entertaining fashion	Wired remote, headphones main adaptor	R	66
Sony D-11 £135	Average -	Chunky player with old fashioned styling, a rather lightweight sound and limited dynamic range.	Headphones, AC adaptor bass boost		106
Sony D-202 £160	Average +	Good sound quality twinned with relatively good portability accounts for the recommendation, can also sound OK in a main system. Nice entry level machine	Headphones, AC adaptor rechargeables, remote, digital out	R	106
Sony D-303 £280	Excellent	Tidy design with adequate features but not as cluttered as the D-350. Excellent sound quality and will even serve as a CD transport	Headphones, AC adaptor rechargeables, remote, digital out	BB	106
Technics SL-XP1 £140	Good +	Remarkably competent and enjoyable player that you can actually use on the move and sounds enthusiastic through a domestic system	Rechargeable batts, mains adaptor/charger, headphones	BB	94 Supp.
Technics SL-XP505 £180	Average -	Excellent transport makes this one of the most stable players on the market and the infra-red remote control is a nice bonus. Sound quality leaves a little to be desired	Headphones, AC adaptor rechargeables, infra-red remote		106
Technics SL-XPS900 £280	Excellent	Great sound quality both via phones and in the home backed up with an impressive array of accessories. Transport is not up to use on the move	Headphones, AC adaptor rechargeables, infra-red remote	R	106

TUNERS

The radio medium operates at a much lower profile than TV, but in areas outside pop music the BBC service is the envy of the world. Live Prom concerts can rival all other sources from a hi-fi perspective.

Only the FM (VHF) bands give stereo hi-fi sound, though AM (MW & LW) are useful for certain transmissions in the UK.

Something of a hi-fi afterthought, tuners are often selected merely to match a chosen amplifier

cosmetically. However, the task they carry out is far from simple (or cheap), combining the skills of RF (reception) and audio (signal processing) engineering.

The importance of the former will depend on local reception conditions, but money invested in a high quality outside aerial system is well spent. For more information on choosing and aerial see the feature in issue 108

Tuners come in two basic types. Analogue

models tune gradually (and usually manually) across the bands, and can have analogue or digital displays; they are often preferred for sound quality, and are certainly best for AM bands. Digital tuners offer convenient automatic tune facilities and hold many station positions in pre-set memories. (The Lab and Sound results for models tested in issue No. 65 refer to FM only. For AM results see under Comments.)

TUNERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Aiwa XT-003 £105	Average Average-	Economically designed and built in the UK, but trade-offs have a marked influence on FM and AM sound quality.	FM/AM digital, 30 presets, no signal strength meters.		93 Supp
Akai AT-56L £170	Good Good -	Listenable, but not exciting, was the overall verdict - it had no gross flaws but failed to capture the imagination	FM/MW/LW digital, 20 presets, 2 aerial sockets, switchable IF bandwidth		108
Akai AT-93L £250	Good + Good +	By AM standards presentable (good) while FM delivers the goods	All bands, aerial switch	R	65

TUNERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Arcam Alpha 2 £185	Good Average+	Re-styled to blend in with the Alpha system, Arcam's cheapest tuner makes up for its lack of features with a sensitive front-end and mellow sound.	FM/AM analogue, no presets, manual tuning + AFC	R	93 Supp
Arcam Delta 80 £340	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
Aura TU-50 £230	Good Good	Tonally neutral, but with rather poor imaging and a certain woodenness to the sound.	FM digital, 16 presets		109
Creek T40s3 £220	Average+ Average	Creek's FM-only analogue tuner is now in series 3 form, though the aesthetics remain unchanged. Ours was hampered by an obvious bass 'hump' though production units are said to be cured.	FM-only analogue, no presets, manual tuning + AFC		93 Supp.
Denon TU-260L £100	Very Good Good+	A new cheapie from Denon with the bare minimum of features. Careful designwork promises a surprisingly open and vivacious sound, so don't overlook it!	FM/AM digital, 20 presets, manual and auto tuning.	BB	93 Supp.
Denon TU-660L £190	Good Good	Not so successful under 'ideal' conditions, the '660 nevertheless made a fair fist of real reception, if a little muddled and lacking life.	FM/MW/LW digital, 30 presets, switchable IF bandwidth, remote	R	108
Harman Kardon Citation 23 £600	Good Very Good	Fine performance, interesting features and ease of use are this tuner's forte, and the sound quality is top notch	FM/AM seek/manual adjustment muting 16 presets remote control	R	60
Harman Kardon TU9200 £170	Average Average	The listening panel appreciated its liveliness, but found it a little muddled. Excessive pilot tone breakthrough may be distressing to listeners under 30 and indicates some design slip-up.	FM/MW digital, 16 + 16 presets		109
Harman Kardon TU9400 £250	Good Very Good	Striking in appearance and with a sound to match, this new digital tuner comfortably exceeded our expectations. On stereo FM it's HK's best yet.	FM/AM digital, 24 presets, auto-tuning, signal strength meter	R	93 Supp.
Harman Kardon TU9600 £299	Average Good	Good bass and detail, and good - perhaps slightly 'enhanced' - dynamics, but measured performance is odd in normal mode and poor in 'Active Tracking' mode.	FM/MW digital, remote control, 24 presets, 2 aerial sockets		109
Linx Theta £475	Good Very Good	A Magnum Dynalab on the cheap with the hallmark styling of this small British newcomer. Some of the best midrange from any tuner	Manual analogue tuning, no presets, signal strength meter	R	72
Magnum Dynalab FT101 £599	Good Very Good	Although expensive for its fairly minimum set of facilities, its excellent sound makes up for what it lacks elsewhere	Analogue manual tuning, no presets, signal strength meter	R	72
Marantz ST-40L £140	Average + Good	A little slow to tune but once accomplished it provides a meaty and dynamic sound on FM. AM too has a little extra bite to its performance	FM/AM digital, 30 presets, manual/auto tuning	R	93 Supp.
Meridian 204 £660	Good + Good	Pleasant sounding with a fine finish but does not make the grade at this price	FM only, auto scan, digital, remote, timer		55
Naim NAT 01 £1377	Very Good Excellent	There may be better sounding tuners in the world, but we have yet to hear one	No presets. Two box, flywheel tuning, FM only, Analogue	R	50
NAD 4225 £160	Good Good ++	Slightly edgy at times and a tad coloured too, but the sound is so free and open that the tuner must be regarded as one of the most enjoyable models of its type.	FM/MW digital, 14 presets.	BB	108
Nakamichi Tuner 2 £350	Good Good +	Generally a believable sound with good detail in complex music, but imaging is not 100%. The price seems rather high for the performance offered.	FM digital, 30 presets, switchable IF bandwidth		109
Nakamichi ST-7E £765	Good + Good +	Exceptionally good for weak-signal areas, and good all round	16 AM/FM presets, auto time digital		55
Pioneer F-676 £200	Good + Good ++	Pioneer's extensive homework on the design seems to have paid off in a tuner that's detailed and clean-sounding. Perhaps a little bright, but not unpleasant.	FM/MW digital, 36 presets, switchable F bandwidth, 2 aerial sockets	R	108
Pioneer F91 £360	Excellent Good +	Easy to use, this model has excellent RF performance and scored very high ratings on the listening tests	FM/AM 24 presets	R	60
Quad FM4 £399	Very Good Good +	Fine sound, excellent ease of use, good build and finish and a more than satisfactory technical performance	7 presets. Digital	R	50
Revox B260 £1120	Excellent Very Good	Sophisticated and expensive, the B260 is ideally suited to the rest of the Revox range and should also work well in other systems	FM - virtually everything	R	60
Rotel RT-930AX £150	Good Good -	A competent rather than exciting performer, with low audible interference though slightly compressed and muddled sound.	FM/MW/LW digital, 20 presets	R	108
SAE T-102 £449	Good + Good +	Expensive for all the radio you get, but sounds interesting. AM - poor	FM/MW only	R	65
Sony ST-S530ES £200	Good+ Good	The cheaper version of Sony's revered '730 certainly looks and feels the part but its sound is, well, less startling. Civilised, yes, but lacks much enthusiasm.	FM/AM digital, 30 presets, hi-blend + Cal tone + manual/auto tuning.		93 Supp.
Sony ST-S570ES £200	Good Average	A host of features, but the sound is muddled, compressed and lacking in frequency extremes.	FM/MW/LW digital, 30 presets, RDS, switchable F bandwidth		109
Technics ST-G70L £200	Good+ Good+	Another very polite and refined-sounding tuner but one that does retain just enough sparkle to keep your interest. Plenty of widgets to play with too...	FM/AM digital, 39 presets, selectable RF/IF + fine tuning, signal. str. mtr.	R	93 Supp.
Yamaha TX-950 £260	Good + Good +	Very clean and civilised - a bit too much so for one listener. But tonal balance, detail and clarity are all very good; lots of useful features add to its value.	FM/MW digital, up to 40 presets, switchable IF bandwidth, 2 aerial sockets	R	108

TURNTABLES - CARTRIDGES

Very much the 'slave' of turntable and tonearm and to some extent undermined by the supply of free 'starter' cartridges on many turntables, the cartridge is still worth taking seriously. The quality of both the stylus itself and the cartridge's tracking performance are important in preserving that most important part of the hi-fi system - the records - and the cartridge also plays a significant role in determining the system balance.

Cartridges fall into two groups: high output models, capable of working directly into any amplifier, and more expensive low output models. Stereotypically, low output cartridges use the moving coil principle of operation, have better mechanical integrity and tighter tolerances, and give better performance but at much higher cost. Most under-£150 amplifiers and many valve designs need either an extra head amp or

transformer to cope with the low output.

Cartridge/amplifier interfacing can be very subtle, but even basic high output MM designs benefit in overall balance from optimised amplifier capacitance loading. Still more important, the mechanical cartridge characteristic of cantilever compliance ('springiness') needs to be considered in the light of the effective mass of the tonearm

TURNTABLES - CARTRIDGES

MODEL PRICE	LAB SOUND	COMMENTS	ARM EFFECTIVE MASS OUTPUT/TYPE	VALUE	ISSUE
Arcam C77 £22	Average + Average +	A sensible moving magnet package with good bounce at a competitive price	6-16g Normal, MM	BB	48
Arcam C77Mg £30	Average - Average	Punchy sound quality with plenty of extra energy to liven things up. The solid body seems well worth the extra £10	4-8g Normal, MM	BB	67
Arcam E77Mg £50	Average Average	Our sample had a disappointing stylus, but gave a coherent, rich and laid back sound, with good 'scale'	3-8gN Normal, MM	R	48
Arcam P77Mg £60	Average + Average +	Cautiously recommended, the P77Mg was preferred to its cheaper partner by virtue of a better tip. Channel balance could have been better	4-9g Normal, MM	R	48
Arcam PMX10 £100	Good + Very Good	Not the very clearest in complex high-frequency sounds, but lively and exciting, good transients	5-11g Low, MC	R	85

TURNTABLES - CARTRIDGES

MODEL PRICE	LAB SOUND	COMMENTS	ARM EFFECTIVE MASS OUTPUT/TYPE	VALUE	ISSUE
Audio Note I02VOH £1295	Good Very Good	One of the best, giving 'an extraordinarily relaxing midrange clarity', needs a transformer	8-18g Very low, MC	R	43
Audio-Technica ART1 £800	Good + Very Good	This is a delicate and very fluid-sounding MC that tracks well, offers very low distortion and exceptionally good stereo separation	9-18g Low, MC	R	72
Audio-Technica AT-420E £35	Average Average	Better suited to pop recordings, this MM bears some of the sonic hallmarks of the Linn K5	7-14g (damp) Normal, MM	R	67
Audio-Technica AT-95E £19	Average - Average	Clear, dynamic if richly balanced, the magnetic '95E is a definite Best Buy	8-14g Normal, MM	BB	48
Audio-Technica OC-10 £307	Good + Good +	Good treble and good detail too, but some congestion and coloration reduces its infomativeness.	4-12g Low/MC	R	103
Audio-Technica OC-5 £123	Good + Good	For the price, it's unusually effortless and detailed, but it tends to become rather relentless and tiring after a while.	5-14g Low/MC	R	103
Audioquest AQ 404i-L £400	Very Good Good +	Slight harshness detracted from the performance of this otherwise clear-sounding and detailed cartridge	8-16g Low, MC		84
Audioquest AQ 7000 £1200	Good Good +	Stunning stereo imaging and good detail at low levels are spoiled by less-than-perfect tracking and high sensitivity to arms.	6-20g Low, MC		91
Audioquest MC5 £220	Average Average	Offers high-output benefits but the drooping frequency response and severe VTA error preclude recommendation	10-20g Normal, MC		54
Cello Chorale £750	Average + Good	Now available through a new distributor at a saving of some £300, the Chorale is still blessed with a delicate but highly detailed treble. Arm matching is a problem	3-9g Low, MC		72
Denon DL103 £99	Good Average +	An oldie but in many ways a goodie, the 103's good performance in bass and general 'life' is seriously let down by its spherical stylus which kills subtle details.	9-22g Low/MC		103
Denon DL110 £69	Good Good	Firmly recommended as a fine all-rounder, this high-output moving coil model is likely to perform well in nearly all circumstances	6-16g Normal, MC	BB	48
Denon DL160 £89	Average + Good	Although listeners just preferred the 110, its brother here proved a twin in lab tests and is still "thoroughly competent"	6-16g Normal, MC		43
Denon DL304 £200	Very Good Excellent	Uncoloured, detailed, neutral, superb tracking; top notch altogether, and a top notch bargain too.	4-12g Low/MC	R	103
Dynavector 17D2 £280	Very Good Very Good	Clear, detailed, neutral and generally very informative - excellent.	6-18g Low, MC	R	91
Dynavector DV-50X £99	Good Average	A high-output MC model with impressive lab performance, but whose tip and sound quality both disappointed	6-14g Normal, MC	R	48
Dynavector DV10X IV £125	Average Average +	Fine sounding and realistically priced, damping is recommended to ensure successful tracking ability	8-18g (damping) Normal, MC	R	48
Dynavector DV23RS £230	Average + Good	Sound quality was described as "shut-in", lacking energy and sparkle but with some "edginess" in high frequencies	10-22g Low, MC		28
Dynavector XX-1 £680	Very Good Good +	Good, but not immensely competitive at the price, and not helped by comparison with the low output version	7-15g Normal, MC		84
Dynavector XX-1L £680	Very Good Very Good	Very clear, very detailed, no troubles with tracking; response lift around 20kHz seems to do no harm	7-13g Low, MC	R	84
Empire Benz Micro MC-Gold £130	Good + Good	Nothing is obviously wrong, but nothing is stunningly right either and tracking isn't perfect. Safe, but perhaps a little too safe	7-17g Low/MC		103
Empire Benz Micro MC-Silver £130	Good Good	High output MC that though ultimately not the peer of the MCGold is more appropriate to the sort of equipment it's likely to be partnered with	8-18g Normal/MC	R	103
Empire Benz-Micro MC-2 £699	Average Good +	Similar to both the Empire MC1000 and vdh MC2 in design, the Benz offers a warmer and very transparent account of the music. Its tracking prowess is slightly limited	5-12g Low, MC	R	72
Glanz GMC-10EH £50	Good Good	The rising HF trend of this high o/p MC may cause problems in certain systems but with a favourable wind its seductive qualities will win out	8-14g Normal, MC	R	67
Glanz GMC-10LX £80	Average + Average +	Bearing some of the hallmarks of the '10EH, the '10LX is still less competitive in the sonic stakes	7-15g Low, MC		67
Glanz GMC-20E £129	Good + Good +	Very good tracking, smooth sound and good detail. Very slight surface noise enhancement	5-10g Low, MC	R	91
Glanz MFG-110EX £25	Average Average	A little bright but giving detailed bass and clear treble, this was competitive at the price	6-16g Normal, MM	R	43
Glanz MFG-310LX £50	Good + Very Good	Detail and treble outstanding for sub-£100 cartridge. Slight coloration may be due to body resonance	6-10g Normal, MF	BB	85
Glanz MFG-610LX £90	Good + Good +	Similar to cheaper '310 but slightly clearer transients and bass. Benefits from lowish impedance loading	3-10g Normal, MF	R	85
Goldmund Clearaudio £1500	Average + Very Good	Something of a mixed bag overall, its sonic character bears a strong resemblance to the Pradikat though it shares some of the hallmarks of the more expensive Accurate	5-12g Low, MC		60
Goldring 1012 £50	Good + Good	Slightly harsh sound but plenty of life and quite good detail. Some very high frequency coloration apparent	6-12g Normal, MM	R	85
Goldring 1022 £70	Good + Good	As with 1012, a touch harsh; detail and transient purity improved, though, and it goes well with electric guitar!	5-11g Normal, MM	R	85
Goldring 1042 £90	Good + Good	Not terribly subtle, and not such good value alongside 1012 and 1022. Quite lively, though	7-12g Normal, MM		91
Goldring Elan £20	Average + Average	A lightweight and frisky-sounding MM that appears to be based upon the same body as the Nagaoka mm4	7-15g Normal, MM	R	67
Goldring Elite £200	Good + Good	The basics are right, and the Elite will cheerfully tackle any source material, but its sound possesses a certain dirtiness which can irritate.	8-18g Low/MC		103
Goldring Epic II £32	Average Average +	An excellent budget choice though the limitations of the stylus are rather obvious at higher frequencies	5-12g Normal, MM	R	67
Goldring Eroica H £105	Good Good -	More confused and coloured than its low-output sibling - high output less of an issue in these days of cheap MC-compatible amplifiers	8-15g Normal, MC		84
Goldring Eroica LX £120	Good + Good	Not the most subtle cartridge in the world; can sound edgy at times, but lively and informative	8-14g Low, MC	R	84
Goldring Excel £549	Average + Good	Goldring's most expensive cartridge to date errs on the warm and heavy side of neutral. Strong bass lines are its forte though its ability to resolve subtle treble details is weaker	6-13g Low, MC		72
Goldring Excel GS £600	Very Good Good +	The Excel has some true high end quality in its lack of annoying colorations, but tracking seems indifferent and high levels tend to sound rough and edgy.	9-20g Low/MC		103
Grado ZF3E + * £47.50	Average - Average	Downtilting balance disguises the brightness of this cartridge; bit of a mixed bag at this price	9-20g (damping) Normal, MM		54
Grado ZTE +1 £26.50	Average - Average	Bass and treble are a trifle coloured but the midband proved highly enjoyable. Ideal for budget systems	6-13g (damping) Normal, MM	R	54

TURNTABLES - CARTRIDGES

MODEL PRICE	LAB SOUND	COMMENTS	ARM EFFECTIVE MASS OUTPUT/TYPE	VALUE	ISSUE
Kiseki Blackheart £1795	Good Good	This cartridge demonstrated refined poise and a delicate but at once potent security, however, the price did seem a little on the high side compared to other Kisekis	6-16g Low, MC		60
Kiseki Blue Goldspot £450	Very Good Good +	Good bass and imaging, but hints of spit and coloration let the side down slightly	8-15g Low, MC		84
Kiseki Lapis Lazuli £4000	Good Very Good	Combining very sensible design concepts at a silly price, the Lapis Lazuli is best thought of as combining the detail of the MC3000 and the fluidity of the Clearaudios	4-12g Low, MC		60
Kiseki Purpleheart Sapphire £799	Good + Good +	Rare, beautiful to look at and sweet to listen to, our review of this high-flyer conjured up images of Japanese art	5-14g Low, MC		48
Koetsu Black S £612	Average Good +	The S is an OEM design built to Koetsu's blueprint. It features a sturdier fixing plate and offers a brighter, faster and more tactile sound than the earlier K	8-15g Low, MC	R	72
Linn Asaka £373	Good + Good +	Disciples of Linn who are trying to realise their true "Karma" may find that saving money is not a short cut to heaven	9-18g Low, MC	R	Coll. '86
Linn K5 £39	Average Average +	Not as crisply focused as the costlier Linn magnetics, the K5 offers a smoother presentation	7-16g Normal, MM	R	67
Linn K9 £89	Average Good	Linn threw this model into the leading pack by beefing up the Basik's bodywork, adding a super stylus, and keeping the price fair	6-15g Normal, MM	BB	Coll. '86
Linn Karma £564	Very Good Very Good	A specialist which is strongly recommended for Linn-based systems; results may be less predictable in more general application	9-18g Low, MC	R	Coll. '86
Linn Troika £798	Very Good Good +	Good all-rounder, but still some hint of unhappiness at very high levels. Good imaging and bass.	6-18g Low, MC		91
London Maroon £149	Average Average +	Now manufactured under the London brandname this Decca cartridge is as iconoclastic as ever	9-20g (damping) Normal, MM		67
London Super Gold £300	Poor Average -	Immediate and (in the midrange at least) detailed, but very coloured, very nonlinear and questionable effect on records. Devotees swear by it	9-15g (damping) Normal, fixed stylus MM		84
Milltek Aurora £249	Good + Good +	An overall feeling of relaxed ease characterised this clear and atmospheric Kiseki-built cartridge	8-16g Normal, MC	R	Coll. '86
Milltek Olympia £349	Average + Good +	Warm and detailed sound - packs the punch of the best MCs with high output as a bonus	12-20g, (damping) Normal, MC	R	54
Nagaoka MP10 £18	Average Average	High frequencies sounded "shut-in" with this spherical-stylus model, but mid and mass were energetic, bouncy and punchy	5-13g Normal, MM	R	48
Nagaoka MP11 Boron £40	Average Average +	Responding well overall in PM's equipment and listening room, this model was mildly criticised for low level and dynamic limitations	5-13g Normal, MM	BB	48
Nagaoka MP11 Gold £47	Average - Average +	There were mild criticisms directed at most areas, but in general the sound was clear, open and even	3-8g Normal, MM	R	48
Ortofon 510 £30	Good Good +	For the price, a good blend of virtues - weight, clarity and neutrality.	3-11g Normal, MM	BB	85
Ortofon 520 £50	Average Average +	Very sensitive to load capacitance this new Ortofon maintains the company tradition for a lively, effervescent SQ	7-16g Normal, MM	R	67
Ortofon 530 £80	Good + Good +	Very clean and assured sound; transients not quite perfectly pure but plenty of detail.	4-11g Normal, MM	R	85
Ortofon 540 £100	Average - Average	Graced with an advanced FGII stylus our sample possessed too high a compliance for broad arm matching. It could also sound a little unforgiving	3-8g Normal, MM		67
Ortofon MC10 Super £70	Average Good	"What a delightfully sweet-sounding cartridge this is . . ." we said	5-15g Low, MC	BB	48
Ortofon MC15 Super £100	Good + Very Good	A good all-rounder, with outstanding performance in detail retrieval, even if it can be very slightly bright and close-up at times.	10-24g Low/MC	BB	103
Ortofon MC20 Super £200	Average + Good +	An "inviting" sound quality; polite rather than exciting it approaches much more expensive models, but does not better them	6-15g Low, MC	R	Coll. '86
Ortofon MC3 Turbo £100	Average + Good	Not terribly subtle, but it obviously doesn't aim at that. The 3 Turbo is bright, cheerful and bouncy - take it as it comes!	10-24g Normal/MC	R	103
Ortofon MC30 Super £270	Very Good Good +	Beautifully engineered and well-balanced, it was slightly criticised as bland, though some may appreciate the lack of rough edges	5-14g Low, MC		Coll. '87
Ortofon MC3000 MkII £850	Very Good Excellent	Low levels of body resonance are a real ear-opener. Nothing to criticise elsewhere; one of the very best	9-16g Low, MC	R	84
Ortofon MC5000 £1500	Good + Good	Review sample could not be fully run-in, which might explain limited tracking ability and bright and forward sound, though imaging is excellent. Fussy about s.	12-20g Low, MC		91
Ortofon Quartz £120	Good + Good	Lively, quite detailed, and a touch bright, the Quartz has many qualities of the much dearer Quasar	3-12g Low, MC	R	91
Ortofon Quasar £300	Very Good Very Good	Many of the qualities of the MC3000, although a touch bright. Good detail and delicacy	8-15g Low, MC	R	84
Ortofon Quattro £200	Good + Good +	Undoubtedly a competent performer, the Quattro however seems a less obvious choice than the other Qs. Generally neutral, but can be edgy and bright in loud passages.	6-18g Low/MC		103
RATA RP20 £22	Average - Average	Good integration, a clear dynamic midrange and the beginnings of fine stereo imagery merits clear recommendation	6-14g Normal, MM	R	48
RATA RP40 £44	Average Average +	The '40 did a good job of sorting out the layers and complexity of the mix, with good focus, excellent stereo spread and fine scale	6-15g Normal, MM	R	48
RATA RP70 £77*	Average Average +	Clearer and sweeter than the '40 this also seemed heavier and less lively. For £99 you can have a van den Hul stylus	6-14g Normal, MM		43
Rega Bias £34	Average Average +	Difficult to mount in some arms due to its shallow build, the bias offers a gentile, refined SQ that certainly makes it worthy of audition	4-10g Normal, MM		67
Rega Elys £74	Good Good	Clearly superior to the Bias, despite their common heritage, the Elys is both more detailed, accurate and musically convincing	8-15g Normal, MM	R	67
Revolver £20	Average + Average	This modified AT-95E enjoys a very lively mid and treble even if the bass is somewhat 'slower' in comparison. A firm budget buy	8-16g Normal, MM	BB	67
Roksan Corus Black £110	Good + Good	Recognisably related to Corus Blue, but distinctly more civilised and smoother.	7-12g Normal, MM	R	91
Roksan Corus Blue £65	Good + Good	Roksan-specified modified Goldring 1012; slight harshness detracts from otherwise good sound.	7-11g Normal, MM		91
Shure M104E £36	Average - Average	Capable in many ways, but giving no substantial improvement over the 92E in our view	5-15g Normal, MM		38
Shure M105E £49	Average Average -	A slightly 'spitty' sound lacking deep bass and dynamic contrast, but can be used in virtually every system where it will perform "unobtrusively"	5-12g Normal, MM		38 Summ

TURNTABLES - CARTRIDGES

MODEL PRICE	LAB SOUND	COMMENTS	ARM EFFECTIVE MASS OUTPUT/TYPE	VALUE	ISSUE
Shure M110HE £60	Average Average	Sound quality was thought eminently presentable, but not exciting; smooth clear high frequencies, but a loss of bass definition	5-10g Normal, MM		38 Summ
Shure M111HE £72	Average Average	Early reviews of this cartridge complained principally of the price - which has since come down	5-10g Normal, MM		38 Summ
Shure M92E £17	Average - Average	Though lacking depth, the overall sound quality was competent, but treble was not its forte	10-15g Normal, MM		43
Shure M99E £29	Average - Average -	Sister to the 92E this is a solid but not particularly exciting cartridge	5-10g Normal, MM		38 Summ
Shure ME75ED £26.50	Average Average -	Rather bright and splashy in the high frequencies but nevertheless a competent model	5-10g Normal, MM		38
Shure ME97HE £49	Average Average +	It won't turn a sow's ear of a turntable into a silk purse, but will at least keep going and produce an acceptable result	8-20g Normal, MM	R	48
Shure ML120HE £95	Average + Average +	Quite decent sound quality and a generally fine balanced performance	6-18g Normal, MM		48
Shure ML140HE £120	Average + Good	Qualitatively the treble of this well-balanced moving magnet model was a match for many moving coil cartridges	6-16g Normal, MM		43
Shure Ultra 500 £499	Good Good	There was no doubting the accomplishments of what could well be the finest moving magnet cartridge around	6-14g Normal, MM		48
Shure V15 VMR £215	Good Average +	Initial listening gave promising results, but extended familiarity gave the feeling of a lack of energy and a "shut-in" sound	5-12g Normal, MM		38
Shure VST V £173	Very Good Very Good	Quite exceptional assurance with difficult material; very stable and clear sound. One of the best. Dynamic Stabilizer actually works!	4-11g Normal, MM	R	85
van den Hul MC One £699	Good Very Good	This extended all the positive qualities of the '10 but added greater authority and scale - worth it for the extra money	6-12g Low, MC	R	60
van den Hul MC Two £899	Good Very Good	Connected directly to any standard MM input the vdH MC Two rewards with a highly detailed yet fluid and musically convincing portrayal	6-13g Normal, MC	R	72
van den Hul MC1 Super £799	Very Good Very Good	Slight softening effect on transients was the only real flaw, but it didn't quite seem to have that special touch one expects for the money	8-15g Low, MC		84
van den Hul MC10 £599	Good Good +	A neutral balanced performer giving transparent midrange, fine depth and focus with firm extended bass. Gosh!	5-10g Low, MC	R	60
van den Hul MM1 £200	Good + Very Good	If its wooden-sounding midrange coloration could be tamed, the excellent imaging and admirable all-round security of the MM1 would make it an excellent performer.	7-15g Low/MC	R	103

TURNTABLES

The schizophrenic split between consumer electronics and 'real hi-fi' is most obvious amongst turntables. The former are supplied simply as a means of playing vinyl in a system context. Cheaply manufactured in the Far East, these are complete 'record players' with a variety of automatic facilities, sometimes tied into a system remote control. But engineering compromises usually severely limit sound quality, cartridge choice may be P-mount restricted, and nowadays such machines are rarely stocked by specialist hi-fi dealers

Specialist turntables offer big sound quality improvements, but lack so-called convenience features (that practised users often find irksome) Such turntables at the cheaper end of the market (sub-£350) tend to be supplied with matching tonearm, and often include a 'starter' cartridge.

Still better quality is found at higher prices amongst the separate motor units and tonearms. Careful partnering and set-up is essential for these components, but 'naturally sympathetic' combinations exist, and a good dealer can help. Listed separately as integrated players and

as motor units and tonearms, our sound quality rating is based on results achieved using a high quality system - but in point of fact the deck is usually the limiting factor soundwise in any system.

Lab performance rating summarises the speed stability, vibration generation and environmental isolation of turntables, along with the friction, alignment and adjustment of tonearms. The tonearm's physical characteristics also define a range of compatible cartridges.

TURNTABLES - INTEGRATED

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES ARM EFF. MASS	VALUE	ISSUE
Acoustic Research EB-101 £230	Good Good	This genuine high fidelity product offers an impressive package at a competitive price	Subchassis, manual, 13.5g	BB	48
Alphason Sonata/HR-100S MCS/Atlas £835/£550/£400	Very Good Very Good	Good sound in all areas - bass, clarity and neutrality all in the top class and bettered by very few decks. Atlas PSU expensive but worthwhile	Belt drive, suspended, optional PSU, 13g	R	79
Ariston Pro £160	Good Good	Remarkably clear and detailed for the price, very neutral. Benefits from cartridge upgrade	Manual, belt drive, 12g, cart.	BB	91
Ariston Pro Maxim/RB250 £210	Average Fair	Warm, full sound with a deep bass and solidity is partly offset by lack of fine detail in mid and top. On a suitable surface, with a crisp sounding cartridge, it easily qualifies for shortlisting	Solid plinth, belt drive, manual, 11.5g		103
Ariston Q-Deck £180	Good Average +	Well engineered and good sounding low cost package which is both easy to set up and to use	Semi-auto, belt drive, solid, inc. cart	BB	67
Dual CS-505-4 £170	Average Average	Easy to set up and to use, this is a consistent sounding and well isolated turntable with a long pedigree. It is slightly lacking in balls, but compensates with a consistently unmuddled presentation and good stereo focus perspectives.	Auto-arm lift, interlocked cueing, 2 speed, pitch control	R	103
Dual CS-750 £300	Average- Average-	Attractive but lazy performance from a deck with many good ideas and which is a pleasure to use. Cartridge is past it's sell by date. Has 78rpm facility	Solid plinth, belt drive, cart. 3-speed, quartz referenced, auto lift		103
Dual CS430 £100	Average Average -	Ragged, sometimes unpleasant cartridge mixes with a modest pleasing player in a very sharply priced package	Belt drive, with cartridge, auto return, 5g	R	67
Dual CS5000 £230	Average Average +	The rare 78 facility may give grandma's collection a new lease of life but the player did not merit recommendation on price vs sound	Electronic, belt drive, subchassis, 10g		48
Dual CS-503-2 £145	Good - Average	Not wholly inspiring; generally coarse and woolly sound is at least not offensive, but easily bettered by the CS505-4. Good value in material terms	Semi auto, belt drive, 10g	R	91
Goldmund ST4 £4589	Very Good Excellent	The Studio turntable takes on a cheaper tonearm than the T3F, yet provides a similar reference standard performance at £2,000 less, in a neatly integrated though bulky package	Solid subchassis, direct drive, parallel arm, detachable h/shell	R	60
Goldring Excelda 1 £160	Poor Poor	Untidy, resonant sound, narrow effective dynamic range and lack of tracking security. The cartridge (the only authentic Goldring part) is quite nice	Manual integrated arm, synchronous motor, auto-start/stop		103
Heybrook TT2 turntable & arm £469/£269	Average Good +	A gradual process of informed evolution and a sensibly designed arm combine to make this a good sounding middle of the road package. Well supported by dealers	Manual subchassis motor with arm, R belt drive, 14g		67
JVC AL-FQ555 £170	Average - Poor	Clear midband sound but woolly bass and crude treble. Ease of use however ranks highly, and there's little to go out of adjustment	Auto, direct drive, 5.5g		67

TURNTABLES - INTEGRATED

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES ARM EFF. MASS	VALUE	ISSUE
Kuzma Stabi/Stogi Reference £995/£899	Very Good Very Good	Beautifully made in a solid oak plinth, the Stabi also sounds very clear, detailed and extended. Stogi Reference is also most capable.	Manual, belt drive, subchassis.12g R		91
Linn Axis/Akito £443	Good - Average +	A neat, attractive and well-made package which delivers a rather harsh sound with a 'one-note' effect in the bass, but it's well suited to mid market systems	Belt drive, semi-suspended, electronic PSU, 10g		79
Linn Basik £250	Good Average+	Strong midband analysis and imagery, clean if sharp treble is matched to a good if occasionally wooden bass. Good at the price, and requires no complex setting up or fine tuning in service	Solid plinth, inc cartridge, manual speed change	R	103
Linn LP12 Basik/Akito £599/£137	Very Good Good	Familiar Linn virtues and vices - plenty of the former though and few of the latter. Trails the full LP12 significantly, but pace, rhythm, timing etc. still in top class, and bass tauter than of old	Suspended subchassis, belt drive, single speed, 45rpm adaptor	R	103
Linn LP12-Lingo/Ekos/Troika £1168/£1097/£798	Good + Good +	The classic reference is improved (at a price) by the Lingo but character remains the same - not as detailed or neutral as the best. Ekos arm, though pricey, is well made and suited to many decks	Manual, subchassis, belt drive, 9g R		91
Manticore Mantra/Musician £340/£170	Good + Good +	Well engineered deck with satisfying sound. The arm is particularly fine and very good value	Belt drive, suspended, 15g	R	79
NAD 5120 £90	Average Average	A number of running improvements have given this player a range and tautness denied its lazier sounding antecedents.	Semi-auto belt drive, detachable arm/tube/weight, 9g	BB	67
Opus 3 Continuo/Decca London International (Revise) £599/£99	Poor Good	Heavyweight motor unit with many fine properties, but which needs further development. The idiosyncratic arm is a suitable (though not ideal) platform for the Decca cartridge. For all its faults though, the whole transcends the sum of the parts	Belt-drive manual, damped unipivot arm, 12g		67
Rational Audio Aura 01 £189	Poor Good	Poor lab results reflect bad rumble, but midrange and treble are very pure and clean; idiosyncratic sound and styling should be tried!	Manual, belt drive, linear tracking arm 10g	R	91
Rega Planar 2 £185	Average + Good	A remarkable product at the price, surprisingly articulate and confident	Manual, 11.5g	BB	48
Rega Planar 3 £250	Good Good	A long time leader in its price category, the '3 (with its excellent RB300 arm) sounded nicely 'musical' in a balanced and coherent manner	Manual, 11.5g	BB	48
Revolver Rebel £185	Average Good -	Quite lively and detailed but not the strongest on subtlety, with slightly lumpy bass. Motor breakthrough audible, and watch for bent motor shaft on delivery!	Manual, belt drive, semi-suspended 12g	R	91
Revox B291 * £892	Average - Average -	Sound quality ranks as below average. Subjective bandwidth is narrow and the music lacks grace and energy. Ease of use however is unrivalled	Automatic, remote controllable, direct drive parallel arm, cart		55
Roksan Radius/Tabriz zi £635	Good Good	Truly modern turntable in appearance. The design is subtle, refined and easy on the eye. Musically it offers exceptional performance with a minimum of setting up and operational fuss	Semi-suspended, belt drive, mains plug PSU.	R	103
Roksan Xerxes 33/Tabriz zi £550/£255	Good Good	Good but not exceptional sound quality from expensive package. At its optimum with a relatively inexpensive arm/cartridge unless upgrade to full Xerxes is contemplated. XPSII PSU adds 45rpm and much to sound quality	Semi-suspended, belt drive, 33rpm only, mains plug PSU, one piece arm tube, 'intelligent' counterweight		103
Roksan Xerxes/Artemis /Artaxerxes £785/£655/£559	Excellent Excellent	Superb though costly record playing hardware, highly integrated and synergistic in nature, but suitable for use with any good MC cartridge. Will not suit all tastes, however	Semi-suspended, belt drive, quartz locked 2 speed PSU	R	103
Rotel RP-855 £200	Good Good	Great sound for the money - detailed and clear with good bass and no irritating nasties	Belt drive, solid, speed adjust, 9g	BB	79
Systemdek 1/900 £188	Poor Average	The motor unit is derivative of the Rega Planar 2, but sounds inferior by virtue of insufficient structural integrity. Pitch stability is also far from acceptable	Solid plinth, manual speed change, no cartridge		103
Technics SL-DD33 £120	Average Average	As with the QD33 though better value	Automatic, direct drive, solid plinth, 7.5g, P-mount	BB	48
Technics SL-L20 £120	Poor Average -	A rather lightweight parallel tracker achieving a poor overall rating, with little to recommend it unless you dig facilities	Electronic, solid plinth, 5g, P-mount		48
Technics SL-QD33 £150	Average Average	The quartz speed controlled version of the DD is short on sound quality but not features. But it did have fair focus and some depth	Automatic, Quartz, direct drive, solid plinth, 7.5g, P-mount	R	48
Technics SLBD-22 £100	Average - Average -	Not bad for the price and a great improvement on the L20, it performs reasonably when not stretched	Semi automatic, solid plinth, electronic, 6g P-mount	R	48
Thorens TD 166 Mk V £240	Good Good	Classic suspended-subchassis deck with clear, stable sound of no particular character. Unlikely to make enemies	Belt drive, suspended, 12g	BB	79
Thorens TD 280 Mk II £190	Good - Good -	Legendary Thorens build quality on the cheap - slightly unsubtle sound but eminently liveable-with and very good value	Belt drive, solid, electronic PSU, 12g	BB	79
Thorens TD 316 Mk II £250	Good Good -	Very solid deck with neat split-chassis construction. Sound is a bit insecure in the bass, but it could suit classical music lovers well	Belt drive, suspended, electronic PSU, 12g	R	79
Thorens TD-3001/TP90SF £850	Very Good Good	Excellent middle ranking esoterica, with strong all round abilities rather than excellence in particular areas. Engineering content is particularly high	Suspended subchassis, belt drive, available w/o arm	R	103
Thorens TD166 VI/UK/RB250 £270	Good Average-	Refined and articulate sound with well focused imagery, suitable for use with good MM and budget MC cartridges. The Rega arm is the best at its price, a good purist deck	Manual, belt drive, suspended, 11.5g	BB	103
Thorens TD2001 £650	Good Good -	Similar to TD320 but much dearer - why? Sound is comfortable but not very detailed	Semi-auto, belt drive, subchassis 15g		91
Thorens TD280 II/UK £189	Average Average	Excellent value for money from a built to last player which is also easy to use. Will benefit from a cartridge upgrade in due course, but has an energetic and detailed sound	Solid plinth 2-speed player, inc cartridge	BB	103
Thorens TD320 Mk II £400	Good Good	Good, consistent sounding deck with much improved (but not ideal) arm. A little expensive for performance offered	Semi-auto two speed belt drive, 14g		67
Townshend Rock Reference/Excalibur £2295/£745	Excellent Excellent	Overall the closest reproduction to master tape we've yet heard, with stunning real bass and excellent neutrality. Front end damping trough improves LF detail significantly	Belt drive, suspended, electronic PSU, front-end damping, 12g	R	79
Voyd Reference/Helios Cyalene £5414/£1350	n/a Excellent	Voyd's flagship is equipped with three of the biggest motors in the business, a Lexan platter and a real brute of a power supply (it dwarfs most power amps!). A strong contender for best turntable in the known universe	Belt drive, 3 motors, subchassis, outboard PSU, 12/14g	R	Coll. '90
Well Tempered WTAT £1690	Average Very Good	Intriguing and challenging design. Musically it is not ideal, but it has a limpid quality and a lack of artificiality that sets standards as well as turning the ear, though it's not completely uncoloured. A charmer yet mainstream enough in its virtues to be viable	Manual 2-speed, damped, suspended arm, 7.5g	R	67
Zarathustra S4/Pluto 5A Prestige/PSU £1500/£2500/£500	n/a Excellent	The very well made and finished heavy platter S4 with the superb Pluto arm make a devastating combination ranking up there with the very best	Subchassis, manual, available without PSU	R	72

MOTOR UNITS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
CEC ST930 £599	Good Very Good	A rarity - a serious hi-fi product that loses nothing to budget rivals in finish or convenience. Good clean sound, very stable and assured	Belt drive, external PSU, 78 speed inc.	R	79
CS Audio Resan kit for Rega £90	Good Good	After-market kit to convert Rega 2 or 3 to semi-suspended subchassis style. Looks good and sounds tidier than original. Feedback is much reduced	Conversion kit, all work reversible	R	79

The Directory

MOTOR UNITS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Michell Gyrodec £595	Good Good	Sweet and natural sounding player, well exploited by the Rega RB300 arm. Aesthetics, and the acres of acrylic, are unique	Manual, belt drive, suspended motor unit		55
Michell Syncro £265	Good Good	A happy blend of qualities endows the Synchro with a blend of subtlety and force - the mailed fist in the velvet glove. Easy on the ear in the best sense	Manual, belt drive, suspended motor unit	R	67
Oracle Paris £695	Good - Average	Looks good but sounds coarse, confused and uneven, with bass liable to thump	Belt drive, semi-suspended, electronic		91
Origin Live Oasis A £495	Good - Average	Rather coarse sound with lack of detail resolution - but lively presentation may appeal. Appearance is industrial	Belt drive, external mains filter, 33rpm only, suspended		79
Origin Live Oasis B £199	Average Average +	Aesthetics are not its strong point, but its lively and articulate - if idiosyncratic - sound will please some tastes. Highly resonant construction is very sensitive to feedback	Belt drive, 33Gy1/3Gyrpm only, solid plinth/subchassis		79
Oxford Acoustics Crystal Reference £2495	Very Good Excellent	This big, open and powerful sounding turntable works beautifully with Airtangent arm to give superb 3-D imagery. Recently updated to mk.II form	Manual, belt drive, subchassis, stand	R	60
Pink Triangle Anniversary £1175	Excellent Excellent	Possibly the most detailed, clear, neutral and therefore accurate deck around. Likeness to master tape is almost uncanny	Suspended, belt drive, electronic, motor on subchassis	R	91
Pink Triangle Export £676	Very Good	Basically a PT TOO with built-in power supply. Retains features of great transparency and neutrality. Review sample had highish motor noise - presumed untypical	Suspended, belt drive, electronic	R	91
Pink Triangle Little Pink Thing £392	Good + Very Good	Leads the field for clarity and neutrality at this price or a good bit more. It also looks very smart! Excellent value. Arm cut-out suits Rega or Linn style	Belt drive, semi-suspended, electronic PSU	R	79
Revolver £150	Average Average	Nicely balanced, but unimpressive timing and lightweight bass made this deck rather average for the price. Manufacturer has since made several changes, but not re-submitted for review	Manual, belt drive, solid plinth		48
Systemdek IIX/900 £200	Good Good	The Systemdek IIX is a high performance, low cost turntable which is particularly strong in the areas of fine detail resolution and imagery. Tested with Rega RB250	Suspended subchassis, metal armboard, glass platter, 2 speed	BB	103
Systemdek IIXE/900AP £358	Good Good+	A development of the IIXE/900, with a comparably detailed sound reinforced by better frequency extremes, timing etc. Needs careful setting up.	Suspended subchassis, metal armboard, acrylic platter, PSU	R	103
Systemdek IV £495	Good Very Good	The level of wow is a theoretical concern at least, but elsewhere this player shines, combining euphony, information and imaging in a polished, untemperamental package	Two-speed manual belt drive	R	67
Voyd 0.5 £3062	n/a Excellent	Based on the standard 3-motor Voyd but with upgrade options (better bearing, platter, etc) which take it half way to a Voyd Reference. Superb build and finish; colourful, dramatic performance.	Belt drive, 3 motors, subchassis, outboard PSU	R	72
Voyd Valdi £868	Good - Very Good	Recent power supply upgrade has resulted in around improvements. This Perspex plattered, two motor deck is remarkably competent, revealing and neutral	Belt drive, suspended subchassis, electronic PSU		79
VPI HW-19Mk3 £1600	Very Good Very Good	Built to accommodate parallel tracking arms, this large but elegant deck produced clean, smooth sound when fitted with an SME arm. Good bass	Belt drive, suspended subchassis	R	79

TONEARMS

MODEL PRICE	LAB SOUND	COMMENTS	ARM EFF, MAS	VALUE	ISSUE
Airtangent 1B £1990	n/a Excellent	A complex but superbly built arm for high quality systems, giving excellent stereo and resolution	7.5g (vertical)	R	60
Alphason Delta £230	Good Average +	A highly competent design from Alphason gives good sound quality but with slight blurring and treble fizz	16g	R	48
Alphason HR100S £490	Very Good Very Good	This S-shaped arm sounds smooth, but nevertheless reproduces transients with fine attack	10g	R	Coll. '86
Alphason Xenon £286	Good Good +	A trimmed down HR100S, the Xenon has inferior bearings and a simpler finish, but sounds crisp and coherent. Fits any Linn cutout	12.75g	R	55
Audio-Technica AT-1130 £186	Good Good	Well suited to most cartridges including high compliance ones, the AT is smooth and tonally neutral, if slightly lacking in 'balls'	8.5g	R	67
Decca London International £49	Average + Average +	This uni-pivot design gives a rather rich tonal balance and some bass muddling. Could be good with Decca cartridges, but not well built	12g		48 Summ
Eminent Technology £1000	Good + Very Good	One of the best sounding tonearms around, the linear tracking Eminent delivers impressive stereo imagery, focus and transparent sound	9g (vertical)	R	Coll. '86
Goldmund T3F arm £4400	Excellent Excellent	This complex parallel tracker created an "ear-opening" experience when tested with a (since updated) Goldmund Studio turntable	16.5g	R	Coll. '87
Kuzma Stogi Reference £899	Very Good Very Good	A large, solid and well-made arm that holds the cartridge firmly, giving exceptionally clear sound with just a hint of brightness	12g	R	79
Linn Ekos £1097	Very Good Very Good	Superb, state of the art design which builds significantly on Ittok's strengths	9g	R	67
Moth Arm £95	Good Good +	The ultimate budget arm? Refined, detailed, sweet and natural - performance improves in line with the rest of the system	12g	BB	60
Naim Aro £752	Good Good -	Designed for use on the Linn LP12 turntable and Troika cartridge, the Aro is a little bright and congested.	10.5g		91
Rega RB300 £139	Very Good Very Good	Despite its modest price this sets exceptional performance standards and could be used on a number of high-quality turntables	10-11g	BB	60
Roksan Artemiz £655	Average Good	Interesting design which works a treat on the Xerxes deck. Fits Rega cut-out.	8g		67
Roksan Tabriz £165	Good Good +	Though obviously targeted at Roksan's own Xerxes, it is also a good alternative to the Rega arms in many applications. A trifle bright.	9g	R	91
SME 3009 Series III £253	Good Average +	Comprehensively adjustable and very well made, suited to MM and high compliance MC cartridges	5g		48
SME 3009 Series IIIS £182	Good Average +	A simplified less flexible (as regards adjustment) Series III with a similarly 'soft' sonic character	5g		48
SME 3009R £335	Average + Average +	A higher mass version of the Series III designed for low compliance MC cartridges	12g		48
SME 309 £568	Very Good Very Good	Beautifully made, finished and presented, this arm is fully and easily adjustable and a highly neutral performer	10g	R	79
SME Series IV £828	Excellent Very Good	Superb engineering and finish with a finely balanced sound giving impressive stereo focus and low coloration	10.5g	R	60
SME Series V £1232	Excellent Very Good	Excellent in terms of design engineering and sound quality, this arm arguably sets a new reference standard regardless of price	10.5g	R	60

Personal Messages

I didn't quite believe the Harmonix tuning bits and pieces when they were demonstrated in an Absolute Sounds room at last year's Penta show. I didn't believe that anyone would try to market something so small and inconsequential at all, and certainly didn't believe that anyone would have the nerve to try and sell them at such absurdly high prices.

I didn't believe sticking little discs of metal about the size of a 1p piece on the baffle of a loudspeaker was going to have any significant influence on the sound, and certainly didn't believe that products as loony and tweaky as these were going to do anything at all to enhance hi-fi's reputation as a rational pursuit for the discriminating music lover.

Such disbeliefs continue to dog my perception of Harmonix, but the wretched truth of the matter is that these dratted devices do seem to change the sound of a decent hi-fi system far more than one has any right to expect, and mostly for the better too.

I say mostly because my results have been a little variable, and are based on rather limited experiences

Harmonix tweaks; expensive, reputedly magical — but what do they do? Paul Messenger finds out and attempts to integrate hi-fi with AV.

with only a few of the devices. Alan Sircom has been tackling the Harmonics with rather more rigour, and will be describing his findings in next month's *Sessions*. In the meantime, I can only say that these little bits and pieces are a tweeker's delight — the perfect palliative to post-Christmas hi-fi angst, even at the price of an arm and a couple of legs.

The how and why of what Harmonix does remains obscure, if not downright irrational. Alchemy and magic might well be part of the mix, since the only physical mechanism that seems feasible is some variation on the mass-damping theme, the self-resonances of the little discs presumably absorbing resonances in the components to which they are attached across a fairly narrow band of frequencies.

While the devices had certainly seemed to sweeten up the sound of the little Linæum speakers in a Penta bedroom, I was much less impressed by their influence on the output terminals of a Linn *Karik* CD player, and was frankly sceptical that something which had worked on the Linæum could be equally effective on a pair of Tannoy *Westminster Royals*.

I let Riccardo himself tune the *WR's*, and was more than a little taken aback to find that they did work, and in much the same way. The treatment quite audibly sweetened and tidied up the sound, especially at the top end of the band, somehow removing or suppressing hash and edginess. The trouble is, when I came to remove them a few weeks later, I found I didn't particularly miss them either. I'm in no doubt that they really do change the sound and also that they improve it cosmetically. Both these observations are remarkable enough in themselves, but I don't think the treatments I've experienced actually

make a system more informative, which is a rather different criterion.

Dialogue without compromise

Following the launch of the splendid B&O *AV9000* system, this column recently (issue 112) dealt with some of the implications and ramifications of the multi-channel systems that are starting to become available, primarily to reproduce signals that combine sound alongside video.

The whole area of AV integration is relatively new and unexplored, especially in Britain where the bandwagon has barely left the starting grid, leaving the Americans with a lead of at least three laps. But there's one key issue within this subject that needs airing and debate as soon as possible.

There's no question that a superb audiophile hi-fi system can give wonderful music reproduction especially with vinyl LP sources. And there's no disputing that a state of the art THX/projector AV system can bring a Laserdisc feature film experience close to that of the cinema into the home. The question that is much more important, and yet harder to answer, is whether it's possible to combine both roles in a single system and room, without significantly compromising one or the other.

The potential trouble spot lies in the centre-front channel — the so called 'dialogue' loudspeaker in the Dolby Pro-Logic AV configuration. There's no real need to use it with a stereo music source, and probably very little advantage with the best radio drama, but it does make a lot of sense with about 90 per cent of television broadcasts

The Dolby P-L specification limits centre-front low frequency extension to a modest 50Hz, which will help to reduce the stress endured by the chosen loudspeaker. But whereas any side and/or rear speakers don't have to work at all hard to add normal surround perspectives (apart from the occasional sound FX), the centre-front is often working harder than the normal stereo pair.

Bandwidth apart, it therefore needs to be every bit as good as the main left and right stereo speakers of the system, which in turn poses several headaches for users of serious hi-fi systems and large screen televisions. To start with the speaker needs to be as close to the screen as possible, which means it needs to be magnetically shielded and pretty small. So I rigged up one of the little Mordaunt-Short *Home Entertainment* speakers and sat it on the telly, in between the two giant Tannoy horns. The *HE* isn't a bad little speaker for its size, but the mismatch in the middle reminded me of the M25 at Dartford before the bridge was finished — slow, congested and all squashed up.

I'm still exploring various alternatives — an active Linn *Keilidh* on its side might do the trick — but can foresee all sorts of problems for serious audiophiles attempting to add an AV dimension to their systems. Indeed, the only practical way to avoid compromise in the dialogue channel might be to opt for a room projector TV display that only needs a reflective (and preferably acoustically transparent) screen between the main speakers, allowing something really meaty to be positioned to handle the dialogue.

THE LISTENER

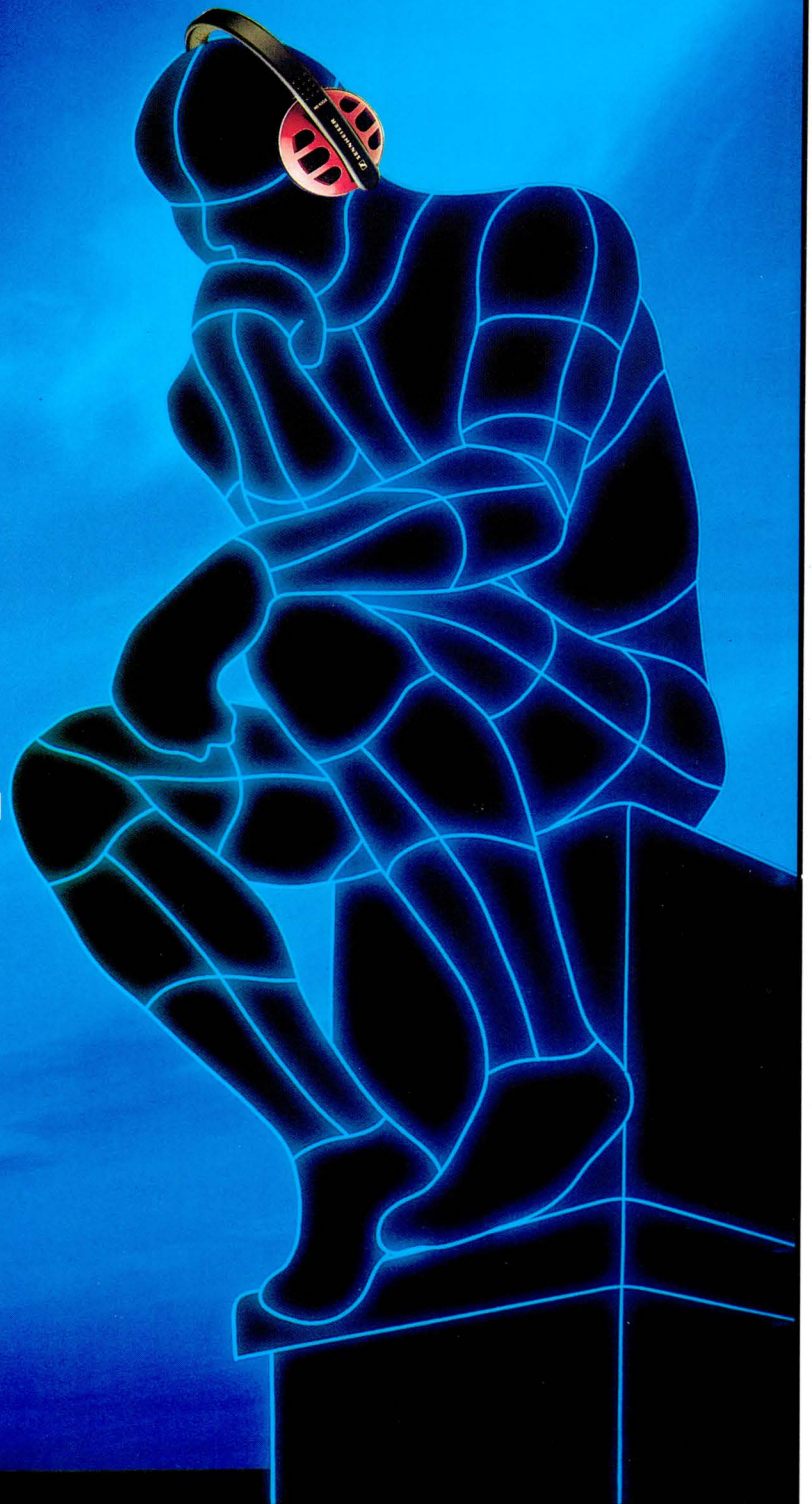
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Rotel's original RCD-865 whipped up a storm, especially from Philips which was a trifled miffed at someone else pipping it to the post with its own technology! And then there were the golden-eared reviewers who thought bitstream would never amount to much anyway.

We know better now of course, and so do the UK arm of Rotel which has spent the intervening two years working on its replacement - the RCD-965BX. Visually it's hardly a departure from the original, though the satin-black alloy fascia with its clear fluorescent display is a little softer on the eye. Extra features include index skipping which joins traditional track skip, search, repeat, random and program play options. There's a new slimline remote too, an attractive little handset that adds direct track access to the tally of widgets.

Inside it's all change with Philips' new SAA7323 PDM DAC replacing the SAA7320 used before. The 7320 family are all single-ended DACs using a total of 256 times oversampling and second order noise-shaping. Nevertheless the SAA7323, with its 352kHz dither, is much closer in execution to the 7320 than the intermediate 7321.

Meanwhile Rotel has a completely new and wholly symmetrical board layout for this combination of SAA7310 decoder, SAA7323 DAC and analogue filter.

Lab report

This player conforms to accepted standards with a nominal 2V output, though its performance elsewhere is still far from conventional. In particular although the SAA7323 DAC avoids the sporadic high-level idle tones of the SAA7320, various fixed signals, including the CLV reference tone of 7.35kHz, are still present. This drone is visible on the -70dB plot and, naturally enough, compromises the signal-to-noise ratio to the tune of about 5dB or so.

Meanwhile the 3D plot highlights the

third and fifth harmonic distortions that mark the 7320 family while extended band products can be seen to influence the player's frequency response at low levels. Interestingly, the new 1Hz noise modulation test reveals the 965BX to be the least affected of the group even if figures for linearity and stop-band rejection are far from state of the art.

Sound quality

There was no mistaking the calibre of this player, which was greeted with unanimous applause from our panel. Yet if one over-riding feature of its sound struck our listeners, other than its generally engaging character of course, then this was its sheer poise and elegance in handling all percussive sounds. Whether it was the lone cymbal from Mary Black's Columbus, the harpsichord from Pachelbel's Canon, or the vibes and percussion from Marty Paich, all possessed an uncommon delicacy and clarity.

This sense of control and integration of even the most complex passages seems almost intuitive, for though the music has a comfortable 'at home' feel, the overall presentation is far from over-civilised or dusty. Our listeners complimented the player for its bubbly but incredibly refined performance, the music sparkling with enthusiasm and vitality but always tempered with a remarkably realistic sense of proportion.

More importantly, although our listeners were duly impressed with its technical proficiency, they were utterly transfixed by the sheer conviction and passion of the music itself.

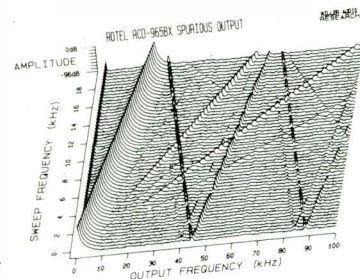
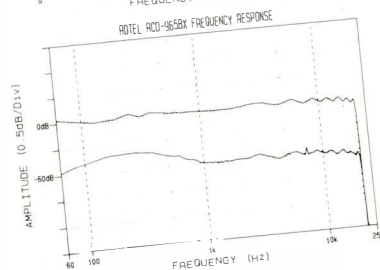
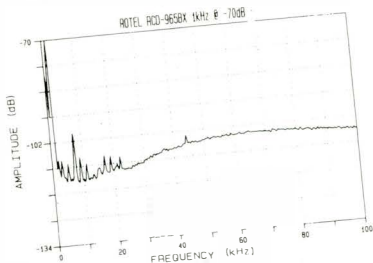
Conclusion

Every group test has its star performer and, this time around, it's Rotel that carries home the honours. The RCD-965BX is a shrewdly balanced player, equipped with a sensible range of facilities, solidly built and engineered to produce the sort

of sound that many high-end products wouldn't have a hope of achieving. This is a Best Buy with knobs on.

TEST RESULTS

	20Hz	1kHz	20kHz
Channel Balance	0.01dB	0.01dB	0.00dB
Channel Separation	92.6dB	101.4dB	96.4dB
THD vs Level, 0dB	-95.5dB	-93.6dB	-70.8dB
-30dB	-79.1dB	-76.7dB	-66.6dB
-60dB	-51.4dB	-47.6dB	-40.1dB
-80dB	-24.2dB	-24.0dB	-17.6dB
-90dB	-4.95dB	-11.2dB	-6.25dB
Dithered, Resolution @	-60dB	-0.07dB	-0.08dB
-80dB	-0.60dB	-0.83dB	
-90dB	-3.52dB	-3.85dB	
-95dB	-1.62dB	+0.95dB	
-100dB	-1.05dB		
Peak Output Level, L	2.075V		
R	2.077V		
Relative Output Level	0.32dB		
Output Impedance	208ohm		
Radio Frequency Spurious	2.1mV @ 11.3MHz		
1Hz Noise Modulation	0.91dB		
CCIR IMD, 0dB	-95.5dB		
Suppression of stop-band IMD	55.2dB		
De-emphasis Accuracy, 1kHz	0.04dB		
5kHz	0.00dB		
16kHz	-0.01dB		
S/N Ratio (A-wtd), w emp, 0LSB	94.3dB		
w/o emp, 0LSB	93.1dB		
w/o emp, 1LSB	93.6dB		
Digital Output	Coaxial		
Crystal Clock Accuracy	+8.8ppm		
Track Access Time (99)	56cs		
Typical Retail Price	£300		



HI-FI CHOICE ISSUE 100

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