

HI-FI CHOICE

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

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

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Menu

One of the advantages of editing *Choice* is that I can leave writing this *Menu* piece until just before the magazine is finished. This month my tardiness gives me the chance to comment on a couple of major developments in the market that happened just as this issue was going to press. The first was Sony's announcement (May 15th) of Mini Disc, a 64mm, recordable, magneto-optical disc system. The second major event was the announcement (May 17th) that Matsushita, the parent company of both Technics and Panasonic, was the co-developer of Digital Compact Cassette. Being slightly cynical by nature, I would venture to suggest that the timing of these two events was a little too close to be a complete coincidence.

With Matsushita announcing its support for the Philips backed format, it looks as though next year will see a massive marketing blitz to convince you, the poor consumer, that you should invest in yet another new system.

DCC is being pushed on the grounds of its backwards compatibility with analogue cassettes, that is, you will be able to play your old, analogue cassettes on the new machines. Sony counters with much the same claim, promising a new generation of players that will be able to cope with the smaller discs as well as their full sized cousins.

While it is always nice to see new technological developments enter the marketplace, the question that has to be asked is do we really need a new format, let alone two new formats? The answer to that one is a qualified 'yes', but while the industry undoubtedly does need a new, digital, recordable format to sit alongside CD, what it doesn't need is a choice of at least four, which is what is currently on offer.

Although both Sony and Aiwa would have us believe otherwise, it appears that DAT has had its day and the format will probably settle down into a nice little niche at the top of the market, appealing to much the sort of person who would have once used open reel tape decks. CD-R, the recordable five inch format looks to be far too expensive for the domestic consumer and although there is a machine promised for the autumn at around £3,500, this still puts it out of the reach of all but the most dedicated audiophile.

This leaves us with DCC and Mini Disc. In the end the result will be judged on who manages to convince the record companies that they have a viable, long term format. And more importantly, who can convince the record companies to produce the prerecorded software, the lack of which was the final nail in the coffin of DAT.

I just hope that the DCC/Mini Disc battle is settled fairly quickly. The thought of numerous bemused consumers sitting at home with Betamax videos and no software springs readily to mind and is a situation we could well do without repeating.

Andy Benham



Photography by
Chris Richardson.

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The CAT SL1 - the latest serious contender in the preamp stakes.



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A slight change this month in that we've decided to take a look at nine carefully selected systems rather than sticking with just one compo-

Just some of the equipment Alvin Gold has been playing with for this month's system reviews.



Sony's state of the art CD combination gets the once over on page 25.

ment. Starting with the £380 Sansui/Mission system and going all the way up to a £7,000 state of the art vinyl and CD system, Alvin Gold looks at your options and offers helpful advice on how to get the best from a variety of components.

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PM discusses the vital role played by loudness in the high fidelity illusion. Just how far do you need to go, and can listening levels affect the outcome of a review?

Update



PRODUCTS

Linn enters the Kremlin

As we announced last month, Linn Products is introducing a new high-end preamplifier, the *Kairn*. At first sight, it looks like a straightforward derivative of the *LK1*, introduced six years ago, but although it follows broadly the same pattern, with electronic source switching (it has seven inputs) and volume control and a remote control facility, so much new thinking has gone into it that it can only be regarded as a wholly new design.

This is particularly apparent on a straight A/B, which we were able to arrange chez Linn Products recently using a variety of sources and another imminent arrival: an active version of the slimline *Kaber* which is notable among other reasons for a new and exotic metallised ceramic tweeter dome. Changing from the *LK1* to the *Kairn* had the effect of deepening and broadening the soundstage, adding colour and variety to tonal colours - and switching from something close to mono (or a very homogenised version of stereo) to glorious, wide-stage stereo. The improvement over the midrange and treble was especially dramatic - and that claim is not made lightly.



Linn's high-end preamp - the *Kairn*.



And even hotter off the presses - the *Kremlin* tuner.

The price is £1,295, which is almost reasonable given the current paucity of high grade preamplifiers, especially those with such useful extras as remote control (a system type capable of controlling CD players with Philips codes) and multi-room options (shades of Meridian/Bang & Olufsen!). Also previewed with very impressive results was a new digital tuner, the *Kremlin*, which is to follow, perhaps mid-summer,

at a so far undisclosed (high) price. The design 'target' was the Revox, which shows how level headed Linn has become. But of the long awaited and much rumoured CD player, the only sign was that remote control.

More amps for Orelle

Orelle has announced the introduction of a new range

of amplifiers. The range comprises the *SA-020* and *SA-050* integrated and the *SP-101/SC-101* pre/power combination.

The £409 *SA-020* offers 50watts per channel while a further £90 buys the *SA-050*. Both amplifiers feature six inputs and have independent record and listen functions.

The *SP-101* dual-mono power amplifier is rated at 85watts per channel and will retail for £555. The partnering preamp will set you back £355 for which you get six inputs, record and listen functions, dedicated headphone amplifier section and op-amp buffered record outputs. In addition to the usual control and equalisation functions, the *SC-101* can also be fitted with a PCB enabling it to serve as an active crossover for Orelle's forthcoming speaker system.

An amp without wire

Roksan moves into the electronics market this month with a state of the art amplifier combination priced around £7,000.

The company is best known for its record player (soon to be players) and loudspeakers, but impressed several reviewers with the *Artaxerxes* phono stage, as capable as it was diminutive. According to Roksan the *Reference* amplifier is just an expansion of the ideas used in the *Artaxerxes*. It consists of a preamplifier, power supply and monoblok pair. The main strengths of the amplifier are described as symmetry (both physical and electrical) of components, and a straight line signal path that virtually eliminates all the wiring within the amplifier.

Signal is all kept on one printed wireless circuit board, and runs a matter of inches through each stage; every secondary function of the amplifier such as power supplies to the LEDs is kept away from the board and even shielded from it. The



Orelle's latest integrated introductions - the *SA 020* and *SA 050*.

amps are deceptively small, and look well-bred, even though they are boastfully described as 'the most powerful in the world in terms of loudspeaker control'. They are finished in either black or silver.

We should have further details and a picture next month.

KEF tweaks

Loudspeaker manufacturer KEF Electronics is offering to upgrade its flagship model the *Reference Series 107* to new specifications. Users who bought their *107s* before the new model was released last autumn can take advantage of the improvements, which include a new tweeter, KUBE equaliser and rebalanced midrange.

The offer costs £595 and is open until August 31 this year.



Lifestyle goes mini with the Denon D100.

More of that Denon lifestyle

Following in the footsteps of the much acclaimed *NS-1* system (*Hi-Fi Choice* issue 94) comes Denon's latest offering in the lifestyle stakes, the mini sized *D100*.

The system, which was designed in this country, consists of a 40watt amplifier, a tuner/timer, an auto reverse cassette deck and a CD player.

As with the *NS-1*, Denon has taken the opportunity to provide full logic control over all the components, so inserting a CD powers up the



Go tell it on a mountain - the Mordaunt-Short Classic Series.

amplifier, for example, while the timer unit built into the tuner gives much the same sort of facilities as are available on a modern VCR, 'everyday' timer start-up or unattended recording.

The system also comes with optional speakers, a two way design made to Denon's requirements by a specialist British manufacturer.

pact stand mounting model with a 165mm bass/midrange driver and a 25mm metal dome tweeter. The floorstanding '40 shares the same ferrofluid damped and cooled tweeter but uses a couple of the 165mm bass/mid units.

Both speakers are available in a variety of real wood veneers including black ash, walnut and mahogany and will be in the shops in July.

A speaker of possibilities

A ribbon hybrid loudspeaker from Canada is being imported by Excelsior Sounds, of Bushey, Watford. The Clements *Reference RT-7* loudspeaker uses a 18cm Kapton ribbon for mid and high frequency and a 20cm polypropylene bass driver. The latter is set in a compression line bass enclosure - a cross between transmission line and horn loading - which apparently extends the response down to below 20Hz. Crossover points are controlled using high quality capacitors which results in smoother transition characteristics according to the makers.

The *RT-7* is retailing at £1,575 direct from Excelsior. Tel: 081 905 6331.

NAD speaks out

NAD has introduced a new loudspeaker model, the *8100*. The new model is a two-way

In Brief

The Bristol branch of Audio T has changed ownership to become a link of the Audio Excellence chain. The Park Street shop will soon have a new demonstration room which the owners boast will be one of the best in the country.

Manticore Systems, of Biggleswade, Bedfordshire, has set up a repairs and servicing department dealing with any aspect on any make of turntable. Virtually anything is promised from the supply of new belts to re-manufacture of replacement parts. Manticore welcomes enquiries: (0767) 318437.

European Commission plans to implement wide-ranging copyright laws, including a levy on blank tape, in 1992 have been vehemently opposed by the Home Taping Rights Campaign. In a letter to the Government (which rejected a ten per cent British tax on blank audio cassettes in 1988) the HTRC says such a tax is unnecessary, and unjust on such user groups as the blind, students, teachers - and tape manufacturers.

Creek Audio has moved from its Southern England base at Mordaunt-Short to fellow TGI member Tannoy's factory in Coatbridge, Strathclyde. Founder Mike Creek leaves but will continue as consultant for the company.

Nottingham's Definitive Audio has moved to larger premises in the centre of the city, partly as a result of picking up new dealerships with Teac and Impulse. In a busy month the company has also introduced the Huygens range of loudspeaker stands and become a Pioneer Reference Point dealer. Demos by appointment only on 0602 813562.

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floorstanding design utilising technology developed for NAD's 8225 mini monitor which was launched last year.

The 8100 features an internally braced cabinet, rear mounted port and Cobex woofer and comes complete with two sets of gold plated binding posts to facilitate either bi-wiring or bi-amping. Spikes are provided to couple the cabinet to the floor. The 8100 will be in the shops by the time you read this and will cost around £300.

NAD's 8100, a grown up 8225.

video. Mark Todd, Toshiba's marketing manager, foresees the impact of the new combined A/V sources like music videos and MTV leading eventually to conventional mainstream domestic audio being absorbed into the total audio/visual package.

Anticipating just such a future scenario, other TV/video orientated brands (like Mitsubishi, Nokia and Ferguson) are also busily improving the quality of TV sound, as are those with feet in both camps (Sony Panasonic etc). Which in turn means that some of the more interesting audio develop-

ments were to be found outside the immediate audio arena.

Goodmans' very clever

this latter unit won't be in the shops until November.

Kenwood also joined the fray with its KR-V7030, again with Dolby Pro-Logic.

On the format front, both Aiwa and Sony were keen to show off a plethora of new DAT machines, while Philips' promised DCC was nowhere to be seen. Both the Japanese companies had DAT equipped mini systems on display while Aiwa was also showing off a DAT which could also cope with still video pictures.

RDS has been a bit of a non-event this past couple of years, but if the shows were anything to go by, things are

SHOW REPORT

Brown Goods

The '91 May trade shows, aka the Brown Goods shows, took place in early April this year, begging the question of just why they are referred to as the May trade shows, but also giving the trade a preview of the products that will be on the shelves over the coming year.

Paul Messenger reports that audio-visual integration was very much in favour with a wide variety of players looking towards a further integration of audio and



Hi-fi of the future? Philips' integrated TV system.



One of the new generation of receivers - Kenwood's KR-V7030.

ICT (inductively coupled transducer) co-axial loud-speaker technology, due to appear in its own in-car range in August, was also featured in the Spectrum sound engineering built into Sony's latest Trinitron Plus TVs.

On a more hi-fi note, the Trade show also saw something of a resurgence in the fortunes of that humble beast the receiver. Now under full remote control, the receiver's comeback seems to be due to its suitability to the task of pulling together, controlling and elaborating the sounds from a multiplicity of sources.

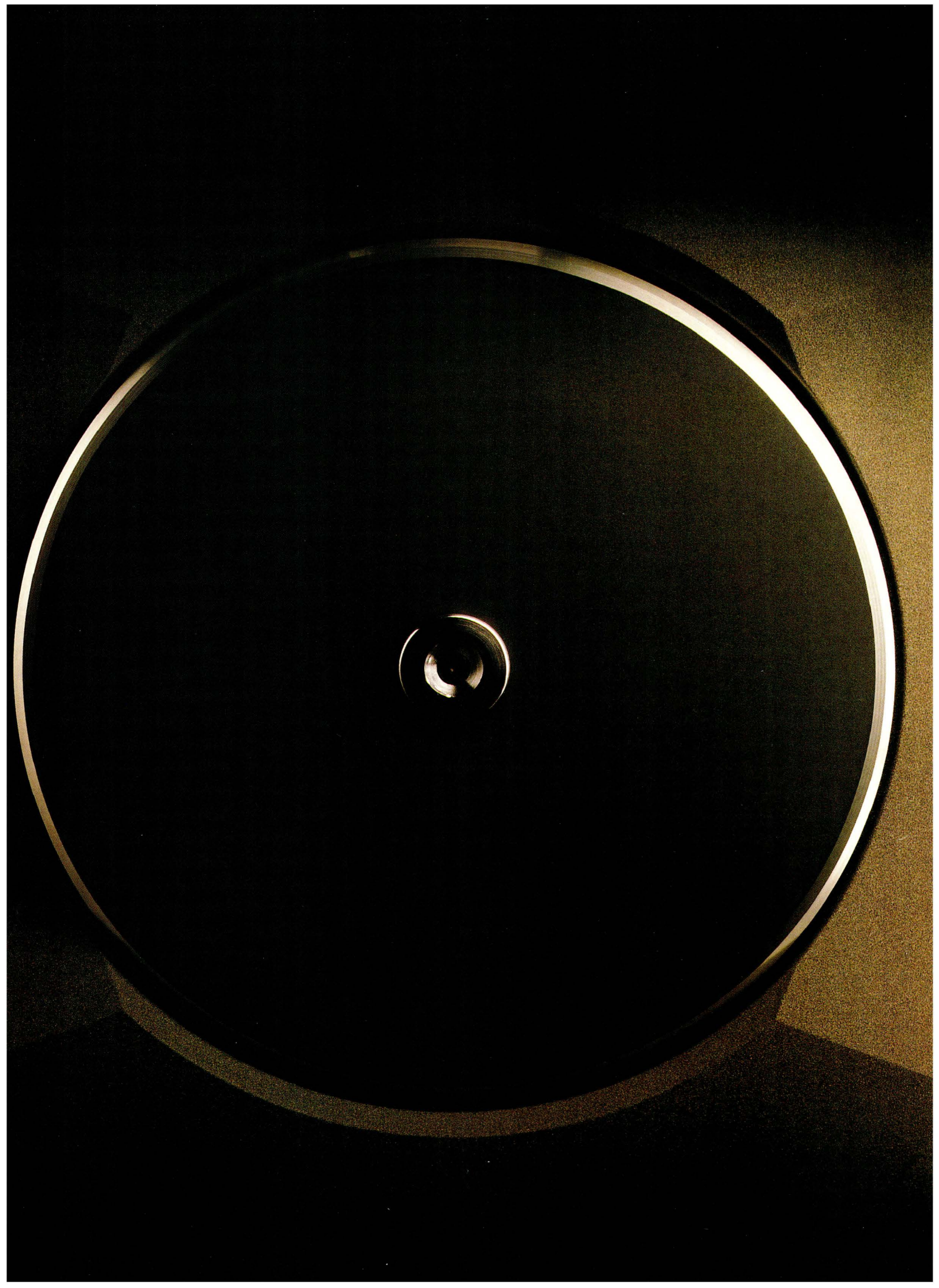
Sony has two new introductions on offer, one at £199 and one at £299, the latter an 80watt model incorporating an extra rear channel amplifier and Dolby Surround decoding.

Technics countered with its own receiver, this time with full Pro-Logic capacity, five channels of amplification and a £329 pricetag, although

starting to pick up a little in this area. Sony has a stand alone hi-fi tuner complete with RDS on display in front of a £139 pricetag while Panasonic was showing off a pair of in-car units which incorporated the much talked about EON (extended other networks) facility.

In the world of personal stereos, ASC (amenity sound control) appears to have taken root and a number of manufacturers had new products which promised to leave fellow travellers on the tube blissfully unaware of just what sort of music their fellow passengers were into.

On the CD personal front, Technics and Philips were vying for the 'world's thinnest' title, the former with the rounded pocket friendly SL XP700, the latter with its Collection series AZ6819, intended more for static use with its cordless (RF) headphones, IR remote control and DSP enhancements.





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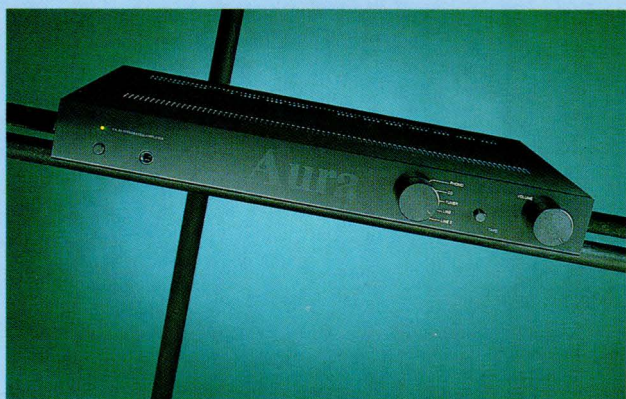
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Aspirations reports back from the suburbs of Tokyo where Pioneer's product planning chief Kimihiko Sugano owns a system he practically designed himself.

Like father . . .



If someone had suggested a year ago that *Choice* should run a Pioneer system in *Aspirations* we would probably have made some diplomatic excuses and tried to avoid a time-wasting visit. The company certainly made capable equipment in the Seventies, but lost track of its hi-fi star somewhat during the last decade (although a Pioneer cassette deck did make it into the first *Collection* edition in 1986).

But while the name wasn't there during the slow birth of the high-end market in the UK, Pioneer has consistently funded research and development for a reference series of products - several of them the brainchildren of the man we're visiting this month.

Before he became head of product planning for home electronics five years ago, Kimihiko Sugano headed the company's high-end division - a small team whose expensive ideas were supposed to reflect into the wider range of mainstream

products. It was a strategy that is only just beginning to bear fruit. Pioneer's new £200 amplifiers bask in the light of audiophile-status-on-the-cheap, and the new CD turntable looks set to achieve the same notoriety.

This is largely because the man responsible is a through-and-through audiophile, complete with whacky tweaking nous.

The potter

Suganosan is now 48, the father of three teenage children, and a classical music fan who is also an award winning amateur potter. He joined Pioneer in 1969, after working for Tokyo Sound designing electric guitars.

Sugano's first job for the company was designing an 1100-seat music theatre - the last that Pioneer built, in Tendo City, northern Japan. Showing me his scrapbook with drawings and photographs of the hall he explained that he oversaw

both the construction and the acoustic measurements.

His own experience of playing trumpet in a jazz band while at University in Tokyo no doubt helped him understand the requirements from both a listener's and performer's perspective.

After designing the hall Sugano joined Pioneer's high end division designing such amplifiers as the *Exclusive* - a version of which he still uses today. Around the same time (1972) he moved to this house in Narashi Nodai, a suburban satellite about 30 kilometres into the western side of the huge residential doughnut that surrounds Tokyo. From here he makes an 80 minute train journey to work every morning.



In western style

He describes the house as typically Japanese. Typically modern Japanese that is; it's half Western with just the bedrooms furnished in the traditional style of rice mat flooring and rice paper walls with their sliding paper doors. The rest is in fact typically, and a little disappointingly, Western. Having eaten lunch in a cramped restaurant within sight of Mount Fuji, Sugano's living room looked as if it had been bought lock, stock and barrel from any High Street furnishing store in the UK.

The living room contains hi-fi for the family, a large television and Laserdisc player - all Pioneer. Sugano's listening room, or father's room, is a self built log-

cabin style extension at the back of the house. Busy hardly describes the decor - it's crammed with souvenirs of his travels and the impressive hi-fi system. One wall is lined with Laserdiscs and LPs while a wall of books, a Decca wind-up gramophone and antique Colt revolver set the tone. In one corner a window opens onto his tiny potting workshop where at weekends he throws the sort of bowls and vases he is sat next to in his portrait.

"I try to spend an hour a day listening to music or reading in the listening room," he said. The collection of CDs and LPs numbers around 100 and 1,000 respectively. Most are classical western works with Beethoven, Mozart and Bizet being favourites. Most of the records were

bought in Japan but with the diminishing vinyl market he says he brings home a shopping bag full every time he makes a trip to Europe.

A classical education

Asked why he preferred classical Western music to Japanese music Sugano replied that he had been brought up with it. His 84-year-old father, Yosiki Sugano, is the craftsman behind Koetsu cartridges, famous among audiophiles the world over and still going strong. He still lives in the neighbouring town where Kimihiko was raised, making all the Koetsus himself. Now one of the grand old men of analogue, his father had recently taken part in a television debate about the sonic merits of



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Something old - the P3a turntable



Something new - the LDX1 Laserdisc



Something borrowed - a Sterling?

vinyl LPs versus CDs - representing the analogue camp. Sugano himself says he would always prefer to buy vinyl for its sound quality, but qualified that if he had bought CDs as a child he might think differently.

At the time he started designing products for Pioneer, most of the high-end brands available in Japan were from the States, with names like MacIntosh and JBL ruling the roost. Like other Japanese audiophile designers, the Pioneer team had to prove that their designs were as good if not better than the fashionable imports. From his time leading the high-end division Sugano says the *H-Z1* head amplifier (1980) and the *Exclusive M5* monoblocks were salient products. "The *M5* used the best components we could get," Sugano said proudly, "you cannot get better parts today." As witness to his statement a pair of the *M5s* is still in-

stalled in this listening room.

The technical success and longevity of some of his designs were partly due to his appreciation of music: "Normally an engineer can design using Ohm's law but with my background in applied physics I became involved with sound from a different angle," he explained. "From childhood I understood the history of audio from the hobbyist's perspective, and for me making a piece of equipment was very simple: I simply wanted to make something which could reproduce the best sound for myself. I didn't care too much about other audiophiles or the general consumer."

A British angle

Sugano revealed that he hadn't always used Pioneer systems. His loudspeakers are a vertical twin design first used by Tannoy in the *Sterling* - a pair of which he owned before designing these.

There is one non-Pioneer product in this system - an onyx-bodied Koetsu cartridge made by his dad who is a regular visitor and listener to the system.

The cartridge is mounted on another of the *Exclusive* range - the bulky *P3a* turntable. The lineup then consists of the *H-Z1* head amplifier, *Exclusive C6* preamp and a pair of *M5a* Class A monoblocks. The CD player is the new *PD-T07* CD turntable, while the black lacquer finish *LD-X1* Laserdisc player enjoys pride of place in this high fidelity audio visual system. A screen can be pulled down over the bookshelves at one end of the room while the laser disc player's sound is fed through the amplifiers and loudspeakers. These last are the *1000T* (for twin) design.

Sugano has modified the speakers a little further by putting rubber around the inside corners to damp resonance and by sticking cloth around the edge of the drive units to absorb spurious sound.

The listener sits a good distance away from the system - about 12 to 15 feet - and the room is a textbook shape for acoustics. The log walls deflect and disperse any standing waves and the shelves of books and records also help to create an acoustically dead atmosphere which won't detract from the atmosphere of the recording. But of course, if Suganosan was able to build a concert hall then one would expect such sonic niceties in a listening room he designed and built himself.

We listened to both CD and vinyl sources, and both put the system among some of the best we've heard; surprising

when one considers it's all available from a Japanese multinational. Perhaps in deference to my lack of gorm on classical music Sugano played the CD of Enya's *Watermark* album - a show favourite for those who like to demonstrate the true definition of bass. The natural bloom of sound from the speakers led me to believe that a lorry was passing on a road nearby when we listened to the title track, with its few thuddingly low drumbeats. Only when the lorry had turned and passed three times did I appreciate that the faint vibration through my vertebrae was in fact produced by the loudspeakers.

Sugano explained that the original idea for the CD turntable had been his own. Five years ago he noticed that light refracted through the edges of Compact Discs, and that some were also seen through. Light was therefore being emitted through the label side of certain discs and through the edges and central hole. The amount of light emitted differed according to the style of the label - how much paint was used. He then began researching the effect of painting the label side of the disc, and of running a felt tip pen around the edges. Audiophiles around the world have now noticed the differences in sound quality such tweaking makes.

Sugano said that by painting the label side black you could achieve optimum results. The best way to do this was with spray paint, placing the CD label up in a bowl of water. The water should just reach the edges of a CD to avoid any paint being sprayed onto its playing side. "But just running a felt tip around the edge will do," he remarked.

Green is the favoured colour by audiophiles but Sugano said that other colours affected sound quality differently. "Black improves signal-to-noise ratio, green improves information retrieval, red gives a more stimulating or up-front sound and yellow is similar." What about blue? "I've never tried blue," he confessed.

The observation is incorporated in the new CD turntable where the disc sits label side down on a black rubber mat or platter. The mat, and the system, are designed to give better imagery, bass and soundstaging. And the CD players do appear to work.

He mentioned, and I think quite seriously, that Pioneer may consider making different coloured CD turntable mats for audiophiles to tailor the sound themselves. It could be a shrewd move; I think I hear a round of applause from the Society of Tweakers . . . or is it another vehicle passing?

It's a family affair

The Hi-Fi Choice in Japan series continues with Dan

Houston and photographer Chris Richardson

The story of Stax is also the story of modern electrostatics - the firm's founder even named it by shortening the word electrostatics. Today Stax is nearly 40 years old and is famous throughout both the audio and recording worlds for its electrostatic headphones. But it also makes floorstanding electrostatic loudspeakers, gigantic amplifiers on castors, the *Quattro* CD player, and a new digital to analogue convertor which uses valves in the output stage - the DAC *Talent*.

Stax is run by a family; the 84 year old founder and chairman Naotake Hayashi, his wife Toyoko, and their son, the company president Takeshi Hayashi.

The current factory was built 20 years ago and has been added to over the years - the end result being a collection of pre-fabricated units which looks as though someone has just plonked them down on the plot. The factory employs 35 people, mainly assembling components which are supplied by a range of (often local) firms. A main corridor on the ground floor leads to the spartan offices, a carpeted listening and reception room, workshops full of test equipment and, at the end, an anechoic chamber hung with rolls of acoustically absorbent material. Plain duckboards across bare earth lead off to speaker assembly units, while back in the main building the first and second floors house dust-free rooms for the assembly of headphones.

Heading for the toy room

If the words tawdry, run down or functional spring to mind then one must take heed of Wordsworth's aphorism: 'plain living; high thinking'. And posters around the walls, of musicians like Chick Corea (wearing his SR Sigmas the wrong way round!), confirm the standing of the company. The one room which is far from plain is Naotake Hayashi's office - or toy room as his son refers to it.

At 84 Naotake still puts in a full day's work, striving to develop electrostatic

boarding the bullet train and heading for the home of the electrostatic 'ear speaker'.



principles ever further. During our visit he was testing his latest invention - a six-foot high horn-loaded electrostatic loudspeaker. The new unit was playing with a dedicated transformerless vacuum tube amplifier; the tube being connected directly to the diaphragm. The speaker folds like a screen, with the wide baffles acting as a straight horn to the diaphragm, and will be finished by the autumn.

Although the type we listened to was made of wood, eventually the hinged baffles will be made from *Coran*, a heavy, inert plastic material manufactured by Du Pont.

"We first thought of this 25 years ago," Takeshi told me, "but it was too big and cumbersome and used a round, wooden horn. The new material is expensive but very inert and there is less vibration. The horns can fold so users can adjust the sound. We're thinking of making a smaller one but the problem of a smaller diaphragm is that it would give more coloration and less frequency extension."

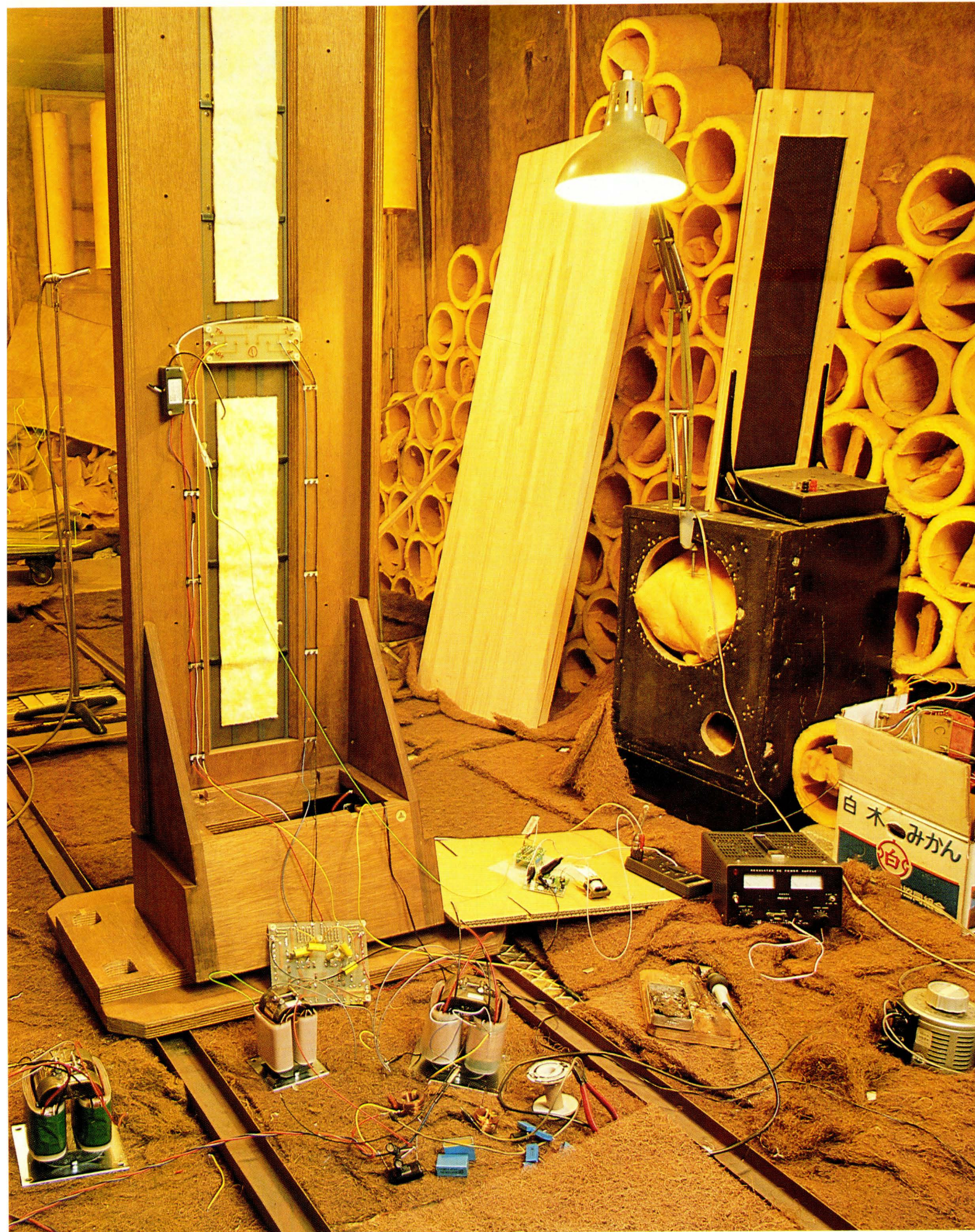
Even with the prototype it was possible to hear how the system worked with the horn amplifying the sound of the driver without making it too directional or harsh.

The company was founded in 1952, its first product being a cartridge using electrostatic theory to convert vibrations into electronic signals. In the toy room, papers and case files surround the walls, along with examples of the company's products over the years. Books on music therapy confirm Naotake's long held belief that music is essential to good health: "soft but clear sound is important," he told us. A small tool box contains a saw (for fine tuning the horns perhaps) while several industry awards collect dust on the shelves and indescribable boxes with their electronic innards spilling out reflect a hands-on approach to design.

Takeshi takes up the story: "After the second world war my father worked in Shanghai as a recording engineer with the Chinese Recording Company. He was always interested in systems which would deliver the best sound quality and he started researching electrostatic theory.

"Electrostatics were invented by a German in 1880, but the materials for the diaphragm were never good enough for quality sound reproduction. Chemical technology had improved during the war and there were better plastics available - even though we now believe purity of sound is better with just the bare metal. Our first products were the Monaural Radio Frequency Condenser Phono Cartridge and an integrated tonearm designed especially for use with the cartridge.

"In 1956 we were still only a cartridge manufacturer and my father patented a design of cartridge with a rotating stylus. Because you rotated the stylus every time you played a record we could use a softer sapphire tip.



Another feature of the stylus was its extremely light tracking weight - about a gram - which gave better tracking performance at a time when other styli were tracking at between 10 and 20 grams.

Stax first came to prominence with its ear speakers which made their debut at the Tokyo Audio Fair in 1959. Takeshi remembers the occasion even though he was still a boy: "I was at junior high school but was already starting to help my father where I could," he said.

The ear speaker

The original headphone was the *SR1*; it was the first electrostatic headphone in the world and set a pattern for the types that were to follow, coming complete with its own energiser unit.

Gradually the headphone business took over, even though Stax continued

ditional dynamic loudspeakers.

There are now three models of loudspeaker: the nearly two metre high elegantly proportioned *ELS-F83*, the shorter and slightly wider *ELS-F81* and the colossal *ELS 8X*. The latter is also available as the *ELS-8X BB* (for battery box). The DC battery supply gives 4,000 volts to polarise the massive diaphragm; it's basically similar to a Stax headphone but with the polarising energy multiplied to compensate for its size. And with the powerful batteries lying on the floor next to the loudspeakers it's not the sort of thing you'd want with children crawling around, as Takeshi admitted.

"Electrostatic energy is getting force from plus and minus signals with a single diaphragm between electrodes," he explained, "if we apply DC voltage to the entire diaphragm and put a high voltage

Takeshi joined the company in 1972 after reading Mechanical Engineering and Industrial Design at Sofia university in Tokyo and a short spell with the research and development team at Harman Kardon - in Long Island, New York.

He worked on Stax's first stereo Class A DC power amplifier, the *DA-300*, a 150 watt per channel monster which was to provide the pattern for subsequent Stax amplifiers. "The Mark Levinson company used it as its reference power amplifier until it had finished its own," he told me with some pride.

A glowing reference

Alongside the *DA-300* sit a variety of valve amplifiers, built by Naotake in the Fifties for use in the listening room. Indeed valves are still very much in favour at Stax. The company's first digital to analogue processor, the *DAC-X1T*, uses a dual triode valve in the output stage, as does the new slim and compact version - the *DAC Talent*, which also uses a new American made 'glitchless' chip to eliminate the need for de-glitching circuitry which degrades sound quality.

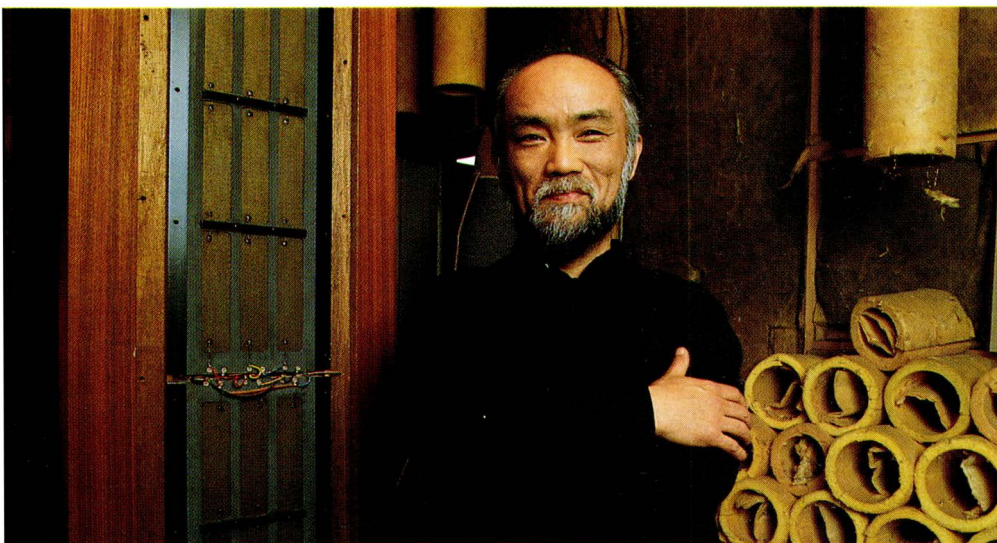
Valves are also in evidence in the *SRM-T1* ear speaker energiser. Valves deliver superlative sound according to Takeshi, who believes that the simplicity of valve circuitry along with the perceived smoother or faster passage of electrons through a valve have kept it very much in the audiophile domain in spite of the greater availability, reliability and design attractions of the transistor.

Powering up

The side-by-side development of both electrostatic loudspeakers and amplifiers led to one of the most powerful amplifiers ever made. In 1987 Takeshi unveiled his *DMA-X1*, an FET output monoblok that weighed a massive 101 kilograms and which could push 1,000 watts into a one ohm load.

As Takeshi describes it, it was more like the power supply for a welding machine! When you consider two were needed for stereo it makes sense that the amplifier was fitted with castors.

Last year another power amplifier arrived. The *DMA-X2* is a slightly smaller version, weighing in at a mere 47 Kg, and with non negative feedback and Class A output stages. "The power supply is A/B which reduces the problem of heat generation. It is balanced from input to output and is a traditional BTL (balanced



Chief engineer Kuniyasu Kaizuka poses inside the 'anechoic' chamber.

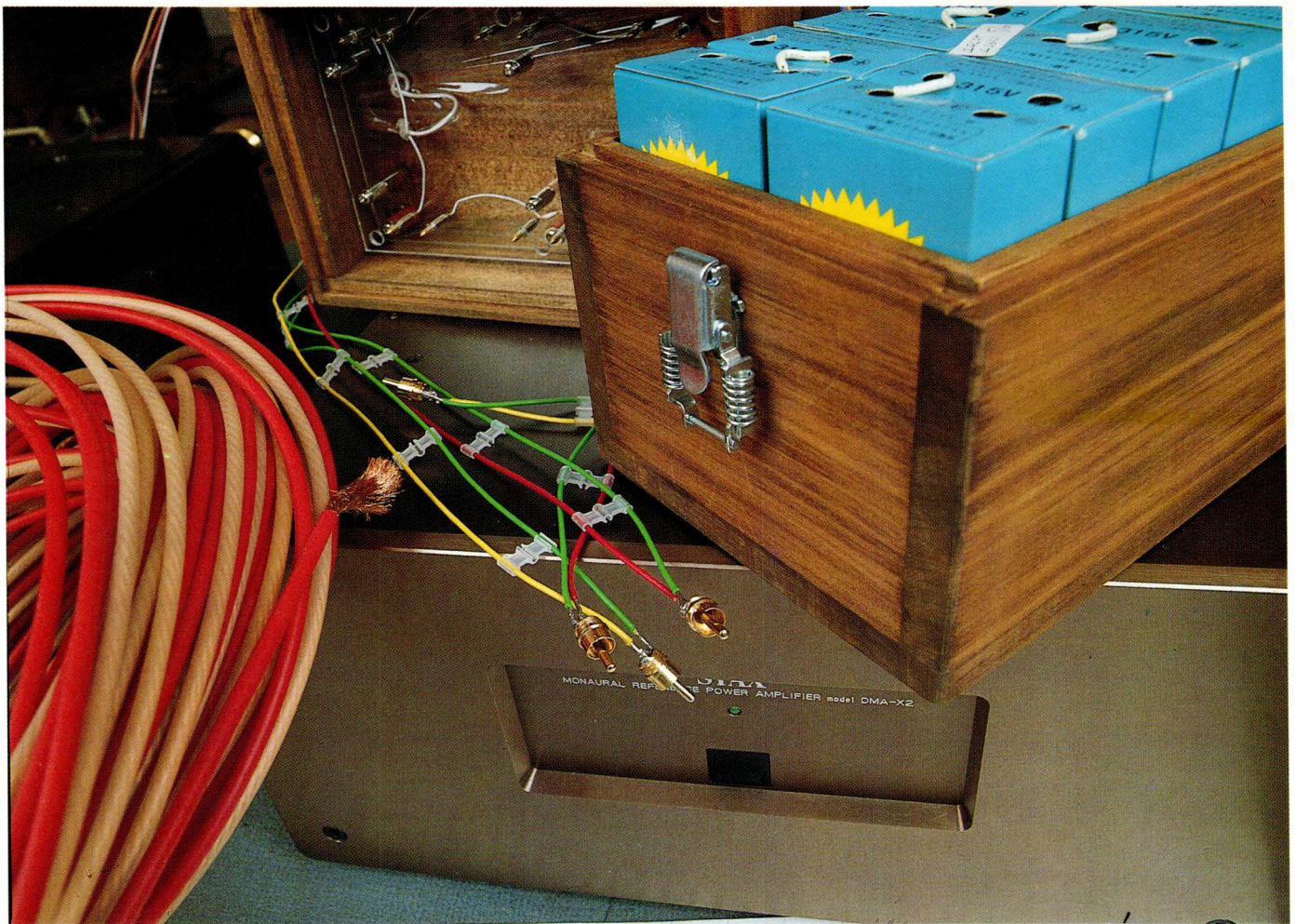
making cartridges and tonearms, finally winding up production in 1977 when the company's last electret direct pickup cartridge was made. "We'd still like to make a phono cartridge," Takeshi said, "but the problem is finding the time."

Headphones now account for 70 per cent of the company's business although as Takeshi points out, products such as the loudspeakers and DACs are changing the ratio slightly says.

The early headphones were soon followed by Stax's first full range floorstanding electrostatic loudspeaker, the *ESS 3A*, launched in 1960. The main reason for developing electrostatic products was to avoid the problems of magnetic hysteresis, something Takeshi views as one of the major disadvantages of tra-

through the plus and minus sides the diaphragm is pulled by the opposites and pushed by the same polarity - that's the basic principle. But we need to polarise the central diaphragm and by using a powerful DC current from the batteries we can eliminate the noise, which is present from the rectifiers in AC systems, and so reduce the impedance factors.

"It's exactly the same with the ear-speakers. The regular system uses a 230 volt power supply and the professional series uses 580 volts - they have battery packs for DC and better sound." This is why the ear-speakers need an adaptor (AC or DC) which raises the signal voltage from your amplifier to cater for the polarising energy needed by the diaphragm.



This huge collection of cells is used to power up the DMA-X2 amplifier.

transformer less) design," said Takeshi.

If all this implies that Stax is not primarily a headphone manufacturer then that is also what we discovered. However, the company is probably still best known for its electrostatic 'ear speakers'.

1977 saw the launch of the SR *Sigma* where the electrostatic diaphragms were angled slightly in front of the ear to make the listener believe he is hearing sound from in front. In 1982 the *Lamda Pro* and *Lamda Signature* followed the same design philosophy and incorporated high quality PCOCC cable and a thinner membrane "for golden ears" as Takeshi describes discerning audiophiles.

Going digital

But by the mid Eighties Stax was heavily into digital electronics, releasing its *Quattro* CD player in 1986. The *Quattro* uses a Sanyo Fisher drive system and Stax designed electronics in the digital to analogue conversion process.

The 18-bit CD player was followed by the DACs which also use multi (20) bit technology. Takeshi doesn't rate bitstream as highly as some: "We have measured the new

Philips one bit chip and we can see that noise levels are greater than with multi bit systems," he said showing me graphs to prove his point.

Takeshi himself favours the analogue medium for its higher frequency range and more lifelike qualities: "The problem with digital formats for high-end people (audiophiles) is that a higher bit or higher sampling frequency is needed. We don't just listen to music with our ears - we can also feel some frequencies with maybe our face or stomach. CD is still in its infancy and of course even four bit tech-

nology would be popular with most people. Denon has announced that it will making a higher density CD which will carry higher frequency sampling - that could be good for audiophiles."

One can see that the making of Stax products is both exacting and painstaking. Takeshi said he spends hours every night listening and relistening to products with a view to improving them. And while the factory may not be as plush and clinical as some of the Japanese workplaces we visited, products are all hand-assembled and rigorously tested before leaving for Germany or the States, or any other of Stax's 20 marketplaces.

Stax engineers don clean clothing and masks to work in a dust free environment while assembling the delicate diaphragms of the ear-speakers and matching a left and right pair for efficiency.

Even though it's not a noisy factory Takeshi says he wants to extend it to incorporate a small concert hall and proper listening room where the engineers can play live music before listening to recordings on quarter inch tape.

Whether this will be on the scale of the Nakamichi hall we visited last month remains to be seen, but if the company's previous exploits are anything to go by then you can rest assured that it will be more than a little out of the ordinary.



Batteries very much included.

A decidedly studio flavour this month, with speaker offerings from B&W and Monitor Audio, neither of which would be out of place in the control room.

Choice Sessions

Serious metal

Monitor Audio's new baby, the Studio 5, gets a once over from metal fan Andy Benham.

Monitor Audio's *Studio 5* is the latest box to join the line-up of metal cone speakers built by Cambridge based Monitor Audio. The 5's bigger brothers, the 10 and the 15 have proved to be something of an enigma, some reviewers see them, particularly the 15, as a giant leap forward. Others are far less forthcoming with their praise.

In the light of this I thought that the only way to make up my mind was to obtain a pair of the smallest units, the *Studio 5s* and pack them off home for some serious auditioning.

In true Monitor Audio style the 5 is available in a variety of sumptuous finishes, the pair I dragged home were rosewood and easily the most attractive thing in my front room, but then, as those who have seen my front room will know, that isn't exactly saying a lot.

Inside and out

The box isn't just pretty on the outside, however, as if you take the 18mm MDF enclosure apart you will find that it has been balanced with veneer both inside and out.

Inside the sealed box you'll find a couple of gaily coloured drivers. At first glance the tweeter appears to be a standard Monitor Audio device, the gold colour coming from the anodising carried out on the aluminium alloy. However closer inspection shows that this is slightly different from previous MA designs. While all the 'gold dome' tweeters have a vented voice coil assembly cooled by a ferrofluid bath, the *Studio 5* uses a new tweeter design which also incorporates a vented pole magnet system housed in a specially designed rear chamber.

The bass side of things is handled by one of Monitor Audio's metal coned bass/mid drivers, this one being a completely new design. It features a 90mm ceramic sandwich aluminium alloy cone with a rubber surround giving a nominal driver size of 130mm, the cone being driven by a 32mm high temperature voice coil with a relatively massive magnet.

Despite the size of the magnets employed by the two drivers the sensitivity

of the *Studio 5* is slightly below average at 86dB.

Like its bigger brother, the 5 needs to be run in for quite a considerable period of time before it comes on song. Monitor Audio recommends no less than ten days so I set a pair up in the office, put the CD player on repeat for a couple of weekends and then completed the job at home.

The changes that take place as the drivers seat themselves are quite simply huge. Fresh from the carton the bass is all over the place and the change after leaving a pair playing over the weekend was quite remarkable.

The first thing that struck me when I listened to the 5 was the amazing quality of vocals. Liquid is a much abused word but one that I feel justified in applying to the 5. Both midrange and treble are exceptionally transparent and you can almost get lost exploring layer upon layer

also knifed into the Eurythmics' *Ball and Chain* and made those slightly over the top studio affects sound quite stunning.

When I put them up for the first time the 5s sat on top of a pair of *Pirate* stands, for the simple reason that they are so heavy I try to avoid moving them if at all possible. However, the 5s seemed a lot happier on top of a pair of heavily damped Foundations, the single pillar design tightening up the bass and giving a better integrated sound.

One problem with the 5s is that they are very demanding of the equipment used to drive them. I ended up changing cables three times before they gave of their best. Solid core speaker cable is a must and if there are any problems with your system the 5s are only too happy to point them out. However, when they are partnered with revealing equipment they really do come on song.

Overall I found the 5s a most enjoyable experience, although they do give a bit away in the bass to the very best designs at this price point and they don't quite have the seamless integration of mid and bass that distinguishes the better, bigger boxes.

After having the units at home for over a month it is also quite easy to see why this sort of approach to speaker design causes such controversy. If the 5s have a problem it is that they sound like hi-fi. Various visitors came and went during the course of the review and those that were into hi-fi noticed, and liked, the amazing resolution that is available. Those that simply came to listen to music were less complimentary

and asked what had happened to the KEF sub-woofers and C25s that are so incredibly well suited to my particular listening room.

The 5s are one of the most detailed performers I have ever come across, they have a degree of resolution which can be quite staggering the first time you hear it and with the right recording and partnering electronics they are capable of producing a very enjoyable sound. However, they do demand that the lis-



Monitor Audio's Studio 5 - suited to precious metal?

of detail. In this respect the *Studio 5s* live up to their name, with this degree of resolution you could quite happily use a pair as studio monitors. Although it's a track I thought I knew off by heart, the 5 gave a superb performance with Lou Reed's *Walk On The Wild Side*, those Helen Terry backing vocals moving backwards and forwards as though on rails. The 5s

tener be prepared to put in some work as well, simply because there is so much detail to take in. The speakers come into their own with complicated classical material and female vocals although those of you requiring outrageous SPLs from rock recordings might be better advised to look elsewhere. However, the way they handle vocals and midrange detail puts them in a class of their own and they produce one of the most detailed soundstages that you are likely to find anywhere.

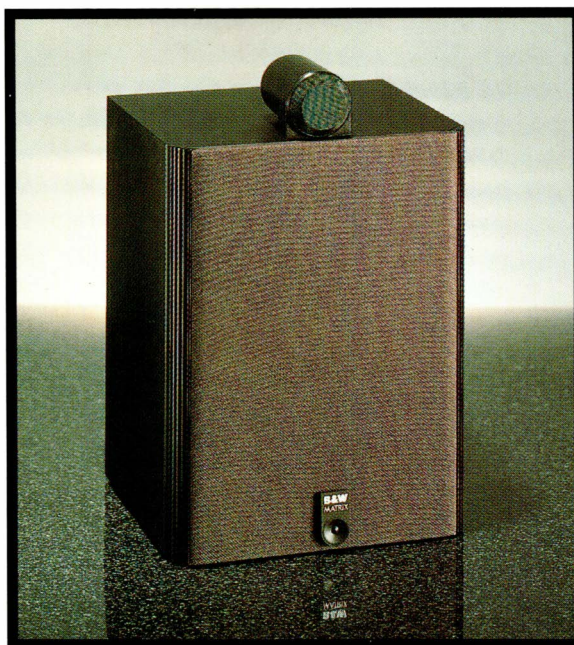
B&W Matrix 805

Sticking with the studio theme, Alvin Gold has been checking out a design born in the Abbey Road studios.

After a largely successful spell with the senior model in B&W's new 800 series, the Matrix 803, I was recently offered the chance of a similar session with the smallest in the range, the 805, which was endearingly described to me as the one 800 series model that can really 'rock and roll.' Perhaps this is because the inspiration for the 805 came from Abbey Road Studios who wanted a compact monitor to complement their existing 801/2 'big boy' monitors.

The pedigree is good. B&W knows a thing or two about loudspeakers, and B&W's Matrix technology - basically a honeycomb internal structure - has been shown to be effective at making enclosures solid, thereby minimising their contribution to the final sonic output. They're very solid indeed as a matter of fact, a rap with the knuckles producing remarkably little of the usual hollow coloration signature, though it does make the system somewhat complicated and expensive to build.

Available in a vertical or a horizontal configuration with the tweeter positioned accordingly, the test model had the tweeter on top - literally in fact, as the metal dome ferrofluid cooled unit inhabits a small mushroom-like housing on the top surface whose shape ensures good lateral and vertical dispersion and whose positioning is time-aligned with the bass driver. The latter is a 6.5 inch unit with a Kevlar diaphragm which is port loaded to the front of the enclosure. Finishes available are black ash, oak, rosewood (all real



B&W's Matrix 805, this one with the tweeter on top.

tree wood) or semi-gloss black or white.

The 805's drive unit complement is designed to sustain high temperatures for extended periods. That is, they can be driven hard, making them suitable for medium rooms and high SPLs from amplifiers rated up to about 150 watts - but not below 50 please. The 805, which has been through the Pentagon design studios, has a number of low diffraction properties, including an elaborate rounded baffle cover, although this is still far from acoustically transparent especially off-axis (a fact that might have gone unnoticed in a loudspeaker less detailed than this one).

Rock and roll and lots more besides

If by 'rock and roll' you understand that the 805 isn't suitable for anything other than rock music, or that it has a special affinity for rock, I am here to disavow you of the thought. It isn't really so. The 805 assuredly *does* rock and roll, in that the bass is quick, agile and packs a solid punch (though it is not remarkably deep), but these qualities are scarcely less needed with other types of music, and in any case it is not what makes the system special for yours truly.

The feature I liked most with this speaker was something quite different: its exquisite articulation and phrasing, which is particularly important with vocals and with small instrumental groups - archetypically chamber music in all its varieties. The 805's extraordinary abilities in this area were immediately noticeable from the very first bar of the first track tried - *Just Once in a Very Blue Moon* by Mary Black - in which the system delivered a near holographic image of the singer in which every lip movement was obvi-

ous, every breath perfectly captured, and every nuance of expression laid bare. The effect was almost akin to the breathy openness of a fine panel loudspeakers.

The 805 is nothing if not astonishingly vivid, which speaks volumes for the quality and integrity of the design as a whole.

But there are facets of the 805's character that may not go down well with some. It has little intrinsic warmth for example. Those new to high fidelity might describe it as thin, a more seasoned interpretation would be that the bass character is a little on the lean side.

Placing it close to a rear wall helps, but imaging then locks onto the wall, and coloration levels increase. Pulling it away from walls means that tonal colours can sound on the cold side of normal, lending orchestral colours a rather 'churchy' quality, though without the echoes.

The tweeter is astonishingly detailed, however, and a great improvement on early metal units used in B&W systems, and in common with the bass unit is capable of operating over an enormous dynamic envelope without muddling, distortion or any of the other common signs of distress.

Change the order

There is more. As part of the package, B&W supplies a little box for connection between pre and power amplifiers, or in the amplifier's tape monitor (or processor) loop, which modifies the basic forth-order Bessel alignment of the bass to a sixth order (36dB/octave!) Butterworth alignment, in the process extending the -3dB point down to 42Hz (the unaided figure is unspecified, but is probably around 50Hz). By attempting the change at line level, the insertion loss associated with what would otherwise be high power components is largely avoided, but the end result is a clear deterioration in the bass which turns from lean to desiccated and from spacious to cluttered in one easy step.

Treat it as a paperweight, or as something to throw at the cat, or more correctly as a crude 'fix' designed to improve the paper specifications. Otherwise the 805 is a joy.

PHILIPS

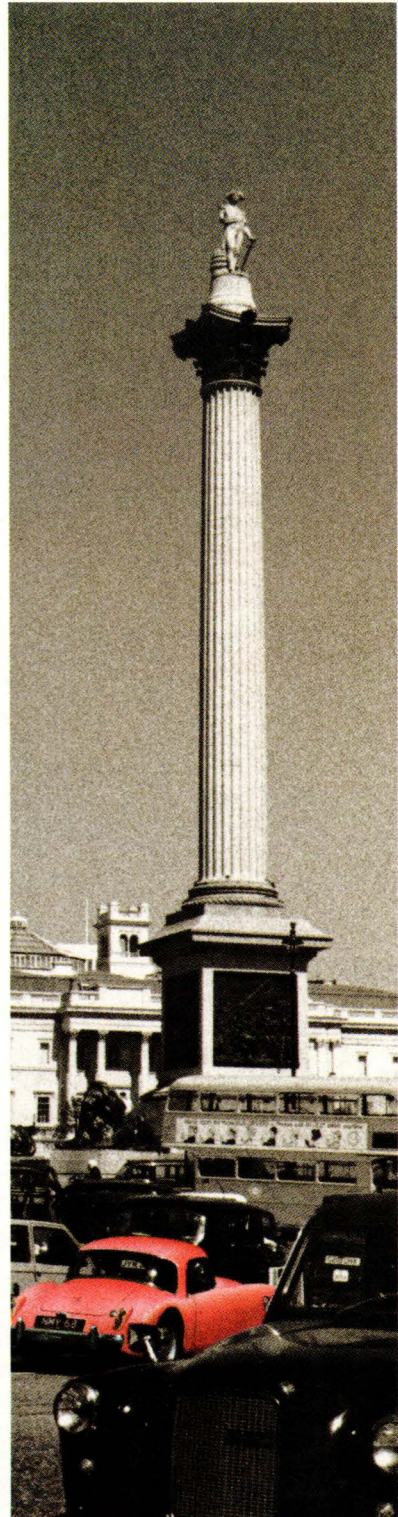
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Philips Car Stereo

More tales from the high-end. Roy Gregory has obtained a sample of the new Absolute Sound magazine reference - the CAT preamp, while Paul Messenger has fallen in love with the Naim DBL and Paul Miller investigates a £5,000 Sony CD player.

Statements

Not so long ago, US valve preamps ruled the high-end roost. Audio Research enjoyed a particularly purple patch, first with the *SP8*, then with the even more expensive *SP10* and culminating in the hybrid *SP11* which enjoyed the all too rare status of Audio World Champ.

Since those heady days, the fortunes of the ultra expensive US imports have taken something of a downturn. A lot of this can be put down to the emergence of CD because all you needed was a passive control unit and away you went, the budget price of passive preamps making a serious dent in the sales of state of the art preamps. At the same time home grown products started to clamour for attention and the focus shifted to the likes of DNM, the *Pip*, the ill starred *Matisse* and Naim's *NAC52*, which despite its £4,000 price tag sold by the container load. Valve retro reared its head in the shape of Audio Innovations and Croft, and suddenly American multiple boxes with handles on were treated like expensive dinosaurs.

Dino's revenge

Still, fashion is a fickle business and if Audio Research no longer enjoys the market dominance it once did, the intervening period of time has allowed a couple of its stateside rivals to emerge from the wings. First came the CJ *Premier Seven*, three boxes and an even more extortionate price tag. Hot on its heels and marginally more accessible pricewise, comes the little known Convergent Audio Technology *SL1*. But why should this contender deserve mention, and indeed audition, more than any of the other young hopefuls? The answer is simple, for it is over the CAT that Henry Pearson, editor of *The Absolute Sound* magazine and high-end fairy godfather, has waved his wand and bestowed the accolade of reference status. This gives the aspiring entrant to the high-end hall of fame the kind of start in life normally reserved for attendees of Eton and Oxbridge!

The *SL1* has in fact been around for nearly six years, undergoing continual honing and development. An all tube design, it consists of a 19 inch rack mounting control unit and a small but very heavy power supply. A minimalist unit, its spartan faceplate offers two centrally mounted rotary controls; one for balance and one for volume. These are flanked by switching for inputs covering moving coil, a pair of indeterminate line level devices and a single tape deck, along with tape out and two main outs. You can't choose between the main outs, but you can defeat the tape out, and there's a mute.

Appearance is, as always, a question of taste. Some people felt the CAT was plain to the point of ugliness, others found it clean and simply refreshing. Personally I like it. My sample was in brushed aluminium (it's also available in black) and if the uncluttered fascia seems a little blank at first, it soon grows on you, just as soon as you come to terms with 'handle withdrawal'.

Coincidentally, I had the Marantz based McCormack *Prism II* CD player at home at the same time as the CAT. Its similar 'American Aesthetic' casework had attracted a fairly ambivalent response until the two were placed side by side. Suddenly they both looked great!

Round the back of the CAT, you find rows of rather nice Cordas phono sockets, with another set wired in parallel with the phono inputs to enable you to set the correct loading according to your choice of pickup. A variety of plugs are provided, and a little experimenting makes you realise how important this often neglected aspect of cartridge preamp interfacing can be. The *SL1* needs considerable burn in, but as a pleasant surprise, it warms up from cold in around half an hour.

And now the good news

Sonically the news is good too. Let's face it, it had better be at £4,750 a go. The first thing you'll notice about the CAT is a

welcome sense of ease. You don't have to work at music when you use the *SL1*. That's down to a couple of things, but mainly its top to bottom tonal naturalness. You have to hear well recorded strings on this pre-amp to realise that other designs are littered with nasty additions and 'hot spots' which constantly distract your attention.

Where the CAT errs is in the area of subtraction, a little weight from the mld bass, a little body from the upper mid. These tonal trimmings serve to speed things up a little, and highlight the absolute rightness of the midband.

Another major contribution comes from the bass. Deep and powerful, it underpins a dynamic range which goes wide open when called to. Big crescendos hold no fears or strain for the *SL1*, which gives a system a sense of graceful power, making the CAT synonym all the more appropriate. That particular combination of lazy grace and explosive speed which sets the feline race apart.

Stereo performance is superbly dimensional, with solid images and excellent portrayal of depth and the spaces between performers. It's also the area in which the best of the competition can better the CAT. The *SP15* focuses side and rear walls better, and offers a more immediately transparent picture. This has a great deal to do with absolute resolution of low level information and dynamics. Likewise, the bargain Michell *Iso* phono stage (see *Hi-Fi Choice* issue 94) offers greater clarity at the expense of tonal warmth. (Reputedly, careful selection of key valves can 'tune' the CAT for greater tonal richness or higher transparency - now that's what I call a can of worms.)

These are the areas which will lead people to choose one product over another. The CAT's strengths are in the traditional areas of valve performance; tonality, dynamics, dimensionality. If you require resolution über alles, you may well prefer to look elsewhere. Either that or buy an *SL1* and an *Iso*, and enjoy the



best of both worlds!

As it stands, the CAT is the finest valve preamp I've heard (I haven't heard the *Premier Seven!*). It has an outstandingly natural presentation which lures the listener into the music. Contrary to popular gossip, the Americans can still pull a trick or two with vacuum tubes and preamps.

Roy Gregory

Last month's CD player issue revealed that if you're looking for top quality sound from a CD player then it isn't absolutely necessary to spend a fortune. However, what should you do if you've got £5,000 burning a hole in your pocket and find yourself overcome by the urge to blow the lot on a CD front-end of some description? In this case, sir, might I interest you and your bank balance in Sony's *CDP-R1a* transport and partnering *DAS-R1a* DAC?

This top-of-the-range duo takes its lead from Sony's first *R1* combination, though, in this instance there has been a wholesale conversion from multi-bit to PLM bitstream technology. Externally the champagne-gold casework with its polished wooden side cheeks looks little different, but tucked inside the *DAS-R1a* are two *CXD2552* PLM DACs. In common

The CAT preamp - £4,750 worth of serious audio gratification.

with those in the *CDP-X77ES* CD player, these DACs operate in a true complementary fashion to reduce distortion, maximise the signal-to-noise ratio and improve the player's overall linearity.

I won't bore you with reams of measurements, but suffice it to say the *DAS-R1a* DAC is seriously state of the art. The company has further improved its performance by incorporating a bi-directional optical link between both transport and DAC. Here the master oscillator in the DAC is used to clock out digital audio data from the transport, synchronising the timing between transport and converter. Of course, standard Toslink optical and EIAJ coax digital connections are provided should you decide to divorce one from the other.

Other potential sources of digital jitter are addressed by means of the *CDP-R1a*'s GTS servo-controlled laser assembly and super-rigid transport mechanism, the latter being built from tough, mineral-loaded castings. The entire mechanism is topped-off by a 5mm plate of extruded alloy, while even the two separate mains transformers are potted in resin to suppress vibration!

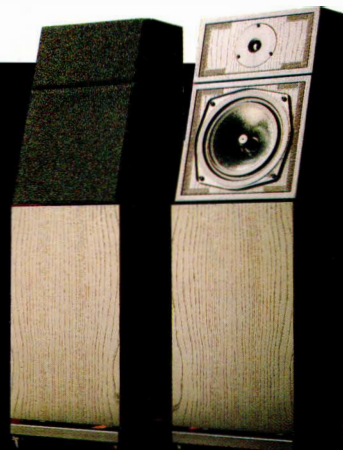
There is no escaping the care and attention to detail that Sony has lavished on the construction of these units, but getting

to grips with their subjective quality could prove a more daunting task. Not least, I should add, because the *R1a* combination has no obvious colour and goes about the task of making music with an almost frustrating evenhandedness. As a result I ended up listening to this duo on and off for a period of several weeks, hopping between the Sony and a myriad other transport/DAC combinations (assembled for our transport survey) in an attempt to discern some sonic hallmark.

A refined performer

My initial concern was that the very refinement, neutrality and civility of the *R1a* might also prove its downfall. Stacked against the Wadia *64x* combo, Sony's two-boxer certainly went about its business in a less obtrusive fashion but it lacked the enthusiasm and the shocking vividness of the Wadia. Time after time the *R1a* seemed utterly impartial, not grey or matter-of-fact but strangely effortless: the music simply appeared before and beyond the speakers with individual instruments hanging in space as if it were the most natural thing in the world.

In this respect the *R1a* bears comparison with the same company's *CDP-X77ES*. My lasting memories of the *X77* are of a light and refreshing sound, both pure and sparkling. The *R1a* sparkles too, but its bubbles are velvety smooth rather than astringent. An elegant, well recorded track



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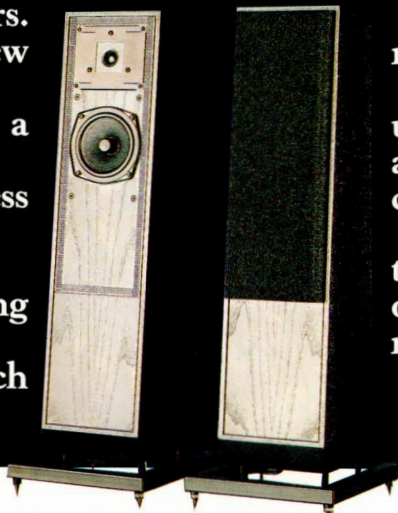
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like *The Promise* from Garson's *Serendipity* CD makes best use of the player's unforced but expansive soundstaging, the piano standing out clearly ahead of the glittering shower of percussion. And the patter of cymbals really did seem to glitter, each delicate strike revealed with pin-point accuracy and drawn into sharp relief by the occasional interruption of wood on wood.

The atmosphere and unspoken tension encouraged by the panflute from Engelberg's *Mosaic* was similarly tangible, the natural but potent colour of the flute bringing the simplicity of his music to life. All too often it can sound about as emotive as someone blowing down a collection of tubes - in this instance the Sony brought out the vibrancy and rich timbral detail of the instrument in a fashion that only served to complement its partnership with the acoustic guitar.

Coping with rock

If the *CDP-X77ES* sounds fresh and invigorating then the *R1a* is all the more mature. Refined and sedate certainly, but never listless, dull or boring. This is all well and good, but how does the *R1a* cope with a busy rock or pop track, the sort of material that has you on the edge of your seat when decoded by excitable DACs like the Wadia? In practice this is where the cracks begin to show. Ok, so the various sound effects that mark the intro to Chris Rea's *Auberge* are both intricately resolved and crystalline in focus, but they still failed to conjure up the airy acoustic that's captured on the disc.

So once the guitar, organ and drums join the fray there seems less 'space' in which to accommodate them. There's no anguished sense of compression, no sense of the instruments attempting to hammer their way out of a constricted soundstage, but neither is there the thrill of his slide guitar and neither is there a raw power and impact behind the drums. The music's just too darn polite!

On the other hand, no sooner does *Auberge* die into silence than the gentler, meandering pace of *Gone Fishing* strikes up a deeper and warmer acoustic. His voice seems to fill the room, richly detailed in an earthy sort of way just as the measured tempo of guitar, percussion and bass fall unhurriedly into place. Once again everything seems in balance and a delightful sense of ease permeates the music. It is a pity this confidence is so rudely shaken by the busiest of material, hinting at a chink in an otherwise impervious armour.

This brings me onto the thorny subject of justifying the extreme cost of the *R1a*

combination. Sure enough, you're certainly getting £5,000 worth of the highest technology, complete with entire divisions of power supplies, gold-plated resistors, compound-film capacitors, top-flight ICs and even a genuine Class A MOSFET output stage in the *DAS-R1a*! There are plenty of features too, most discretely hidden away on a matching infra-red handset which offers a range of play modes, a program memory bank and versatile custom index filing system. Nothing is left to chance with the *R1a* combination.

Nevertheless, I cannot help but wonder if the sheer sophistication of the *DAS-R1a* DAC, in particular, is of any genuine sonic benefit. It is highly complex yet still elegantly executed and - most importantly



Sony's top of the range drive and DAC are in constant two-way communication.

- a very genuine attempt on the part of Sony's engineers to push back the frontiers of CD technology. In this respect at least they have succeeded even if, somewhere along its multitudinous pathways, the heart and soul of the music itself occasionally escapes its grip.

Paul Miller

Love it or loathe it - probably both, consecutively and even concurrently - Naim's new £6,000+ *NADBL* loudspeaker is a statement amongst *Statements*, unequivocally redefining the performance boundaries of the domestic hi-fi system.

Shocking is the adjective that most accurately describes my reaction to the first week spent with these generously proportioned box-sets (the word 'big' has recently been interdicted from the Naim Dictionary of Psychobabble, along with all references to PA or public address).

Listening to the *DBL* shocks and surprises, simply because of the way layers of previous confusion are stripped away, revealing with uncannily convincing authority and coherence both the mechanics of the recording process and unsuspected continuity in the musical performances.

The experience is both pleasurable and painful. The pleasure comes from the extra vividness of the music itself - Roy Orbison's growl on *Travelling Wilburys Volume One* had never sounded more

thrilling, and the musical structure becomes more readily apparent.

The downside comes in the warts and carbuncles of the recording process. Vocals apart, *TWI* has never deserved more than an adequate rating for recording quality, but I hadn't realised how bad it was until I pumped it up on the *DBL*s. These beasts ruthlessly reveal that many of the backing tracks clearly originated from a cassette recorder placed in the bathroom of Dylan's New York apartment.

The combination of thrilling music with frequently disgusting sound characterises the *DBL* experience. The whole process is highly involving, which in turn makes it challenging, demanding, more than a mite uncomfortable and definitely not for easy-listeners.

An early impression highlights the dilemma. "Good God, they sound like a couple of wardrobes", I commented during one disappointing rendition of an old favourite. They did indeed sound like a pair of old wardrobes on that occasion. But what might have been blamed on the speaker turned out to be merely a more or less accurate rendition of the recorded acoustic. Change the record or source and the wardrobe turns into a cubbyhole, a bathroom, or even (less often, unfortunately) a nice acoustic environment.

Although the *DBL* unquestionably provides a rare level of insight into the quality of the source, that doesn't mean to imply it's the perfect transducer. Any loudspeaker represents a series of compromises, and how these often conflicting ideal desiderata are resolved has much to do with the eventual sound achieved.

One such ideal, for example, is that the loudspeaker should try to behave as a point source - something which even its most loyal fans could not accuse the *DBL* of emulating. Whether you beat around the bush and point out that it sits snugly against the wall, and that the baffle slants backwards towards the top, this remains a speaker of daunting dimensions.

Bulkwise it has far more in common with my four drawer filing cabinet than with a familiarly large loudspeaker like Linn's *Isobarik*. It's not that the height or depth are particularly outrageous, more the sheer width that makes it difficult to ignore.

That and the weight of course, which is estimated at around 90kg, and which I've made no attempt to check. Once planted and assembled, the prospect of moving them, short of bringing in some civil engineers, seems a little remote.

If the above considerations render subtle experimenting with positioning less than practical, installation proved quite simple and straightforward, the two Naim men getting things up and running in about an hour; after a further hour spent fine tuning, things were starting to boogie.

What's in a Naim?

I have already described the speaker in outline (*Personal Messages* issue 93), so will try not to overdo the description this time around, but the *DBL* is an unusual and elaborate design, and the construction has much to do with the final sound that is achieved.

The largest of the three enclosures has no drivers at all. It's a large, complex and very sturdily built bass cabinet, spike-coupled to the floor and incorporating separate spike/frame arrays for support-

ing the other two enclosures.

The lower, and larger, of these contains the massive 15inch frame ATC main driver with its enormous 300mm doped paper cone. This box is small enough to keep tight acoustical control over excessive cone excursion, while a low resonant frequency is attained by means of an acoustic resistance (controlled leakage) panel that couples it into the main enclosure, a sealed gasket ritual being part of the installation procedure.

Even the upper box is larger than the average speaker, and houses the mid and treble drivers, based loosely on those used for the *IBL* but with modified motor systems in the quest for high sensitivity.

Both these drivers are separately, mechanically decoupled from the box itself, thereby operating under mass loading conditions. Naim's familiar 'leaf spring' arrangement is used for the tweeter and the midrange has a fretwork variation on the same theme.

The finishing touch

All was nicely finished in an awful lot of good quality walnut veneer, though they lack the sheer class of the similarly sized and priced linseed-oiled Tannoy *Westminsters* I sampled a good few years back. They don't match my room at all well, more's the pity (I fancy a white pair), and the large thick black foam grilles don't really help shrink the width much under my lighting conditions.

The early production samples were strictly active drive, which is no problem in my case since I've used Naim *NAP250* tri-amped Linn *Isobariks* for many years, though in fact my electronic crossover was substituted for an updated version (working from the same *HICAP* power supply). The Naim people took back my old *NAXO*, a heaven sent excuse not to attempt direct *Isobarik* comparisons, I'm relieved to say.

Although much of the design is logical and well founded, there remain certain aspects that might be deemed controversial. Although it's a wall-mount design, the sheer bulk of the cabinetwork keeps the large main driver sufficiently far from the room boundaries to introduce significant unevenness, especially since said driver is operated up to a surprisingly high crossover point of around 400Hz.

Conventional wisdom has it that a narrow baffle works best for midrange imaging and coloration, so it also seems a little odd to find the full 650mm baffle width maintained to the top of the enclosure here, especially since narrowing the top section might have presented interesting

styling possibilities which would have reduced the perceived bulk.

I suspect that Naim's rationale is that the baffle itself takes control over the distribution pattern, and is more consistent than a tapering approach, though it's probably one reason why the *DBL* image is a bit larger than life, and best enjoyed from at least a couple of metres away. (Within the zone created by extension of an equilateral triangle formed from the outside edges of the speakers.)

A sense of scale

Certainly this isn't a loudspeaker for small rooms, my own far from tiny 6x4m room being a shade on the tight side in all honesty. Moreover, the tweeter is mounted quite high up, which doesn't really help my preferred A/V listening position (lying on the floor, quite close to a telly between the speakers), but I guess that won't affect most normal people.

The frequency balance is unusual too. Almost all speakers make use of one or more bass resonances somewhere between 30Hz and 120Hz in order to give the system's bass output a helping hand. The *DBL* (and *IBL* for that matter) do everything they can to avoid bass resonances, both models rolling off quite early but very gently.

My past experiences with various other designs has led me to like a relative bass output level (20Hz in-room) that more or less matches the midrange level, but that wasn't possible with the *DBL*. Well it was possible, via the active crossover, but when set up for 0dB/20Hz the sound was dominated by excessive output towards the top of the main driver's range (200-300Hz).

Adjusting for optimum midrange balance left me with -4dB or thereabouts at 20Hz. Although the bass range below 200Hz seems rather more affected by room modes than most other designs, the balance from 200Hz upwards is pretty good, especially for such a large area baffle, with minimal crossover problems (which is one area where an active system has a head start).

A sensitive beast

With my preferred balanced settings, sensitivity is around 92-93dB - high, but not extravagantly so. The slightly retiring nature of the bass comes as a bit of a surprise, since all the visual cues signal a sock-it-to-'em earthquake experience. However, if there's a slight lack of scale, there's nevertheless enormous speed, information, detail and control. It's interesting to note that very little vibration can be felt in the various box panels, even



How loud can you go? You Naim it, the DBL can play it.

with the volume flat out.

Another consequence is that the main midrange is slightly exposed, happily in this case across a broad 200Hz-2kHz decade, but this tends to push the sound out slightly ahead of the already quite deep boxes, again favouring the larger room.

It's this characteristic, uncommon in hi-fi models but quite familiar amongst professional sound reinforcement loudspeakers, that I believe accounts for an initial impression of a 'PA' type sound, especially if the crossover isn't carefully adjusted.

Chuck in the large baffle area, and maybe that big paper cone too, plus the unusually high sensitivity and it's easy to see how this speaker could be misunderstood. But spend a little time with it and almost all will be readily forgiven.

I doubt it will be high on the shortlist of those seeking precise holographic stereo image depth, though the image there is solid enough when one gets a couple of metres back and makes sure to stay on the bisector. Indeed, there's good focus and microstructure to be heard, even if voices do come across rather larger than life.

There is a slight enriching and echoey coloration especially on male singers, but vocal rendition is one area the *DBL* demonstrates its startling superiority. Orbison's trill may thrill like never before, but Dylan sounds more like Dylan,

Jagger like Jagger, Pavarotti like a large Italian with a very good voice, Joni Mitchell does sometimes have sinus problems, and Tom Waits becomes totally intelligible.

A human contribution

It's simply uncanny the way this speaker emphasises the distinctiveness of individual human contributions, not only on voices but on instruments too. Indeed on many well loved favourites, listening past the cock-ups of the recording processes, I became aware of whole layers of instrumental subtlety - multi-tracked overdubbed harmonies and the like - that had previously remained hidden.

And believe it or not, this giant of a speaker works consistently well at almost any level. Though not perhaps a first choice for the task, it remains delicate and informative when reproducing late night TV, while at the same time possessing loudness capabilities beyond most people's wildest dreams (or nightmares).

The more you turn up the volume, the louder the sound gets. That much is logical. The crucial distinction here is that it doesn't change in character to any significant degree, right up until you start to clip the amplifiers (which hardly get hot, even when driven flat out; this speaker is an easy amplifier load, despite its bandwidth and sensitivity).

There's no point in going any louder still (though it might be nice to try a six-pack amp set), since by this time the ears are well into nonlinearity and the chest cavity is resonating, with in-room peaks registering 110-115dB. This accuracy in tracking the complete dynamic range is, I suspect, a major factor in the sheer believability of reproduced voices.

Out with the old . . .

Probably the majority of *DBL* customers will be current users of *SBLs* or *Isobariks*. I know little of the *SBL's* relative performance, but some comparison to my five year old samples of the big Linn speaker is clearly relevant. Three weeks into the *DBL* experience and there's no question in my own mind that the time has come to retire the *Isobariks*, which have after all given me lots of nice music over more than a decade.

It will be with some regret, because there are certain things that this comparatively compact semi-omni can do which I will regret losing. They're certainly better suited to my room size and use patterns, and I'll miss the way they give good consistency across most of room. There's an airy relaxation too about the way they seem able to integrate into a room.

The big Naim wins hands down on detail, information, loudness and speed, though it has its own colorations and stereo idiosyncracies. Furthermore, it really ought to have a room about 6 by 4m, and doesn't really glue things together for the first couple of metres in front of the speakers themselves, which is certainly a practical constraint.

As a final word, there's no question that this is a very big and expensive loudspeaker, but only in broad balance terms does it resemble the sound of PA systems. On the end of a carefully optimised hi-fi system in a good size room it delivers a remarkable combination of devastating musical accuracy alongside prodigious loudness capabilities that is unequalled in my wide (but not all encompassing) experience.

It is, however, a demanding rather than a relaxing experience, isn't kind to the iniquities of recording studios and engineers, and won't necessarily be appreciated by fans of the silver disc. What you hear is clearly a lot more truthful than what you've heard before, though I wouldn't go so far as to suggest it can quite manage either the whole truth or nothing but the truth.

Paul Messenger

Win £2,400 worth of Nakamichi and B&W hi-fi

Another month means another fabulous free-to-enter competition in Hi-Fi Choice. This month we're giving away a complete Nakamichi and B&W system comprising CD player, cassette deck, receiver and B&W 610 loudspeakers. Plus, three runner-up prizes of Nakamichi's fabulous Cassette Deck 2.



How To Enter

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

The Prizes

The first correct entry drawn from our mail bag after the closing date will win a Nakamichi *CD Player 4* (£315), *Cassette Deck 1* (£625), *Receiver 3* (£315) and *B&W 610* loudspeakers (£200). The second, third and fourth correct entries will win a Nakamichi *Cassette Deck 2* (£315).

The Questions

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

1. Name the founder of B&W loudspeakers.
2. What is Nakamichi's top of the range cassette deck called?
3. Nakamichi makes a range of products that incorporate the Music Bank System, what are they?
4. What does it look as though Sony will be announcing on May 16th?
5. What might you not be familiar with if you lived in Lapland?!
6. What does CAT stand for?

Entry Form

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HFC/JULY/91

Closing date: Thursday, 1st August, 1991

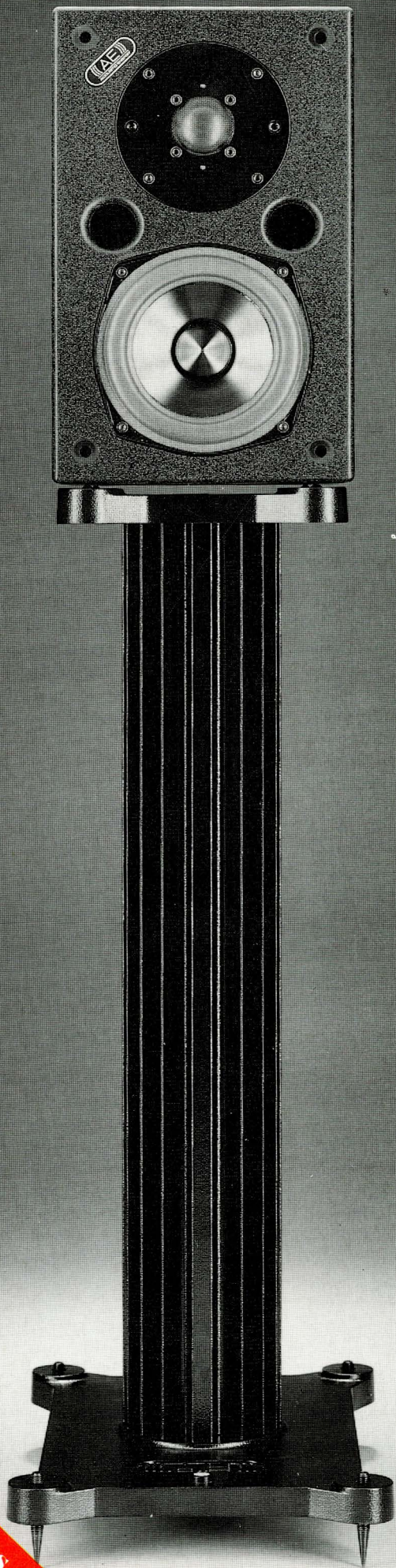
Your answers:

- 1.....
- 2.....
- 3.....
- 4.....
- 5.....
- 6.....

COMPETITION RULES

- 1) All entries must be on the entry forms provided. Photocopies will not be accepted. Incomplete forms will not be considered.
- 2) There is no cash or other alternative to the prizes.
- 3) Employees of Dennis Publishing Ltd and associated companies, the manufacturers and suppliers of the prizes, their agents and relatives, are not eligible to enter the competition.
- 4) The competition is not open to readers living outside the United Kingdom.
- 5) The prizes will be awarded to the first sets of correct answers opened after the closing date. No correspondence whatsoever will be entered into regarding the competition. The Editor's decision is final and binding.
- 6) The winners will be notified by post and the results will be published in *Hi-Fi Choice*.

Send your completed forms to:
**Nakamichi Competition, Hi-Fi
Choice, Dennis Publishing Ltd, 14
Rathbone Place, London W1P 1DE.**



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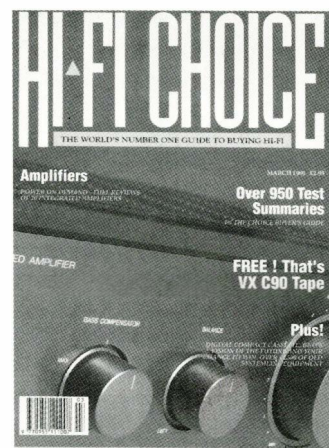
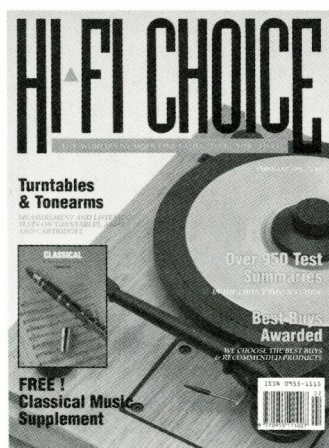
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"Cambridge SoundWorks May Have The Best Value In The World. A Winner."

David Clark—Audio Magazine

Ensemble

BY HENRY KLOSS

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

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



Introductory Price £299

Not all the differences are as obvious as our two subwoofers.

Unlike seemingly similar systems, Ensemble uses premium quality components for maximum power handling, individual crossovers that allow several wiring options and cabinets ruggedly constructed for proper acoustic performance. We even gold-plate all the connectors to prevent corrosion.

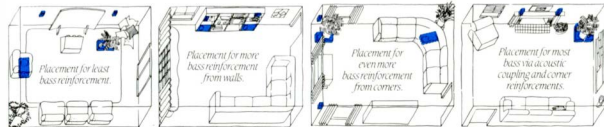
Unlike satellite systems which use a single large subwoofer, Ensemble features separate compact bass units for each stereo channel. They fit more gracefully into your living environment, and help minimize the effects of the listening room's standing waves.

30-day money-back satisfaction guarantee.

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

Your listening room works with Ensemble, not against it.

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



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

"We Know Of No Small Speaker That Surpasses The Overall Sound Of Ambiance"

—Stereo Review

Ambiance

BY HENRY KLOSS

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

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



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

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

Inc. Magazine

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

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

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

MODEL ELEVEN

BY HENRY KLOSS

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



- Fits under airline seats—23 lbs.
- Can be checked as luggage.
- Works on all electrical systems.
- Delivers the full range of music.
- Is backed by a unique 5-year warranty.
- Perfect for boating, camping & holidays anywhere in the world.

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

sound virtually identical to our acclaimed Ensemble™ speaker system.

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



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

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

Performance that rivals the best home component systems.

Until now portable music systems were, at best, a compromise. Even the most expensive ones lack the deep bass necessary for full, natural sound. But Model Eleven delivers the all-out performance previously found only in high quality home component systems. Its three speakers are designed to



Henry Kloss created the Ambient speaker models of the "50s (AR), '60s (KLH) and '70s (Advent) as well as our highly-acclaimed Ensemble and Ambiance™ speakers. While packing a stereo system into a suitcase before a holiday, he realized that an amplifier, a CD player and two small speakers take up the same space required for an entire suspension motor to produce a small deep bass. That was the inspiration for BassCase. Model Eleven's bass speaker enclosure, which doubles as the entire system's carrying case.

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- Dual CS503/1 or (Ariston Q deck add £40) or (Dual CS505/4 add £40)
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SUGGESTED SYSTEMS

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

SPEAKERS	AMPS	Goodmans Maxim II Widale Delta 30.2 JPW Minim Gale GS210	Celestion 3 JPW Sonata M/Short MS 3.10 Mission 760 Royd A7	Celestion DL4 II Tannoy E11 JPW Sonata + M/Short MS3.20 Widale 410	Nad 8225e Celestion 5	Monitor Audio R7 Hibrook P15 Celestion DL6 II Tannoy M15 Wharfedale 505.2	Castle Warwick KEF C45 Celestion DL8 II Arcam Alpha Monitor Audio P9 M/Short MS 3.30	Castle Durham Heybrook HB1/3 Tannoy M20 (Bk) Tannoy DC 2000 (Add £70) Rogers LS4A
Rotel RA820AX	289.95	299.95	319.95	339.95	369.95	379.95	419.95	
Rotel RA820BX4	319.95	339.95	349.95	369.95	399.95	409.95	449.95	
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Rotel RA840BX4	369.95	379.95	399.95	399.95	449.95	449.95	499.95	
Harman HK6100	309.95	319.95	299.95	309.95	379.95	399.95	444.95	
Rotel RA810A	259.95	279.95	299.95	299.95	339.95	349.95	399.95	
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Yamaha AV330	249.95	349.95	349.95	389.95	389.95	429.95	479.95	
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Marantz PM 30SE	279.95	289.95	289.95	309.95	369.95	389.95	439.95	
Technics SU 810K	279.95	289.95	289.95	309.95	369.95	389.95	439.95	
Musical Fidelity B1	329.95	349.95	349.95	369.95	379.95	409.95	459.95	

FREE
 Cartridge supplied with these systems

Leads provided with these systems (QED 79 strand add £1/metre)
 Carriage for mail order customers on all systems in excess of £300 (UK mainland only)
 NB speaker stands are NOT included but highly recommended - wide range available from £20 per pair

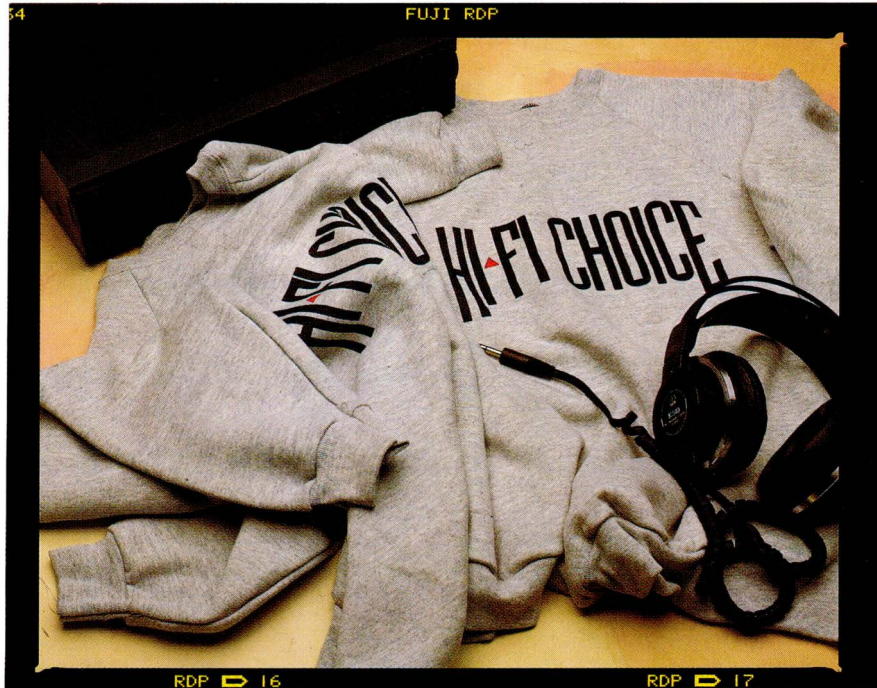
SPECIAL OFFER
 Target SP40 spiked stands only £20 per pair when purchased with any Suggested System (normal price £30 per pair)

5 YEAR PARTS & LABOUR GUARANTEE
 available for small extra charge at time of purchase - ask for further details and conditions.

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

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 - Nad 5425 add £160
 - Nad 5440 add £65
 - Philips CD624 add £115
 - Philips CD634
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 - Rotel RCD865
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 - Technics SLPG200AK
 - Technics SLPG400AK
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 - Ariston Q Deck add £40
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21st Century Fox

Once again DCC is in the news, and this month Barry explains the difference between linear and compressed digital decoding.

Predictions in monthly magazines (which go to press a month or so before you read them) are always risky. But by the time you read this, two things *should* have happened. Matsushita (Technics and Panasonic) will have announced a firm commitment to DCC. And Sony will have made a policy statement on Mini Disc, the recordable disc that could rival DCC.

Matsushita has already built a production line for DCC decks. But the Japanese government trade body MITI still officially backs DAT and Matsushita's top man has until now been heading the EIAJ electronics industry trade body. So Matsushita has been politically restrained from making any policy statements on DCC. But there is a top man shuffle in May and the DCC news looked likely to break at Technics' annual European seminar, scheduled this year for May 17th. After that there could well be a splash on DCC at the Chicago Consumer Show in June, with Matsushita joining up with its recently acquired software giant MCA.

Sony has been planning a world wide press announcement for May 16th, at which the company looks equally likely to announce plans for Mini Disc. MD is a small (2.5inch) magneto-optical disc that records, plays back and erases - like tape. It looks as if MD, like DCC, will use data compression which relies on masking effects. The technology called ATRACK, which allows more digital bits to be squeezed onto a disc for linear coding without compression, is unlikely to be ready in time to compete with DCC.

Even if there are last minute hitches in this schedule, we are now moving fast into a new era of angry contention, comparable to the grand valves-versus-transistors, and analogue-versus-digital, debates. The next

battle will be on linear-versus-compressed digital coding. Can compressed code, as used by DCC and probably also MD, sound as good as linear code as used by CD? What happens when the decoded signal is copied through several generations or broadcast with limiters and compressors which pump up the low level signals? In readiness for these grand arguments, it pays to know how compression works.

When a DCC recording is made, the deck splits the sound into 32 separate frequency bands and analyses

the only voice you will really notice is Merman's. It cuts through like a buzz saw, masking the rest.

The coding system on which DCC relies, called PASC, (Precision Adaptive Sub-band Coding) would save on digital bits by coding mainly Ethel Merman.

But will some people hear through the buzz saw and enjoy the subtler sounds of Dailey, Kelly, Gaynor and O'Connor? It all depends on the listener. And that's what the argument about DCC, MD and data compression will be all about.

All of this helps explain

boxes explode on opening, and snap on sight in CD jewel boxes.

On the evening before the first session, CBS Records in Soho Square had still heard nothing about the DCC dems. Polygram, who handled the invites for Philips, said that CBS were coming on the second day but cancelled because the company had high level visitors. CBS confirmed they did have high level visitors but knew nothing of the invitation. Polygram reconfirmed that CBS had definitely been invited. If Sony really does try to go-it-alone with Mini Disc as an alternative to DCC, then the company must have very strong confidence in the format. I suspect Sony has some surprises in store.

Meanwhile DCC still has to contend with the Philips factor. Witness what happened at the Federation of British Audio awards dinner. First off, though, let me say that I reckon the FBA does a fantastic job of raising money, this year for the Leukaemia Research Fund. Compare this with how little the fragmented computer industry does.

But I wonder how many people at the annual awards dinner this year looked at the programme and read the adverts. Believe it or not, a full page spread for Philips Bit Stream CD players perpetuated the same absurd errors which I had pushed under the nose of both Philips and their advertising agency, Ogilvy and Mather as long ago as last year.

'The one bit system makes 256 calculations a second on each of the 45,100 bits of information on the disc', read the Philips advert in the FBA programme. This is stupidly wrong on all counts. The CD system samples each channel 44,100 (not 45,100) times per second, then codes the samples in 16-bit words. The way the advert reads, a CD would play for only a fraction of a second.

The record people were particularly impressed by the DCC cassette design and how it slides neatly into an outer shell package. There are none of those daft hinges which make conventional cassette boxes explode on opening, and snap on sight in CD jewel boxes.

the sound content in each. It then codes each band in each sample separately, using the principle known as masking. This is the same principle on which noise reduction systems, such as Dolby, rely. If there are two sounds of similar frequency, then the ear hears only the louder eg a high pitched musical note masks the high frequency sound of hiss. So there is no need to waste digital bits on coding sounds which are inaudible.

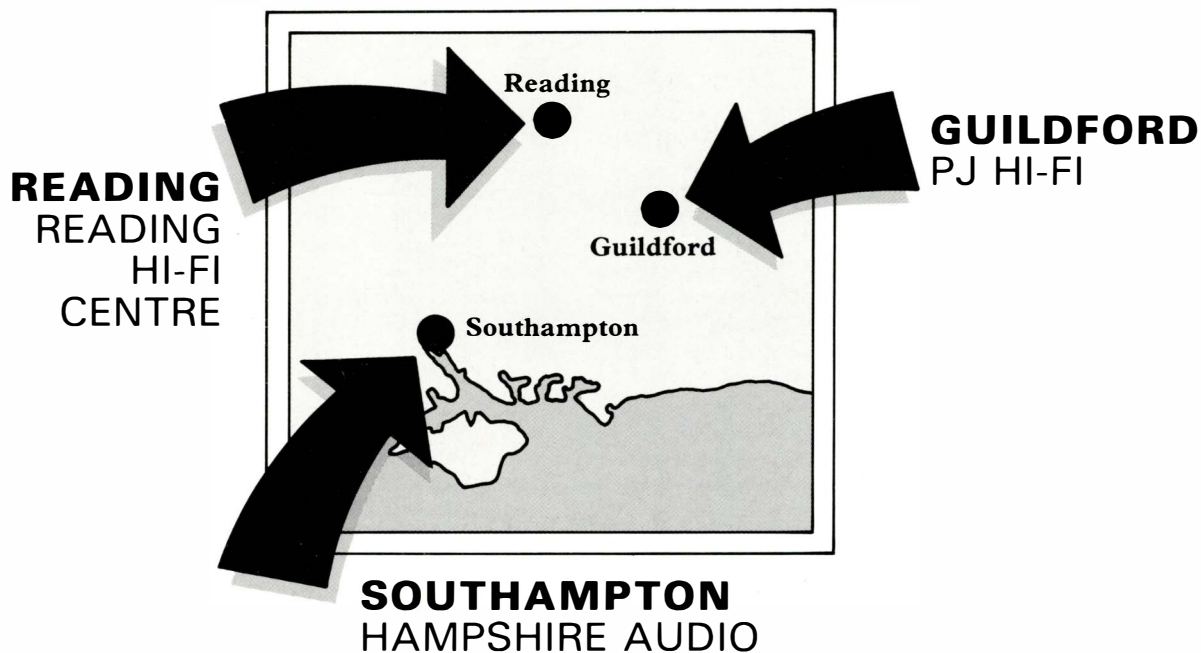
There is a very simple way to explain this complicated concept. When you next watch an old Hollywood musical with the likes of Dan Dailey, Gene Kelly, Mitzi Gaynor and Donald O'Connor singing in the same chorus line as Ethel Merman,

why CBS remains the only major record company not to have committed support to DCC.

When Philips' people from Eindhoven were in London last month to demonstrate DCC, there were eight sessions for the trade and one for the press. All the major record companies (eg EMI, BMG) attended. So did Woolworths which accounts for about 25 per cent of the records sold in the UK. The sessions covered matters like high speed duplication, packaging and shop displays.

The record people were particularly impressed by the DCC cassette design and how it slides neatly into an outer shell package. There are none of those daft hinges which make conventional cassette

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Readers Write

CHOICE ANSWERS

Sssibilance

The main items in my present system are a Marantz CD85, Musical Fidelity B200 amplifier and Wharfedale 505.2 speakers on QED stands with 79 Strand cable.

I have arrived at this set up over a couple of years by exchanging and upgrading and it generally makes very nice music, with one exception - sibilance.

I realise its presence must be down to the initial recording as it is only evident on some discs, but I was wondering if any of my equipment was exaggerating the problem - would an outboard DAC help tame it? If so, which would you recommend I audition?

Would you also agree that my front end is good enough to warrant better speakers (they were next on my continual up-grading ladder). If so, any recommendations would be welcome. David Clarke, Holmfirth, Huddersfield.

We know what you mean, there are some discs that sound really 'nasty' on good multi-bit players like yours. There are basically two approaches to reducing this harshness, the one you mention or replacing the machine completely. As the CD85 was a well built machine based on a Philips transport, it is probably worth using with an outboard DAC. There are more and more of these on the market and we intend doing a round-up of them in a forthcoming issue. For the meantime we've had some good results with Meridian's 203 (£495), Arcam's Black Box 3 (£360) and Micromega's Duo

BS (£499). There are also good vibes about the Deltec convertors which cover the price range mentioned above, but we've not formally reviewed them.

Alternatively, you could consider one of the more successful standalone candidates from the Directory, there are some new and very reasonable players from NAD and Aiwa which deserve audition. Our advice is that you find a friendly and well stocked dealer and take your player and 'nasty' discs down for a session in his listening room.

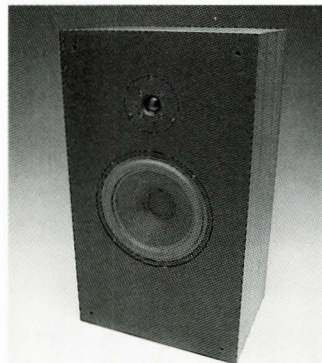
As for speakers, yes your system does warrant better ones but choosing the right ones is a matter for your own taste, financial flexibility and domestic acceptability. Use the Directory to make up a suitable shortlist and then go along for a listening session.

What's in a name?

Thank you so much for your conversations and for your interest in our concerns regarding the 'counterfeit Snell speakers', which we understood were being produced and marketed in the UK by Peter Qvortrup. We were most interested to read your reviews of Mr Qvortrup's design efforts as reflected in his Audio Innovations Model J Loudspeakers (*Hi-Fi Choice*, issue 95) and his Audio Note AN/K-B loudspeaker in your current issue. We appreciate the opportunity to provide some additional information to this discussion.

First, I think that it is useful to clear up some apparent misunderstandings.

Following Peter Snell's untimely death, the Company was most fortunate to have Kevin Voecks become the new design authority. Kevin and Peter, as long-time friends and professional colleagues, had considerable respect for each other's work, and shared the same basic design philosophy. Kevin, in



The Audio Note AN/J-B née Audio Innovations Model J but not a Snell!

fact, had been using Peter's *Type As* to aid in his own design work, both at Symdex and Mirage. Accordingly, when Kevin came to Snell Acoustics, he not only was not inclined to do anything different, but instead welcomed the opportunity to continue to develop and refine the very ideas Peter had been working on. Since, and as time, technology, and collective research have produced new ideas and better components, Kevin's work has been devoted to the same single-minded issue that has driven our Company since its inception in 1976 - accurate, clear and uncoloured sound

reproduction.

We appreciate the fact that Peter Qvortrup has an opinion about the results of our on-going evolutionary mission, but can't help recall his highly opinionated position in 1984, that Peter Snell himself "wrecked" the *Type E* and *J* with the *Series II* and the *Type A* with the *Series III* models, (since these updates were the work indeed of Peter Snell and not Kevin). A year or so later, Mr Qvortrup then took a similar position with Kevin's updates to the *Series III* in the *Type E* and *J*, and the *Series IIIi* in the *Type A*. Apparently, and despite Mr Qvortrup's earlier concerns, the *Series II E* and *J*, and the *Type AIII* had somehow become better with the passage of time.

We were most interested to learn that while Peter Qvortrup has 'loosely' modeled his new speaker designs on the earlier Snell models, they are in fact different, they use different drivers and they sound different. Your reviews seem to confirm, this. We regret, however, that he feels the necessity to market his new products on the coat tails of the long-established and highly respected Snell reputation.

On the other hand, we are pleased to be able to advise you and your readers that our company is alive and well 'across the pond' and that our speakers continue to be built with the same regard for quality and integrity which has set them apart in the past, and created the wonderful reputation they so richly deserve.

We look forward to submitting the current models of the *Type KII*, *IIII* and *EIII* so that you can review the 'real thing' and look forward to your opinion as to the progress of our company over the past six years. Thank you for this opportunity to share our company philosophy with your magazine. Dr William R Osgood President Snell Acoustics, Haverhill, Massachusetts.



Marantz's CD85; a well built multi-bit machine that could exaggerate sibilance on some discs.



Definitely not Carver buyers

When you consider the bewildering array of brands and models available today, it's easy to conclude that all audio equipment is pretty much alike. And you'd be right.

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Groove dirt

I've been purchasing *Hi-Fi Choice* since last August, and am writing to tell you how much I enjoy every issue. The articles are informative and the photography is (er, that's enough sycophancy - Reviews Ed).

Have you ever printed an article on record cleaning? If so when and in which issue? If not, what do you recommend? I have been buying some secondhand LPs lately, and was wondering which would be the best way to clean them.

Michael May, Marysville, Pennsylvania.

It's good to see that some Americans have impeccable taste in audio magazines.

I buy a lot of used records but on the whole use little more than a good brush (those which combine velvet with bristles seem to work quite well) and the stylus itself to clean them. However, there are several serious record cleaning machines on the market, VPI and Nitty Gritty both make well regarded though unreviewed examples. Using one of these is probably the best approach, but they aren't cheap. Prices start at around £200 in the UK.

A cheaper, if more laborious, way is to use one of the proprietary fluids which are not particularly expensive and can be reasonably effective if a bit fiddly to apply. A couple of years ago a fluid called Hunt EDA P2 was being raved about in the press, I've tried it and it seems to work quite well.

The loudspeaker, the spike and the polished floor

I am looking for ideas for a more acceptable alternative to spikes for speakers, I use Rega ELAs, sitting on a polished wooden floor. The idea of making small holes in this finish is not particularly appealing.

D. M. Jones, Chelmsford, Essex.

A very effective alternative to spikes between loudspeaker stand bases and polished floors is

Blu-tack, alternatively, upward facing cones can be used. Undoubtedly each method will have its own character, but Blu-tack will be easier to implement and more domestically durable.

Well choked

Congratulations on the new style CD player reviews in issue 95 which brought out many interesting facts and surprising results. I'm glad that Paul Miller again draws attention to the problem of radio frequency noise and its effect on the rest of the system; of course, it's only one factor in the final sound, but it can be critical. I'm absolutely delighted with my

new Meridian 206B, but it didn't really sing until I replaced the mains cable with the RF rejecting Kimber mains lead. When I recently tried to shorten and simplify my interconnects, back came that overbright and edgy sound. Apparently the capacitance of the longer cables was just what was needed to attenuate the RF.

But help is at hand. In the States TDK has recently released Digital Noise Absorbers; ferrite clamps which clip around interconnects and/or mains leads close to the CD player. The British distributor tells me that it has no plans to sell them here, and I was about to

order them from the States for a trial when I found a nearly identical product at Tandy, stock no. 273-105, at £3.99. Its called the *Snap-together Ferrite Data Line Filter*, and fits cables up to 6.7 mm in diameter. My Van den Hul D102 is a very snug fit, which makes it easier to clip them on than get them off again.

Like ferrite rings, they act in the same way as chokes to suppress RF. Many purists regard any choke as the enemy of good sound; the great advantage of these is that they're easy and cheap to try. You can go further if you want and try them on the leads from other components. David Foxon, Oxford.

Roksan Interconnect Winner

Speed freak

My current system comprises of, among other things, a Marantz CD94, Roksan Xerxes/RB300/AT-F5, with Bryston 12B/3B amplification and Naim SBL loudspeakers. The only problem I have with it is that, taking domestic harmony into account, the speakers are too big.

After extensive listening tests and research using your recommendations, I purchased the above system in order to have a fast lively sound with plenty of power.

I would appreciate any suggestions you might have for small speakers and stands that I could use as a substitute for the SBLs, in the context of my system and a £1,000 budget. For space reasons I'll need to be able to place them within a metre of the wall.

I have listened to the Sonus Faber *Electas* but found them too good to be exciting! Alastair Walts, Windlesham, Surrey.

Too good to be exciting, are you serious? Never mind, we know where you're at. The speaker choices that come most immediately to mind are the

Royd Sintra (£330) which will do what you want on the Linn Kan stand, and probably Royd's own stand as well, and the Kan II itself (£417) which is very much a speed oriented loud-speaker. A couple of more civilised but very quick and enjoyable contenders are the Acoustic Energy AE1 (£748) which has its own attractive if expensive stand and the Epos

ES11 (£300).

Your best option might be to go for one of the less expensive speakers and stand combinations and upgrade your cartridge to something like Audio Technica's new AT-OC10. It won't be as brash as the AT-F5 but will still be quick and a lot more entertaining.



Domestically unacceptable! Naim's fleet footed SBL.

Choosing and Using . . . CD Drives

We've focused our attention on CD drives this month, and asked Paul Miller to put a batch of ten through their paces.



If there is one query that has come to dominate the *Hi-Fi Choice* postbag it is the question of upgrading a CD player by purchasing an outboard DAC.

For those with technophobia, the DAC (digital to analogue converter) is the device that takes the stream of ones and zeros contained on a CD and turns them into the music that comes out of your speakers.

In theory

Theoretically at least, the digital output of all CD transports must adhere to a variety of conditions laid down in both Philips' Red Book and an official document entitled IEC958. Consequently, each and every transport should be capable of driving whichever DAC you chose. With most of the drives two different types of digital output are offered but whether the connection is made via a coaxial socket or Toslink optical fibre, the format of the data remains exactly the same. They simply take the form of pulses of light (fibre optic) or pulses of electricity (coaxial).

Because of this we thought that it would be a compara-

tively simple matter to get together a number of drives and try them out with a quality DAC to find out which of the drives gave the 'best' digital data stream.

As is often the case, the simplest of ideas prove the most complicated to execute. As we have already said, the digital output on one CD player or transport should be indistinguishable from any other, assuming the decoder has done its job and all the digital errors have been corrected or concealed. This is crucial, for any enthusiast wishing to upgrade his or her CD player with an outboard DAC must expect a certain degree of compatibility. This goes double for a dedicated CD transport. Remember we're dealing with digital here, a fixed and known quantity described by ones and zeros rather than the rather vague notion of 'analogue' audio.

Nevertheless, it didn't take us long to realise that one digital output certainly doesn't 'sound' like another. In fact the differences between one transport and another was often as obvious, if not more obvious, than the differences we had observed the previous month between

competing CD players!

On day one we assembled the listening panel and auditioned the transports in a random order and under blind conditions. Each drive having being left powered up in the lab for the previous 48 hours to prevent any warm-up problems. Deltec amplifiers and Snell *III* speakers filled the back end of the system while our selection of music ranged from rock (Peter Gabriel *So*) through jazz (Marty Paich Big Band *Moanin'*) to classical (Telemann & Vivaldi *Concertos for recorder, bassoon and strings*).

On the first day we chose a Meridian 606 DAC to turn the numbers into music and, surprise surprise, the Meridian 200 and 602 transports were identified as front-runners. On the same day both the Wadia WT3200 and WT2000 placed ninth and tenth. Now anyone who has heard the Wadia drives operating with the Wadia converters will know that they are very capable machines, so the next day we got everyone together again and went through the whole procedure again, only this time we employed Wadia's X-64.4 DAC. The two Wadia

drives romped home in gold and silver positions. Moreover the Meridian duo flunked to bottom place while all the transports inbetween were thoroughly jumbled up. Try sorting out sensible recommendations from that little lot!

Sorting it all out

A third listening session, using Teac's *D-10* converter established a new, if less controversial, order and began to shed a little light on the potential compatibility between various transports and DACs.

Because we ended up using three DACs during the course of the test, you'll find that the arrangement of the listening results is a little different from normal tests, where only one set of partnering equipment is used. At the end of each review there are three, sometimes different, sound quality reports. The first relates to the DAC which our panel thought best suited the transport, the other two DACs are then listed in order of preference with comments relating to the sound of the drive with the remaining converters.

Kenwood DP-X9010

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Kenwood set a trend for other manufacturers to follow when it introduced its *DP-X9010* transport over two years ago. This is a heavyweight machine supported by laminated casework and it features an equally chunky linear-tracking laser assembly. The drawer emerges from the centre of its black alloy fascia, below a broad fluorescent display that reveals all necessary track, index and time info. Few controls are available on the player itself, but the matching remote handset offers a huge array of twiddly bits.

Inside, Kenwood's 175g laser slides on sintered alloy rails, while to the left and right lie separate PCBs catering for the RF amp, servo electronics and decoding ICs. Most of the processing ICs are culled from Sony, though Kenwood has sought to re-clock the digital output from its *CXD1125* processor. The coaxial digital output is eventually isolated by a miniature transformer and a standard Toslink optical output is fired-up alongside.

Lab Report

Two years of production have seen Kenwood reduce levels of spurious RF contaminating the digital output, though the datastream is still far from stable. Traces of RF noise are still visible on the digital waveform while some 11 per cent overshoot can be seen due to mis-termination with the Meridian 606. Nevertheless it's the trace recorded with Wadia's DAC that seems most at odds with the other transports, for though the basic 'Wadia footprint' is obvious enough, secondary interference is missing due to its failure to lock.

Of greater importance is the high level of noise surrounding the reconstructed -90dB tone, noise that is accompanied by 15/16Hz sidebands due to a discrete (rather than random) jitter component. Adding insult to injury, the clock is out by some 0.0113 per cent which relegates it to Class 2 accuracy.

Sound Quality

Via the Meridian 606 DAC: in the view of two listeners this transport had all the hallmarks of a multi-bit CD player! In other words it possessed a good sense of pace and dynamics together with an equally solid bass definition. However, the overall balance was rather forward yet still lacking in space and tempered by a rising top-end. Percussion was slightly tizzy, while any natural sibilance tended to be exaggerated.

This lent a hardness to the natural timbre of instruments, making the recorder on our classical disc sound more like a plastic than a wooden instrument, for example. For once our listeners actually preferred the optical rather than coaxial connection, for here any softening of its harsh treble was considered a bonus. Any sense of stereo perspective was flattened in the fashion of other optical outputs, but at least vocal sibilance was free of any additional abrasive quality.

Via the Teac *D-10* DAC: Kenwood's transport elicited much the same reaction on our third day of listening, offering up a rather weak and weedy sound sprinkled with grainy overtones. Initially the panel thought it quite lively and detailed but the glare that accompanied brass instruments like trombone and sax soon became very fatiguing. Bass notes, by contrast, sounded both free and weighty, escaping the confusion that dogged the mid and treble octaves.

Via the Wadia *X-64.4* DAC: true to its specification the DAC would only lock onto the 9010's digital output when re-set to a Class 2 accuracy level but here the sound was again rather weak and grainy. The optical mode was preferred for its smoother and weightier balance, but the overall consensus remained uninspiring.

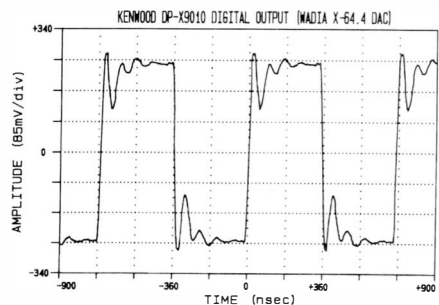
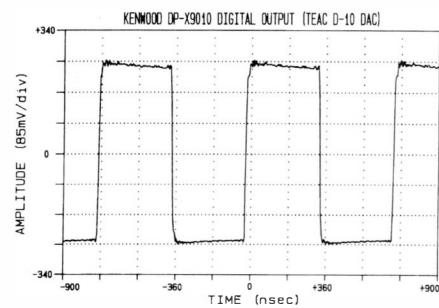
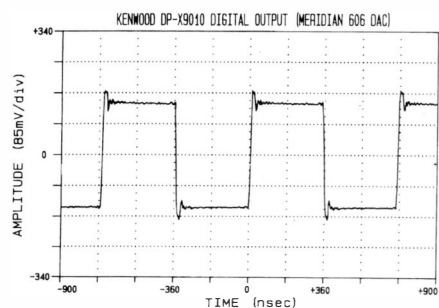
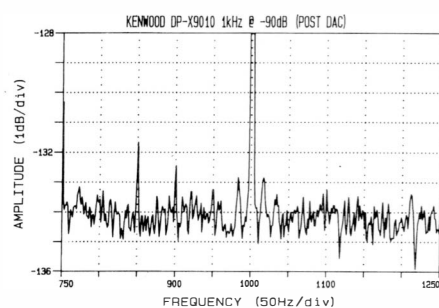
Conclusion

It is gratifying to discover that a blind listening panel's thoughts correlate with

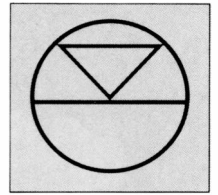
my own subjective findings of two years ago - an opinion, I might add, formed while using different DACs, amps and speakers! However, the performance of the *DP-X9010* leaves quite a bit to be desired when joined by newer, more expensive machines.

TEST RESULTS

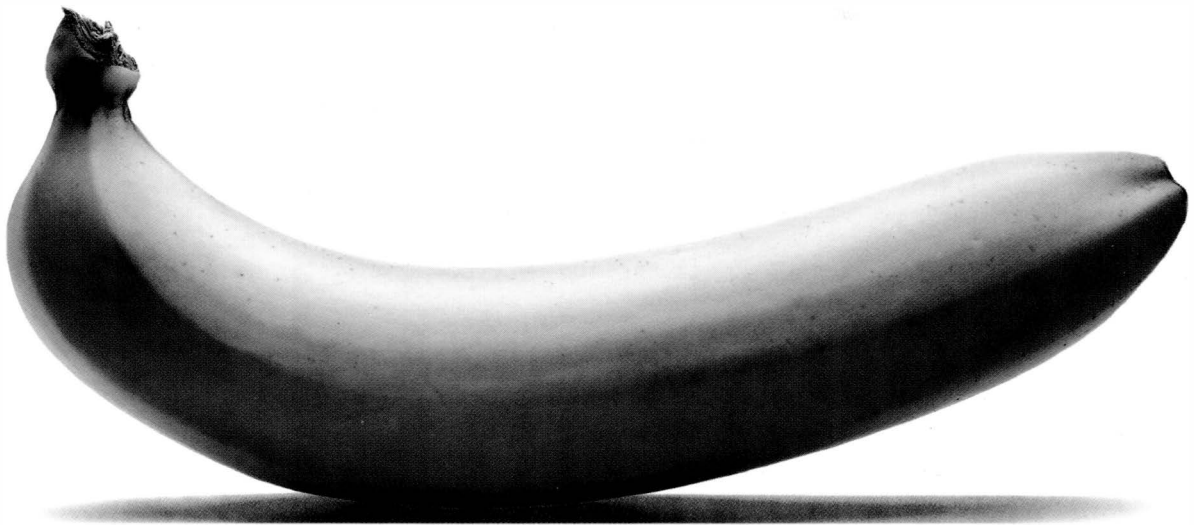
	Teac	Meridian	Wadia
Digital output (mVp-p)	521.7	363.9	559.1
Edge rise time (nsec)	7.94	7.98	15.97
Digital output (optical)			-15 to -21dBm
Output impedance			75ohms
Clock/repetition rate			2.8224MHz
Clock Accuracy			112.5ppm
Frequency error at 20kHz			+2.250Hz
Jitter + noise at -90dB			-24.09dB
ErrorCorrection			<3.2mm
Typical Retail Price			£500



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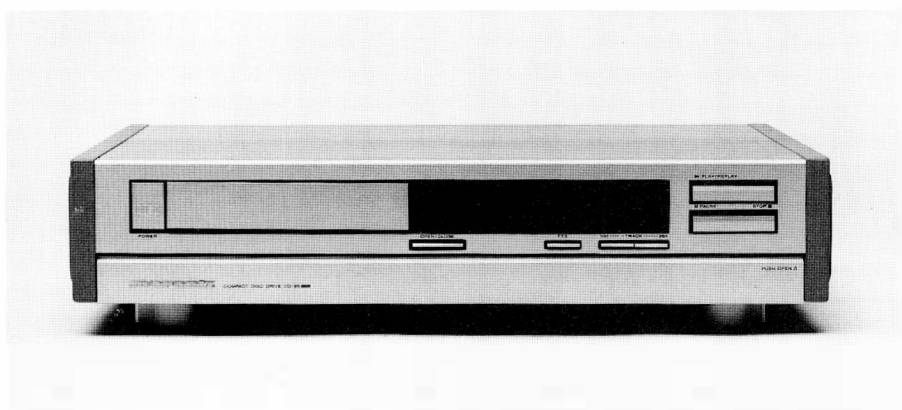
LINN



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Marantz CD-95 Drive

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



Top dog in Marantz' range, the CD-95DR combines the aesthetic design of the CD-94II player with an internal architecture modelled on the older CD-12 transport. A full range of direct track access, intro-search, index skip, repeat and program play facilities are tucked away beneath a retractable flap, while entry into the comprehensive FTS memory is provided alongside the player's conventional transport controls.

Talking of which, Marantz has specified Philips' luxurious die-cast CDM1 transport mechanism - the company has even finished it off in gold to match the champagne lustre of the fascia. Copper-plated shielding is employed inside to separate the transport control and servo circuits from the main decoder board which employs Philips' older SAA7210, a chip which has now been superseded by the SAA7310.

This decoder is linked to an SAA7220P/B oversampling filter, used in this instance solely for its capacity to supply a biphasic digital output. Interpolation of digital errors with the addition of subcode data is accomplished here, but the four times oversampling stage serves no useful purpose. A Toslink optical and two coaxial electrical outputs are provided, the latter isolated via a pair of miniature transformers.

Lab Report

Transformer coupling helps reduce RF noise that might otherwise circulate between the transport and DAC but it also has the effect of slowing the edge rise time to a minimum of around 10.6nsecs. The digital output itself is a high 723mV (re 75ohms) with AC-coupling blocking any DC offset.

Jitter is about average for this group while the clock error is just 0.00225 per cent of nominal and well within a Class 1 specification. RF noise is low and error correction spot-on up to 3.8mm!

Sound Quality

Via the Meridian 606 DAC: here the CD-95DR was praised for its authoritative and confident handling. We were especially impressed with the resolution of bass sounds such as the bassoon from our classical disc, an instrument which now seemed to enjoy extra weight and conviction. Compared to Philips' own player it was not quite as open nor as bubbly, but with plenty of resolving power on hand, its portrayal of subtle detail gave it something of a musical edge over similar units.

Nevertheless, our listeners were also left with the impression of a low-level digital hash pervading the soundstage - the sound was not gritty but neither was it totally pure. Engaging the optical output brought about a loss of tactility, a blurring of the subtle timbre of flute and harpsichord in a way that made the overall sound less comfortable. Less distinct, the optical connection was also thought to emphasise those negative qualities heard via the coaxial connection.

Via the Wadia X64.4 DAC: in this instance its sound was cleaner, crisper and better focused through the treble but it was also leaner and harder than before. Still, what was present was very tidy, dry and taut while the interplay between pop vocalists was better reproduced than it had been via the three Teac transports. The sound of backing instruments was drawn out from a deep and purer soundstage but brass as well as vocal performers were tainted by a hint of unwanted sibilance.

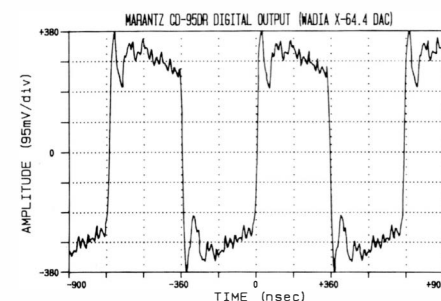
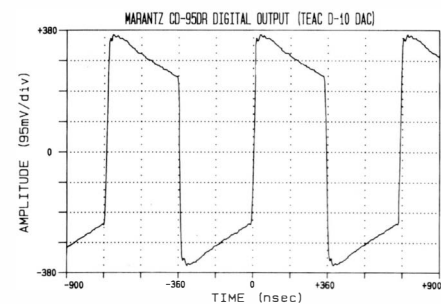
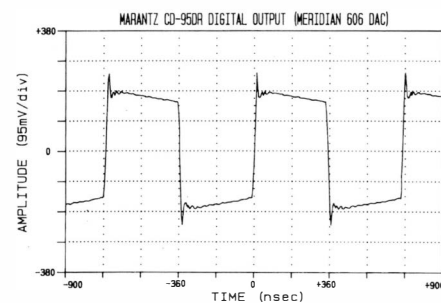
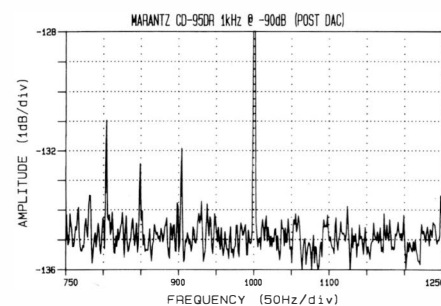
Via the Teac D-10 DAC: now the transport offered up a sound that seemed to relish the complexity of our jazz and classical pieces, retaining its bright and lively pace but avoiding the tendency to sound thin or lean. Yet for all its freedom and punch the overall sound was considered to be rather sterile, lacking the involvement and richness of either the WT3200 or Meridian 200.

Conclusion

In material and feature terms the CD-95 would seem to represent better value than generic models like the WT3200. It seems rather more compatible too, though it failed to really sparkle with any one of our three DACs.

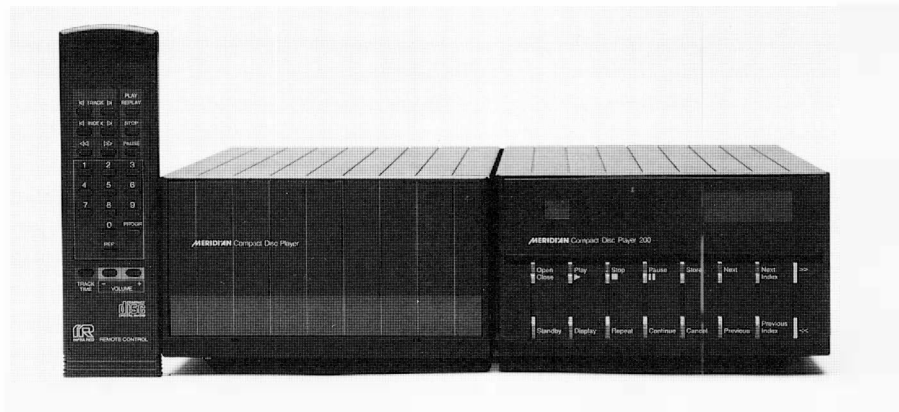
TEST RESULTS

	Teac	Meridian	Wadia
Digital output (mVp-p)	723.3	480.1	773.0
Edge rise time (nsecs)	12.95	10.55	16.75
Digital output (optical)		-15 to -21dBm	
Output impedance		77ohms	
Clock/repetition rate		2.8224MHz	
Clock Accuracy		22.5ppm	
Frequency error at 20kHz		-0.45Hz	
Jitter + noise at -90dB		<-24.93dB	
Error correction		<3.8mm	
Track access (99)		4secs	
Typical Retail Price		£1,500	



Meridian 200

MERIDIAN AUDIO LTD, ECCLESTON ROAD, TOVIL, MAIDSTONE, KENT ME15 6QP. TEL: (0622) 672269



Meridian's first and cheapest CD transport is actually derived from the integrated 208 CD player, sharing the same basic mechanism and range of facilities. At a touch the open/close button and the left half of its stylish fascia breaks clear of the main chassis to reveal a die-cast magnesium platform, below which lies the motor spindle and swing-arm laser assembly. There's no separate disc tray as such, you simply load the CD directly onto the mechanism which then withdraws into the heart of the player.

Inside the player a laminated arm swings across to clamp the disc while the entire assembly is decoupled on three sorbothane blobs. Third-generation servo and control ICs mean swift and secure track access, while Philips' latest SAA7310 decoder improves upon the error-correction offered by older chips like the SAA7210. But Meridian has not stopped here, choosing to implement Philips' new PCF3523 ADOC (audio digital output circuit) to drive the digital output via a miniature transformer.

Lab Report

A clock frequency error of just 28ppm guarantees a Class 1 status, even though the jitter spectrum shows an unusual but 'real' component 73Hz off the main 1kHz signal. Digital spikes are well controlled while the final band noise figure of -24.9dB is on a par with Teac's sub-£1,000 player. Meridian's output transformer introduces a slope to the digital waveshape but at least any ringing into the 606 DAC is both mild and well damped. Spurious RF noise is also well contained.

Sound Quality

Via the Meridian 606 DAC: this combination did not enjoy quite the perceived depth or the bass weight of the CDD882/606 pairing, yet in almost every other respect our panelists judged it superior. Lavish with their praise our listeners ap-

preciated the 200's excellent sense of definition, clarity and stereo focus - qualities which are retained without it screaming detail from the speakers.

The treble was also very refreshing, cymbals sounding very delicate and tonally pure without being made to appear obvious or over-dramatic. Indeed, it was this very natural, truthful and unfatiguing demeanour that so endeared the combination to our listeners. So even if the florid phrasing of the recorder (Vivaldi disc) was sometimes buried beneath the weight of strings, our listeners never lost sight of this delicate instrument throughout the entire passage.

Via the Teac D-10 DAC: a very solid, fresh and dynamic sound was apparent which made everything sound more immediate, three-dimensional and tactile. Soundstaging was up with the very best and though there was no obvious sense of band-limiting, its delivery of the lowest bass notes could have been punchier. Oddly enough there was absolutely no sense of the 200 'dragging its heels' in the fashion of 602, which it trounced with its out-of-the-box imagery and grand sense of scale.

Via the Wadia's X-64.4 DAC: with a sound that was notably more diluted than it was with either Wadia transport while also far less involving than it had been with Philips' CDD882, the 200 still sounded more even-handed than the 602! It certainly did not harden up in the fashion of the 602, but the music itself lacked vibrancy and colour - a very bleached or grey sound in the view of most listeners.

Conclusion

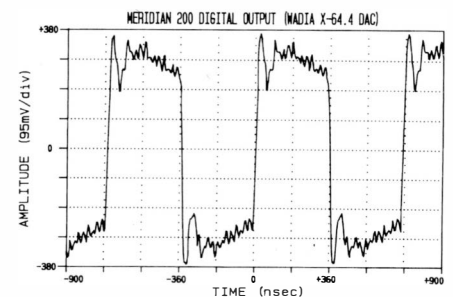
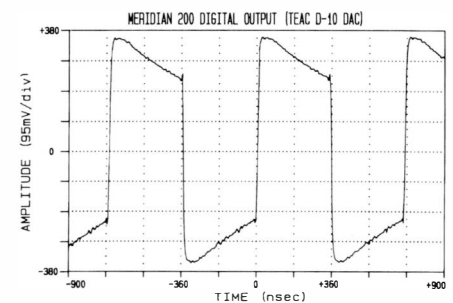
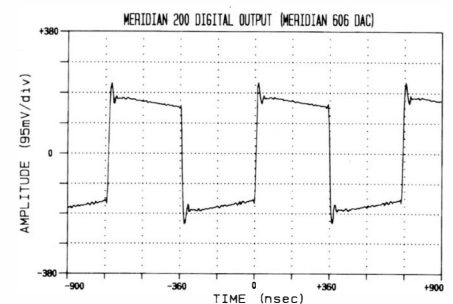
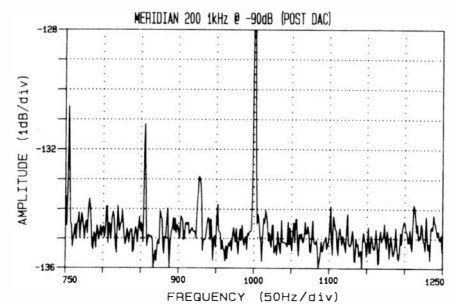
Partnered with either the Meridian or Teac DACs the 200 transport romped home to enthusiastic applause from our listeners, a result that ties-up nicely with our collective experience of this machine with most other DACs. Combine this with a fine optical output (our panelists thought

Recommended

it the least compromised of the group) and you've a recipe for success. As a star performer at a realistic price, Meridian's 200 earns my most heartfelt Recommendation.

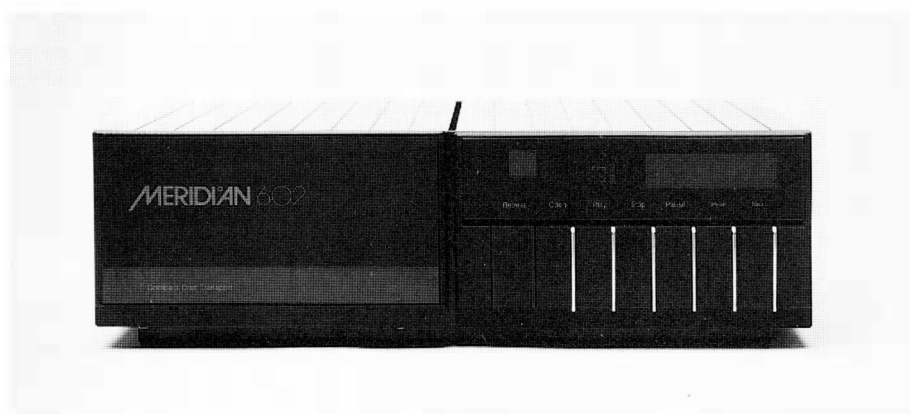
TEST RESULTS

	Teac	Meridian	Wadia
Digital output (mVp-p)	713.3	448.6	742.8
Edge rise time (nsecs)	7.98	7.98	15.5
Digital output (optical)			-15 to -21dBm
Output impedance			78ohms
Clock/repetition rate			2.8224MHz
Clock Accuracy			27.5ppm
Frequency error at 20kHz			+0.55Hz
Jitter + noise at -90dB			-24.93dB
Error correction			<3.8mm
Track access (99)			2.2secs
Typical Retail Price			£750



Meridian 602

MERIDIAN AUDIO LTD, ECCLESTON ROAD, TOVIL, MAIDSTONE,
KENT ME15 6QP. TEL: (0622) 672269



At twice the price of Meridian's 200 transport, the new 602 is both more luxurious in appearance and more refined in its execution of Philips' digital technology. The same basic two-case construction has been adopted, but the large transport mechanism is marginally more rugged as well as better finished. In fact the all-over satin black bodywork is a distinct improvement over the matt finish of the 200.

Featurewise there are only the most elementary controls on the player itself, and the dot-matrix display is only marginally more helpful than that included on the 200. Inside, Meridian has opted for a new partitioned four-layer board together with improved servo and power supply regulation. There's an extra optical output too while Philips' ADOC (audio digital output circuit) has been substituted by a conventional SAA7220 P/B chip followed by a series of hex-inverters to beef-up the coaxial drive.

Lab Report

Once again a transformer isolates the ground path and causes the mild sloping seen on the digital waveforms. However the D-10 and 606 input traces are very 'clean' across the top surface - proof of Meridian's effective RF isolation. More importantly the 602 has half the risetime of the 200 (4nsecs instead of 8nsecs into the 606) while also boasting a superior 20ppm clock accuracy. The jitter spectrum is freer of discrete artifacts too, though the collective band noise figure is little different.

Sound Quality

Via the Meridian 606 DAC: if the 200 was hard to criticise then the 602 was damn near impossible to fault in the view of our listeners. Its resolution of the subtlest treble details was intricate to the point of being exquisite while its wonderful sense of space lent ample room for individual

instruments and performers to 'breath'. The processing of Gabriel's voice was now laid bare on our pop selection while the steady pitter-patter of percussion was so pure and delicate that it proved almost hypnotic.

Bass instruments, whether drums, double bass or bassoon were also beautifully resolved, revealing timbral nuances in a way that seemed - subjectively at least - both faithful and utterly natural. More than any other transport the 602 was felt to grasp genuinely new facets of a musical performance without exaggeration or distortion. But then the 602/606 turned out to be a very 'special' combination.

Via the Teac D-10 DAC: after a few uncertain moments the Teac DAC finally locked-onto the 602's de-emphasis flag (a problem not encountered with any other transport), revealing a pleasantly unfatiguing sound but one that lacked the openness, life and dynamics of either the WT3200 or Meridian 200. All the essential detail was there but it simply failed to capture the imagination of our listeners.

Bass notes tended to drag their feet while there was also the faintest loss of extreme treble detail. For example, the woodwind on our Vivaldi track lost a little of its air and space, so even though the overall feel of the player was undeniably friendly, rosy and refined it was not particularly vivid.

Via the Wadia X-64.4 DAC: the 602's positive qualities could be heard struggling to emerge, particularly its fine resolution of strings and gentle percussion, but once the music became moderately busy it also became muddled, hard and tiring. Vocal sibilance was also less comfortable but bass, on the whole, was gratifyingly meaty. However, the panel soon tired of the wearing upper octaves.

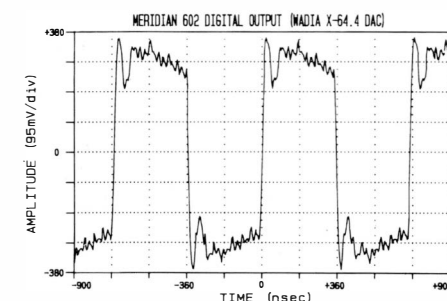
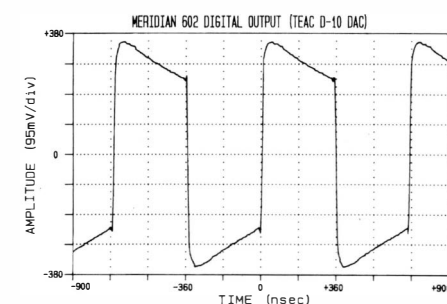
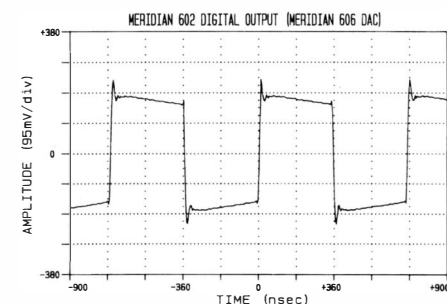
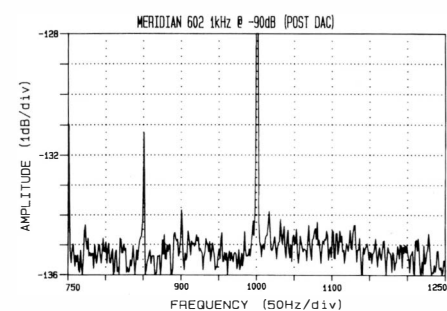
Conclusion

The extra cost of the Meridian's 602 buys the user certain technical advantages plus

a rather higher standard of finish. It also earned its place as the natural partner to the 606 DAC, a combination that in my view, surpassed all others. Nevertheless it proved less successful in the broader arena where the cheaper 200 emerged triumphant.

TEST RESULTS

	Teac	Meridian	Wadia
Digital output (mVp-p)	711.1	452.1	732.1
Edge rise time (nsecs)	5.99	3.98	13.9
Digital output (optical)		-15 to -21dBm	
Output impedance		78ohms	
Clock/repetition rate		2.8224MHz	
Clock Accuracy		20ppm	
Frequency error at 20kHz		+0.40Hz	
Jitter + noise at -90dB		-24.95dB	
Error correction		<3.8mm	
Track access (99)		2.5secs	
Typical Retail Price		£1,500	



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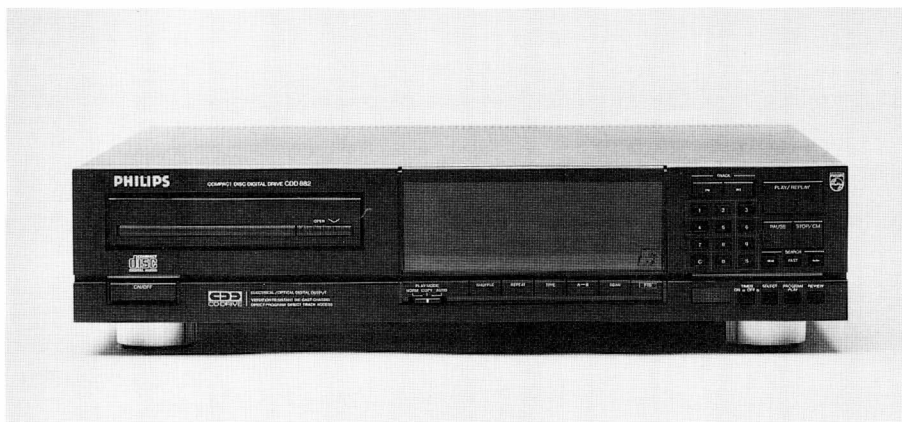


All prices and specification correct at time of publication, all prices include VAT.



Philips CDD882

PHILIPS ELECTRICAL LTD, CITY HOUSE, 420-430 LONDON ROAD, CROYDON, SURREY CR9 3QR. TEL: (081) 689 2166



When Philips felt the desperate urge to squeeze a CD transport into its range, the simplest approach was to remove the DACs from its established CD880 CD player rather than return to the drawing board. Of course the CD880 may no longer with us, but the stripped-down CDD882 transport is alive, kicking and graced with just about the most OTT fluorescent display I've ever clapped eyes on.

Philips' diecast chassis, alloy fascia and chunky CDM1 MkII laser mechanism are all very positive features but the appearance of the unit is ruined by a wash of buttons and blue lights. Still, the user will never be short of facilities with full FTS programming, scan, repeat and random play modes augmented by the ability to start at any track, index or time position on the CD! Certainly, in terms of features, there is very little to criticise.

Inside, however, it's a different matter, for Philips has employed the CD880's main PCB complete with the 5708/5709 signal processors, SAA7210 decoder and SAA7220P/B oversampling filter. But here it stops, for all the ensuing DAC and analogue filtering circuitry has been omitted, leaving the oversampling filter to drive the digital output via a simple AND-gate and isolating transformer.

Lab Report

The low-frequency filtering introduced by this transformer is evident from the sloping waveshape, though, more importantly, the convoluted track layout used to route this digital output has resulted in a degree of capacitive coupling between the signal and return lines. Compared to a similar system such as the Marantz CD-95, the 882's output is both lower in level at 483mV (re 75ohms) and has an inferior edge definition. Both the slower 14nsec risetime (606 DAC) and excess RF interference are evident from the three waveform traces published alongside.

The 1kHz/-90dB plot also reveals jitter

on a par with Kenwood's DP-X9010 but though there are more digital 'spikes', the central 1kHz signal is both better defined (thinner) and frequency stable (16.3ppm error). Theoretically at least, this still ranks as a Class 1 digital output.

Sound Quality

Via the Meridian 606 DAC: this partnership intrigued our listeners with its very rich, full sound and spacious, out-of-the-box treble. Infused with a marvellous sense of space its big-hearted presentation made the Peter Gabriel CD sound immediately louder and marginally brighter while percussion seemed to have more bite. Similarly, vocals were more pointed in delivery and perhaps a little more sibilant than usual.

To some extent there was a youthful-ness and exaggeration about the music, yet rather than being harsh, the sound was simply fuller and more enjoyable. Reverting to the optical output did not alter the tonality of the music but it was markedly less vivid and perhaps slightly coloured in a vague, hollow or boomy fashion.

Via the Wadia X-64.4 DAC: the panel was generally positive about this pairing, for though the soundstaging was slightly muddled compared to the WT3200, the overall effect was certainly more exuberant and stimulating than the Meridian 602. There was however, a loss of energy and impact in the lowest of bass octaves.

Via the Teac D-10 DAC: here the sound was not obviously imbalanced - there may have been a slight loss of bass weight - but then neither was it especially involving. One listener felt it vaguely mechanical while another suggested it was slightly compressed and lacking emotion.

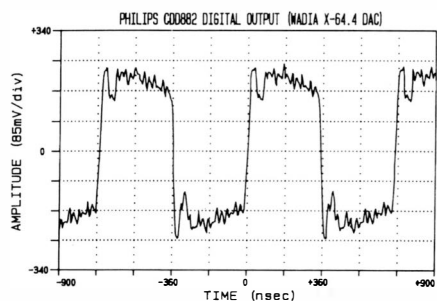
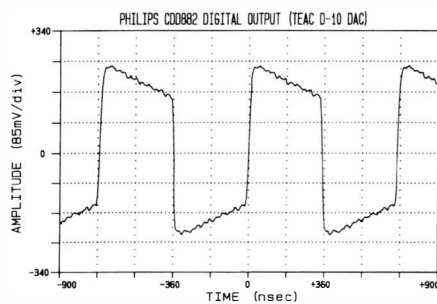
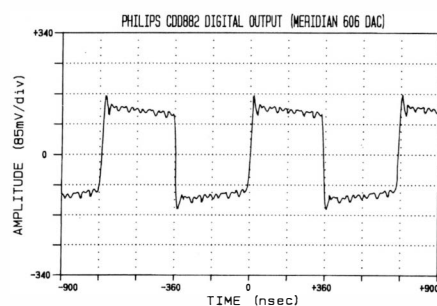
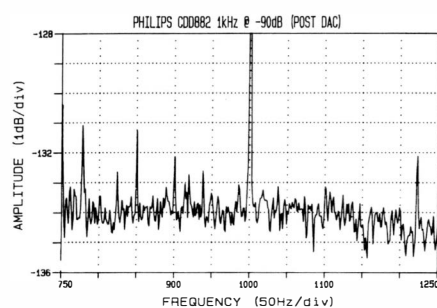
Conclusion

For the facilities and build on offer the CDD882 represents pretty fair value if, in

essence, it's less a dedicated transport than a butchered CD880 CD player. It works well with the 203 and 606 DACs but could be even more compatible if only Philips had spent a few pennies re-laying the digital PCB.

TEST RESULTS

	Teac	Meridian	Wadia
Digital output (mVp-p)	483.2	324.9	502.8
Edge rise time (nsecs)	17.35	13.95	17.95
Digital output (optical)			-15 to -21dBm
Output impedance			72ohms
Clock/repetition rate			2.8224MHz
Clock Accuracy			16.3ppm
Frequency error at 20kHz			+0.325Hz
Jitter + noise at -90dB			-24.03dB
Error correction			<3.8mm
Track access (99)			1.8secs
Typical Retail Price			£500



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84 Bridge Street
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ZEUSAUDIO

Hope Street
Belfast
TEL: 0232 332522

ZEUSAUDIO

23A Kingsgate Street
Coleraine
TEL: 0265 56634

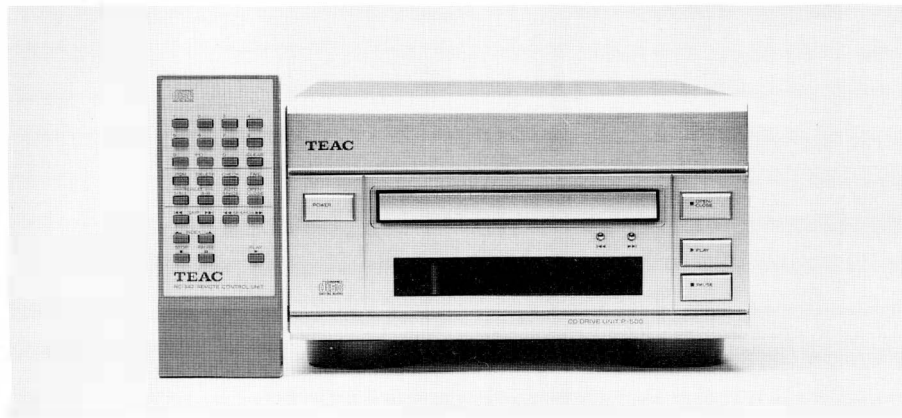
MICROMEGA

P.O. Box 13
London, E18 1EG

TEL: 081 989 0692

Teac P-500

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



This is the cheapest of three proprietary transports manufactured by Teac, three machines that share a unique sense of style and mechanical innovation. So if the elegant champagne-gold fascia, slim drawer and orange fluorescent display are not far enough removed from commonplace designs, then the internal mechanics of the player most certainly are.

The *P-500* incorporates a lightweight version of the 'Vibration-Free Rigid Disc Clamping System' deployed in both *P-10* and *P-2* transports, resorting to plastic mouldings for the tray, drive mechanism and floating subchassis. Still the basic concept remains unchanged, forcing the loaded CD up against an inverted turntable which is driven from above by a small motor and controlled by a CLV servo. This contrasts with other CD mechanisms which load the disc onto a rotating spindle, a simpler option but one that offers no peripheral support for the disc.

Lab Report

Teac's coaxial digital output is transformer-coupled so its ultimate rise time is a little restricted, particularly when driving the variable impedance offered by the Wadia DAC. The 16nsecs measured here contrasts with the 6.4nsecs recorded into Meridian's DAC, even if the unavoidable mis-termination results in a modest overshoot. Still, RF noise is respectably low and the clock error just fractionally outside a Class 1 rating at 54ppm.

Jitter is also low for this group though the 1kHz/-90dB spectrum does reveal three strong digitally-derived spikes. Track access and error correction are both superb.

Sound Quality

Via the Meridian 606 DAC: on a general level the very pure, engaging and fluid presentation of this transport prompted an appreciative if not overly enthusiastic reaction from our panel. The sound was

not obvious or deliberate in execution but it still revealed the various layerings of Peter Gabriel's track with great ease. Indeed though the sound was not crackling with crisp, sharp detail, its very sympathetic handling of vocal sibilance was greeted with warm praise from the panel.

Yet this remains a very comfortable sound, revealing but somehow faceless and lacking in excitement or tension. Rather like the Wadia *WT2000*, this transport does everything it should but - in the words of one listener - ultimately fails to raise the shorthairs! Don't look to the optical output for any improvement, for this precipitates a slower, thicker sound fairly typical of the Toslink breed.

Via the Teac *D-10* DAC: once again we were greeted with a pleasantly relaxed and mellow sound which, though not exactly bleached, did perhaps lack the widest range of tonal colours. The panel also felt the sound could have been more interesting, it just wasn't fruity enough to engage the attention over an extended period. The transport is simply not as dynamic or expressive as its peers but then neither is it grainy or fatiguing. By appearing to have tailored both bass and treble detail Teac has engineered a safe but undemanding sound.

Via the Wadia *X-64.4* DAC: the odd midband coloration that persisted with both the *P-10* and *P-2* transports went unremarked on this occasion. Nevertheless, the *P-500* encouraged a vagueness about the timbre and focus of individual instruments that contrasted with the crisper, clearer sound of the costlier Teacs. A consistent if unremarkable result.

Conclusion

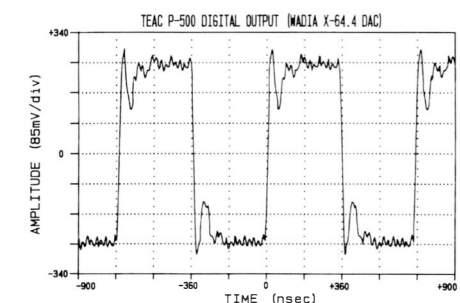
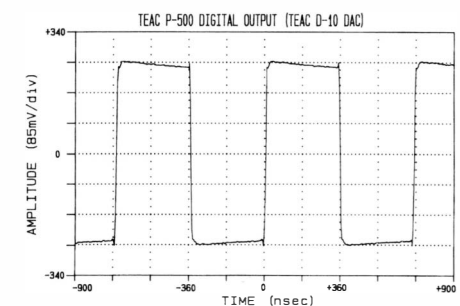
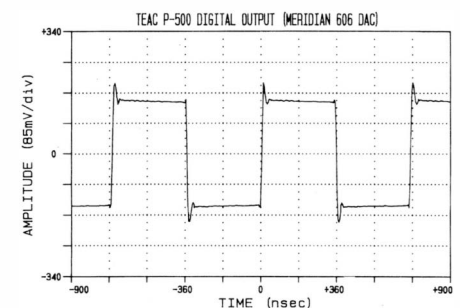
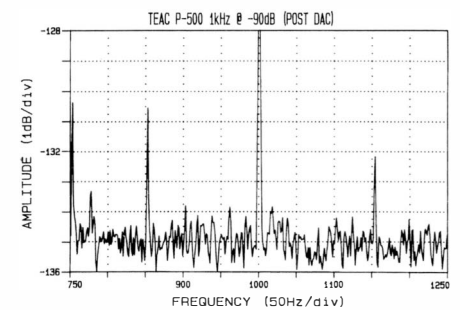
This was one of the few transports to yield a broadly identifiable 'sound' regardless of the type or character of the DAC it partnered. It's certainly a smooth and pleasant enough sound, inoffensive rather than invigorating but still rather better

Recommended

balanced than its immediate competition. At £600 it must be Recommended, but bear in mind the Meridian 200 offers a considerably more refined performance for a premium of just £150.

TEST RESULTS

	Teac	Meridian	Wadia
Digital output (mVp-p)	523.9	395.4	588.4
Edge rise time (nsecs)	8.25	6.35	15.95
Digital output (optical)			-15 to -21dBm
Output impedance			76ohms
Clock/repetition rate			2.8224MHz
Clock Accuracy			53.8ppm
Frequency error at 20kHz			-1.075Hz
Jitter + noise at -90dB			-24.91dB
Error correction			<3.8mm
Track access (99)			2.1secs
Typical Retail Price			£600



Teac P-10

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



Of all the Teac transports, only the *P-10* has really established something of a reputation among enthusiasts in the UK, but then it's certainly more affordable than the *P-2* and offers a far higher standard of workmanship than the *P-500*. For example, the same basic VRDS transport mechanism is employed but in this case the inverted turntable, subchassis and support structure are all cast from alloy. A superior brushless motor is used with part of the drive system actually fixed to the flanged upper surface of the rotating turntable.

Teac has drilled three holes through this inverted 'platter' in order to cut down on ringing - an unfortunate side-effect of the mild concavity used to press home the CD underneath! A chunky mains transformer feeds separately regulated supplies for the display, servo and decoding electronics, while both Toslink optical and coaxial digital outputs are on a separate board mounted on the rear of the case.

Featurewise the player itself offers only play, pause and track skip (there's no stop button!) so you'll need to rely on Teac's remote handset for direct track access, index, program and repeat play facilities. Otherwise it's an absolute dream to use!

Lab Report

Once again Teac has elected to transformer-couple the digital output so the edge rise time varies from 17.6nsecs (Wadia DAC) to 10nsecs (Meridian DAC), both of these traces showing the ringing and resonances characteristic of mis-termination with each DAC.

The slightly low 73.4ohms output impedance of the *P-10* actually helps limit the attenuation caused by Meridian's DAC but it does nothing to reduce digital jitter for, in the light of the 1kHz/-90dB test, the *P-10* fails to quite match the *P-500* in this regard. Error correction and clock accuracy are also slightly below par though any residual RF interference is very low.

Sound Quality

Via the Teac *D-10* DAC: yet again it was the natural partner to Teac's *D-10* DAC that emerged victorious in our blind listening tests, for here the *P-10* produced the deepest and most satisfying bass of any transport on that day. Working across a broad canvas of sound it revealed the horn section within our Vivaldi piece with greater depth and fullness than either the *P-2* or *WT2000*.

Sure, the sound was raw, rich and beefy but it was also peppered with fine details that ensured it was polite, firm and utterly compelling. One listener thought this combination of transport and DAC really managed to 'swing', combining the fluidity of the Meridian 200 with the ebullience of Wadia's *WT3200*.

Via the Meridian 606 DAC: without a doubt this emerged as the most full-blooded of all the Teac transports, vivid and detailed like the *P-2*, but with noticeable improvement in the weight and texture of bass notes. Above all it encouraged a very listenable and involving sound. Whether we listened to jazz, pop or classical it was never difficult to slip into the flow of music.

Only the two Meridian transports bettered it in terms of the focus and tactility of stereo images, yet the sheer weighty presence of individual instruments was impossible to ignore. A great sound but perhaps not as truthful or genuinely musical as that of either the 200 or 602.

Via the Wadia X-64.4 DAC: there was general agreement over the weighty and convincing bass offered by the *P-10* however, this result was tempered by a slight lack of instrumental separation. Complex movements suffered most while a faintly grey or wooden coloration persisted throughout our pop and jazz selections.

Conclusion

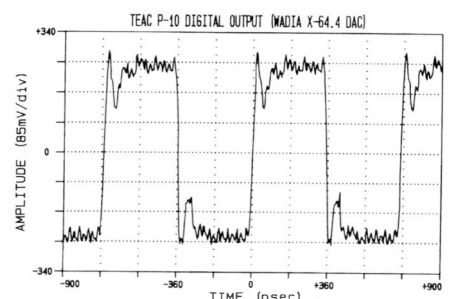
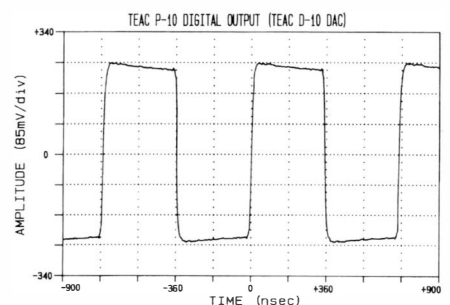
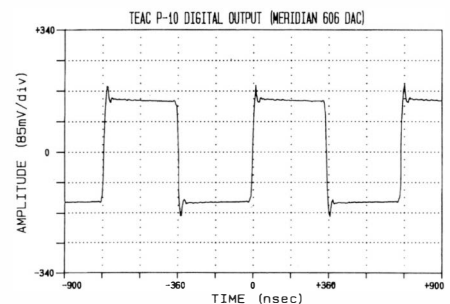
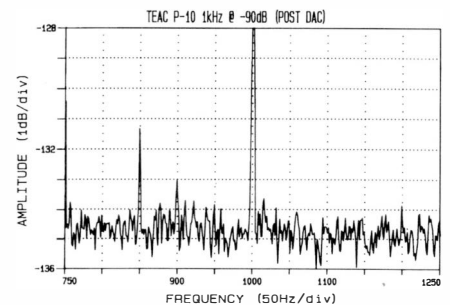
By popular consensus the *P-10* ranks as the most successful of Teac's three very

Recommended

distinctive CD transports. It certainly provides a very substantial foundation to the sound of most DACs, stranding the thinner-sounding *P-2* on a rather costly oasis. This plus an above-average optical output all adds up to a confident Recommendation.

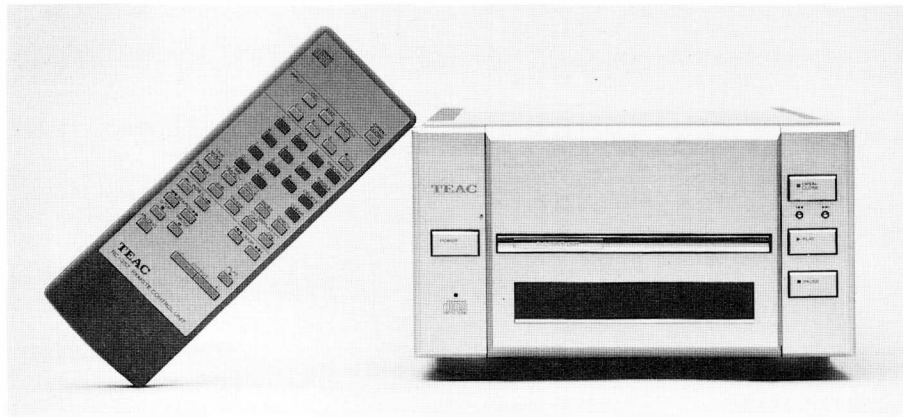
TEST RESULTS

	Teac	Meridian	Wadia
Digital output (mVp-p)	510.1	373.3	560.1
Edge rise time (nsecs)	14.55	9.98	17.55
Digital output (optical)		-15 to -21dBm	
Output impedance		73.4ohms	
Clock/repetition rate		2.8224MHz	
Clock Accuracy		68.8ppm	
Frequency error at 20kHz		-1.375Hz	
Jitter + noise at -90dB		-24.78dB	
Error correction		<1mm	
Track access (99)		2.5secs	
Typical Retail Price		£1,400	



Teac P-2

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



As the logical successor to the Teac *P-1* transport, the flagship *P-2* brings those ideals expressed in Teac's cheaper machines to a cost-no-object conclusion. The player is beautifully finished with a diecast alloy fascia and nextel-coated bodywork that matches the wafer-thin but exceedingly rigid CD drawer. Inside Teac has implemented the chunkiest version yet of its VRDS transport mechanism, complete with cast platter (better damped than in the *P-10*), supporting yoke and subchassis.

An entire PCB assembly is given over to multiply-regulated power supplies that feed the display, servo, RF amp and decoding circuits while even the mains transformer is mounted outside the main case to minimise interference. It is possible to dim the display by recourse to one of three rotary controls found on the side of the case, the other two enabling you to adjust the eject and load speed of the drawer!

The *P-2* is graced with an appropriately huge remote control though many of the extra facilities, such as input selection, muting and variable output refer to the matching *D-2* DAC and not the transport. Two optical and two coaxial digital outputs are provided, by the way.

Lab Report

Teac has employed a different coupling transformer for the *P-2*'s digital output, one that offers less LF filtering (hence the flatter waveshape) and better isolation from RF interference, but also slows the risetime from the *P-10*'s minimum of 10nsecs to some 16nsecs. Furthermore the falltime increases to 17.9nsecs via the Meridian DAC even if the overshoot and ringing is better damped.

On a more positive note, the master clock suffers an error of just 1.25ppm while Teac's robust VRDS transport mechanism helps reduce jitter to lower levels than those encountered with either the *P-500* or *P-10*.

Sound Quality

Via the Meridian's 606 DAC: here the *P-2* gave of its best with a very vivid and powerfully projected sound. Compared to the *P-10* it was slightly lean just as the richest tonal colours were lightly bleached, adding a faintly metallic hue to the naturally warm tone of vibes on our jazz selection. By contrast the solo trombone was complimented for its up-front projection, metallic grip and bite.

Other listeners pointed to some additional emphasis of natural vocal sibilance, which occasionally slurred the words themselves. So though in some respects the *P-2* actually seemed less articulate than the cheaper *P-500*, its sharper, rawer presentation was simply more interesting.

Via the Wadia *X-64.4* DAC: the panel was greeted by a very distinct sound in this instance, a sound with a definite 'character' that persisted right through the midband. This pairing was readily identified by the panel as being very similar to the *P-10/X-64.4* combination, its strange instrumental muddling and faint upper bass bloom proving to be Teac/Wadia hallmarks. Our listeners likened the effect to a 'paper-coned driver', wooden in delivery with a persistence or hanging-on of individual notes. Moderately detailed, they thought, but far from wonderful!

Via the Teac *D-10* DAC: this pairing fared least well, for though it was not aggressive, gritty or grainy, neither was it particularly clear or refreshing. The panel said it lacked sparkle and was less able to resolve subtle instrumental detail, almost as if the music were hidden behind a thin and blandish haze. Vocal sibilance was brought to the fore just as sax and harpsichord sounded unnaturally shrill.

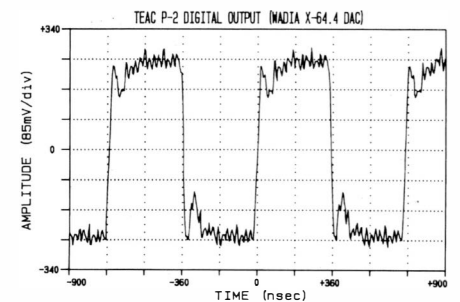
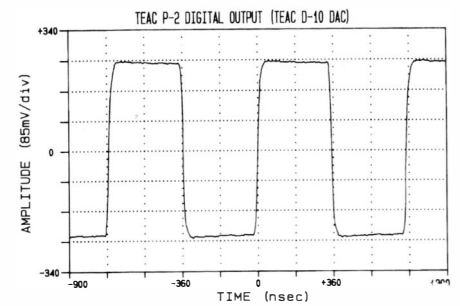
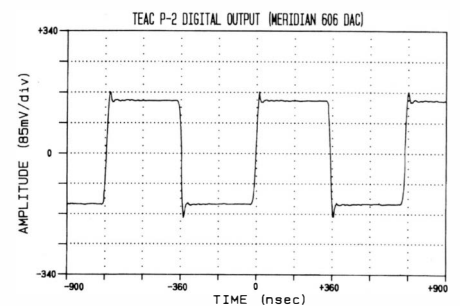
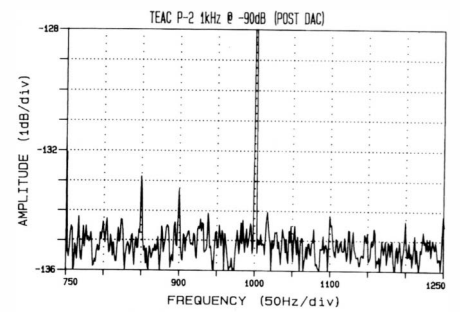
Conclusion

A masterpiece of engineering, perhaps, but the *P-2* also seems a little too complicated for its own good. Elaborating on the

P-10 is laudable enough but somewhere along the line Teac has lost sight of those special qualities that make this established transport something of a winner. By rights the *P-2* should be a bigger, bolder and generally more refined version of both *P-500* and *P-10*. In practice it's not.

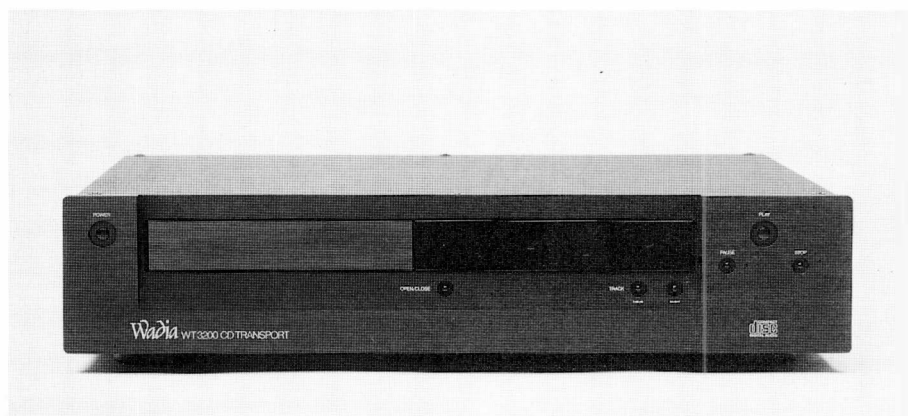
TEST RESULTS

	Teac	Meridian	Wadia
Digital output (mVp-p)	508.3	357.9	569.3
Edge rise time (nsecs)	23.9	15.97	23.95
Digital output (optical)			-15 to -21dBm
Output impedance			74ohms
Clock/repetition rate			2.8224MHz
Clock Accuracy			12.5ppm
Frequency error at 20kHz			+0.025Hz
Jitter + noise at -90dB			-25.15dB
Error correction			<2.8mm
Track access (99)			3secs
Typical Retail Price			£2,750



Wadia WT3200

ACOUSTIC ENERGY LTD, 3A ALEXANDRIA ROAD, EALING,
LONDON W13 0NP. TEL: (081) 840 6305



Take a standard Marantz *CD-95*, tear off its champagne gold fascia, remove the FTS program facility and immerse the copper-plated frame in a massive aluminium chassis and - broadly speaking - you've got yourself a Wadia *WT3200*. Of course the unit certainly looks different enough with its fingertip track access, play, pause and stop buttons plus an orange filter window to disguise the fluorescent display. A 'Marantz' remote control gives the game away, however.

Inside you'll find the same PCBs, servo and decoding electronics used by Marantz, though there's extra logic circuitry to cope with the soft-touch on/off facility and a larger toroidal mains transformer for good measure. Wadia's distributors make play of the fact that the *WT3200* uses a glass-lensed laser, but then so do all machines that are equipped with Philips' *CDM1* mechanism...

Minute ferrite beads are used to tame RF noise on the *SAA7220*'s supply line, though crucial differences exist after this digital IC where Wadia have eschewed Marantz's coupling transformers for an active *74H244N* line driver. Buffering the digital output in this way provides no rejection of earth-borne noise, but it will improve the rise time of digital signals - a worthwhile trade-off in my opinion.

Lab Report

Wadia's mods are subtle, yet have a significant effect on its technical performance - witness the improvement in rise time (4nsecs) and edge definition over the *CD-95* for example. There is some 21 per cent overshoot via the Meridian DAC but, interestingly enough, the 12nsec risetime into Wadia's own *64.4* DAC is matched only by the other Wadia transport! Just as important is the -90dB/1kHz spectrum, which reveals a remarkably low level of jitter contaminating the *WT3200*'s digital output. Once again, compare this with Marantz' *CD-95*.

Sound Quality

Via the Wadia *X64.4* DAC: as if on cue, the Wadia transport emerged with a fuller, more extended and marginally more detailed sound than that obtained with the *CD-95*. Bass was just as well controlled but it was deeper too, the overall presentation seeming all the more dynamic and lively, perhaps as a consequence of its wider bandwidth. The natural sibilance of our pop selection was also handled in a most sympathetic fashion, so much so that vocals were not precisely etched in definition but seemed all the more fluid and natural rather than mechanical in delivery.

The standard Toslink optical connection sounded grainier but once again also less vivid, adding a strangely hollow coloration to the music's natural acoustic. Oddly enough Wadia's AT&T optical link also tended to compress perspectives within the soundstage, leading to a loss of immediacy and clarity in the view of our panel.

Via the Teac *D-10* DAC: confident and clear in projection, this transport extracted a wider range of tonal colours across a broader soundstage than most were capable of when partnered with the *D-10*. Strings and sax alike were sharply focussed, pointedly detailed and free of scratchy or aggressive colorations.

Via the Meridian *606* DAC: Wadia's transport bombed out with this DAC (see overall conclusions) for though the immediate reaction was very enthusiastic, our panel soon became jaded with the brightly lit and sharply etched sound. The listeners all felt that its decidedly 'hi-fi' sound might prove impressive in a shop dem, but was unlikely to reward the purchaser with much long term comfort.

Conclusion

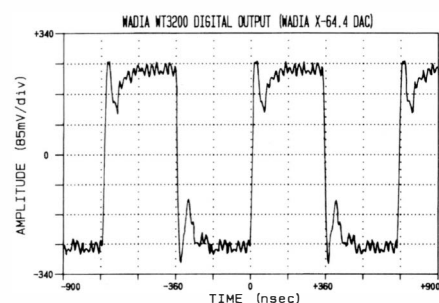
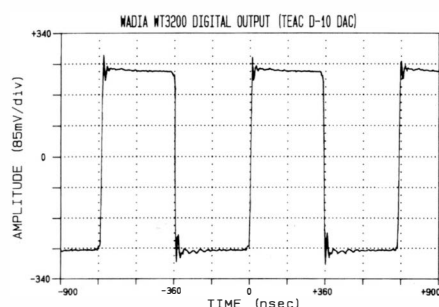
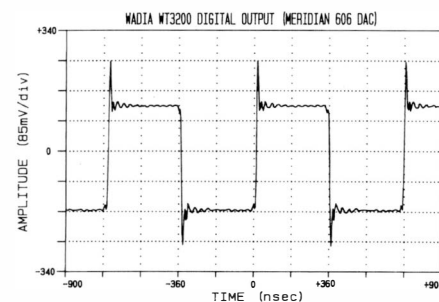
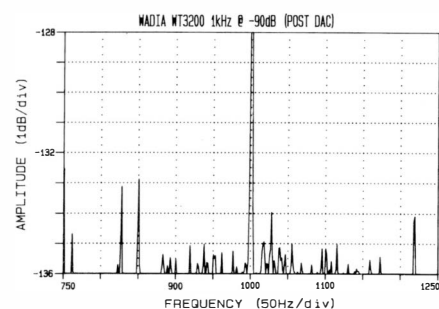
This modified Marantz transport ranks as our most expensive Recommendation. It is technically superior to the *WT2000* in

Recommended

some regards, and while teaming-up with Wadia's own DAC it yields a superbly open, fresh and dynamic sound. If you've taken to the sound of a Wadia DAC then the *WT3200* is an essential partner.

TEST RESULTS

	Teac	Meridian	Wadia
Digital output (mVp-p)	602.3	517.8	576.6
Edge rise time (nsecs)	4.02	3.99	12.01
Digital output (optical)		-15 to -21dBm	
Output impedance		73ohms	
Clock/repetition rate		2.8224MHz	
Clock Accuracy		40ppm	
Frequency error at 20kHz		-0.80Hz	
Jitter + noise at -90dB		-26.06dB	
Error correction		<3.8mm	
Track access (99)		4.5secs	
Typical Retail Price		£1,995	



Wadia WT2000

ACOUSTIC ENERGY LTD, 3A ALEXANDRIA ROAD, EALING,
LONDON W13 0NP. TEL: (081) 840 6305



Just as the WT3200 bears close ties with the CD-95, so too does the costly WT2000 have a Japanese heritage. In fact it's based on the Teac P-2 with extra alloy cladding to beef up the appearance and structural integrity of the machine. But look underneath the black alloy top-plate and you'll find the same VRDS transport assembly, linear-tracking laser, servo, display and decoding electronics as the P-2.

Wadia has eschewed Teac's bolt-on mains transformer in favour of an out-board unit all its own. This black box houses two toroidal mains transformers that are connected to the main transport via a thick umbilical, though once inside the cabling is routed to the same power supply regulation PCB as that found in the P-2.

As with the WT3200, the principal refinement appears to have been in the replacement of Teac's miniature transformers with an active 74HC244N line buffer to drive the digital output. This has been connected to a pucker 75ohm BNC rather than a phono socket, while both standard Toslink and Wadia-compatible AT&T optical output options are also offered. You can still dim the display and adjust the eject/load speed, but Wadia has moved these trim pots from the side to the rear of the transport.

Lab Report

Once again the differences between the P-2 and Wadia WT2000 are largely attributable to their active line buffer, speeding up risetimes to a fabulous 3.6nsecs (6.7 times faster than the P-2) while enhancing the very flat waveshape. RF interference is extremely low but, like the WT3200, the transport overshoots (30 per cent) when mis-terminated by the 606 DAC.

More important, it offers the fastest edge risetime into its own (Wadia) DAC while benefiting from a zero ppm clock error! Jitter is exceedingly low too, second only to the WT3200.

Sound Quality

Via the Wadia X64.4 DAC: this pairing proved to be the best of the lot in the opinion of our listeners who were impressed not only with its full and dynamic bass but by the overall 'clout' of the music. It succeeded in avoiding the midband coloration that had persisted with both the P-10 and P-2 transports and afforded a very balanced, transparent and communicative view of events as a result.

After a longer period of listening, the panel thought the WT2000 lacked the full fluidity and natural treble that so distinguished the WT3200, yet it won through with its commandingly solid, gripping and convincing portrayal of the pop and rock tracks. Remarkable as it might seem, both the WT3200 and WT2000 were identified from our random pack of ten as the two undisputed front-runners - quite the opposite result to that obtained when the 606 DAC was pressed into service!

Via the Teac D-10 DAC: better controlled and more coherent than Meridian's 200, the WT2000 also handled vocal sibilance in a very natural and unfatiguing way. It was criticised for a slightly restricted bandwidth and a certain slowness, which contrasted with the exciting, dynamic quality encouraged by both the 200 and WT3200.

Neither was the bass as full or robust as that offered by the P-10, but the very wide soundstaging provided plenty of room for percussion and harpsichord which did not leap out in obvious relief but seemed exquisitely detailed in a way utterly superior to the Teac P-2.

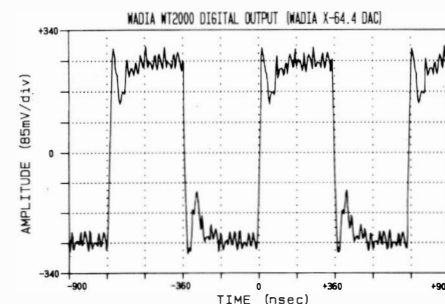
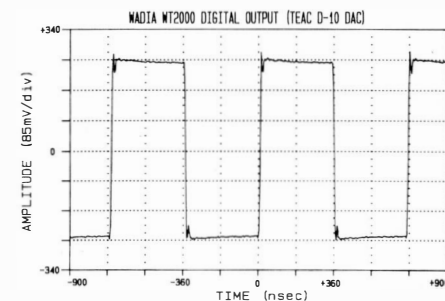
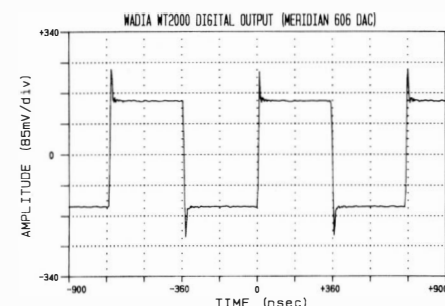
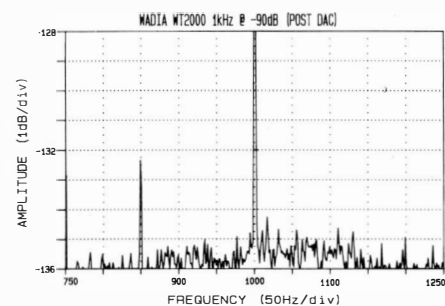
Via the Meridian 606 DAC: this proved an unfortunate and disappointing combination, for though everything was broadly in order the overall sound did little to fire the enthusiasm of our listeners. Dynamics were slightly muted and the soundstage oddly 'shut-down' leading to a very matter-of-fact and inoffensive presentation which lacked stimulation.

Conclusion

Wadia has successfully adapted the output of the Teac P-2 transport to suit its own DAC system, but I cannot understand nor justify the huge difference in price between the two players.

TEST RESULTS

	Teac	Meridian	Wadia
Digital output (mVp-p)	546.1	475.5	592.1
Edge rise time (nsecs)	3.55	3.95	12.0
Digital output (optical)		-15 to -21dBm	
Output impedance		75.2ohms	
Clock/repetition rate		2.8224MHz	
Clock Accuracy		0ppm	
Frequency error at 20kHz		0.00Hz	
Jitter + noise at -90dB		-25.58dB	
Error correction		<2.8mm	
Track access (99)		2.2secs	
Typical Retail Price		£5,495	



Tech Talk

Paul Miller looks at the complex task assigned to a CD drive, and details the lab tests that were used in our reviews.

As we mentioned in the introduction, the output from a CD drive is simply a string of ones and zeros, be it transmitted by means of the coaxial or optical output. Both outputs provide access to a serial datastream often referred to as S/PDIF which is transmitted in blocks comprising 384 32-bit words. Each of these digital words starts with a sync sequence which identifies either the start of a new 384-word block or whether the word contains left or right channel information. The remainder of the 32-bits are occupied by the audio samples plus subcode, error and parity bits.

All this is transmitted in serial form at 2.8224Mbits/sec using a pair of transitions to represent a logic 'one' and a single transition to represent a logic 'zero'. A transition occurs when the signal 'edge' passes through its zero-crossing point - simple huh? Three oscillograms accompany each review showing the digital output terminated by each of the test DACs. The vertical parts of the waveform are the edges that determine the point of the transition.

What else? Well because these signals are firmly in the RF (Radio Frequency) spectrum the impedance of the transmitter, connecting cable and receiver (in the DAC) must be matched for the signal to be transferred with maximum efficiency. IEC958 states that the domestic digital output should adopt a 75ohms characteristic impedance with an output of 500mV (0.5V). This is the reason why any old audio interconnect will not suffice for duty between a transport and DAC. You must use a high quality shielded 75ohms coax like a decent FM radio downlead for instance.

All the transports in this test offer a fairly consistent 75ohm output, though the level of the signal varies from 480mV (Philips CDD882) to 720mV (Marantz CD-95DR).

If you were not to use a pucker 75ohms cable or the input impedance of the DAC were not 75ohms then a mismatch would occur. This is just one reason why the oscillograms of the same digital output look so different when terminated by each of the three DACs.

For example, if the transport 'sees' half this impedance then only 50 per cent of the signal level is received and the other 50 per cent is reflected, setting up standing waves within the cable. Depending upon the propagation delay within the cable a fundamental resonance is set up, increasing the level of background RF noise and compromising the definition of these vital signal edges. Reflected pulses that are coincident with a primary signal edge will also interfere with the exact timing of the transition.

The jitter bug

Reflected edges, RF noise and slow edge risetimes all lead to one thing - jitter. You've probably bumped into this term before, after all it's used often enough, even if it's rarely explained. Simply put jitter is an uncertainty in the exact position of the signal edge, an uncertainty that varies the interval or timing between one edge and another. It's rather like the signal edge shifting in and out of focus, making it difficult for the receiver's comparator, for instance, to decide the exact position and timing of that digital 'one' or 'zero'.

Yet jitter can occur at any stage from the CD's laser pick-up to the moment it reaches the D/A convertor. And even if the datastream is initially free of jitter, a similar uncertainty or 'fuzziness' in the edges of the crystal clock can introduce jitter by the back door. If the edges are still compromised by jitter by the time they reach the DAC, then distortion will result.

Both frequency and amplitude modulation of the music signal will occur, producing distortion either side of the desired signal that is both audible and taxing. If the edges were jittered by 150Hz, for example, then a D/A converted signal would be joined by a succession of 150Hz sidebands.

But jitter is rarely discrete, more often it's random and noise-like in character so the AM and FM sidebands crop up as an increase in the noise - the skirt if you like - that accompanies the reproduced music signal. Dynamic changes in the noise floor like this are particularly insidious because they affect the way we perceive differences in both loudness and timbre between different sounds.

Dithering about

This is the reasoning behind the detailed spectrum that accompanies each transport review. Here I've taken a dithered -90dB 1kHz signal from each transport and then converted it back into 'analogue' via a DAC that's moderately susceptible to jitter.

What you should see is a sharp 1kHz peak and no noise whatsoever, so the higher the noise and the more digital 'spikes' are visible the higher is the level of jitter. The scaling is highly magnified though, so we're only looking 250Hz either side of the 1kHz peak at just 1dB/div on the amplitude scale. The top of the peak, if we could see it, would stretch to -90dB or about five times higher than the top of the plot.

The peak should also be as thin and sharp as possible, any broadening indicates a near-DC jitter caused, in this instance, by drift in the transport's clock. Just compare the Kenwood with the Marantz transport, even the Philips' peak is much finer despite its broad-band jitter being as bad as Kenwood's.

And then look at the two Wadia plots. Obviously they're suffering less jitter than any other design, but then both the WT3200 and WT2000 are based on existing transports.

The heart of the machine

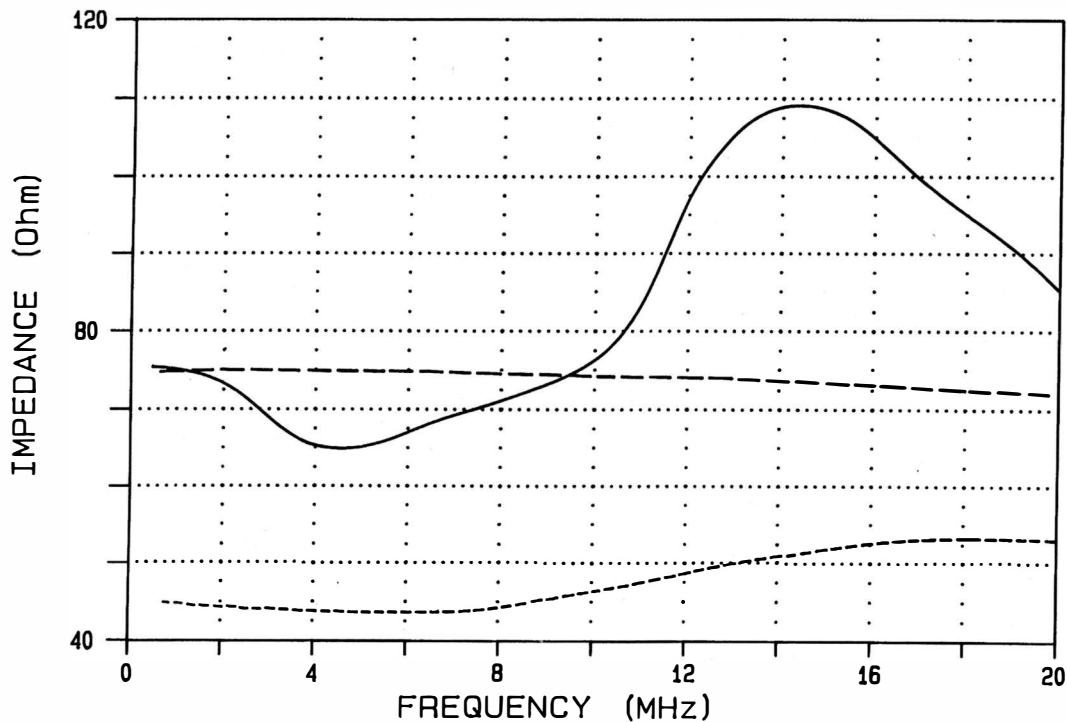
Wadia's improvements fall into several categories, the first being its use of a heavy alloy case to shield the internal electronics from interference. Any change in the digital 'environment' will also be reflected in the pattern of jitter, simply moving the digital interconnect cable across the transport's case can influence jitter, believe it or not. It's no coincidence that cables linked to Kenwood's player are far more susceptible than those used with Wadia's for example.

Isolating the mains transformers will also change the electronic environment and so - in this case - reduce 50Hz-related jitter. More important though, is Wadia's decision to drive its digital output via an active buffer rather than through an isolating transformer like everyone else. Could these mini-transformers turn out to be a primary source of jitter?

Furthermore, some DAC's are more adept at re-clocking jittered data, just as some are more sensitive to the percolation of RF noise. Remember, RF noise will not only exacerbate jitter but will also cause RF intermodulation in the analogue stages that follow the DAC.

Wadia's X-64.4 DAC generates very high levels of RF interference all of its own (this is a very 'busy' processor) so it seems reasonable to suspect that a little extra RF from the transport won't make an awful lot of difference. Other DAC's, like the Meridian 606, are far more sensitive to RF noise (hence the superb result with its own very quiet 602 transport). By

Impedance vs Frequency for Meridian, Teac and Wadia DACs



contrast the X-64.4 is most dependent on the exact definition and risetime of the signal edges. And the fastest risetimes were achieved by both the Wadia transports . . .

All is revealed

So, the argument that any one of these DACs is simply more 'revealing' than its competitors is so much baloney. I'll leave that facile cop-out to the high-end subjectivists because life and digital communication are just not that simple. You see, regardless of the oversampling and D/A technology employed, each of our test DACs terminate the transports' digital output with a unique characteristic impedance.

As we've discussed, any mis-termination at the input can only exacerbate jitter through reflection, piling up problems before the data ever reaches the DAC itself. Whether that DAC happens to adopt a bitstream or multi-bit topology is neither here nor there as far as the digital input and data acquisition stages are concerned.

Only the Teac D-10 utilises what might broadly be termed a passive 75ohms input, maintaining a constant impedance characteristic

across a wide signal bandwidth. Here at least it is possible to match transport, cable and DAC to minimise data reflections, RF interference and jitter. What happens afterwards is very much up to the D-10!

This is clear enough on the graph on this page which compares the input impedance trend for all three of our test DACs. The near textbook 75ohms character of the D-10 is represented by the long dashes. By contrast the Meridian 606 (short dashes) and Wadia X-64.4 (solid) both employ active termination in an effort to improve risetimes and thereby seek to reduce jitter. Still, while accelerating the transition risetime might seem a bright idea, it's also very difficult to maintain an even impedance trend using hex-invertors and the like.

Mix and mismatch

A mismatched termination, while ostensibly faster, is also noisier and this increase in RF can, in turn, actually degrade jitter performance! It's a juggling act and, on the basis of these results, one that's more successful with some DAC/transport combinations than others.

Just take a look at the

impedance plot for Meridian's 606 (short dashes). At 600mV the input diodes are driven into clipping and the impedance falls from 75ohms (<300mV) to 44ohms. Hence the lower voltage measured for each transport as 'received' by the 606. Now Meridian is justified in specifying a 75ohms input impedance at 300mV because this is close to the real zero-cross point where the comparator 'looks' for any signal transition or edge.

Nevertheless, with 75ohms digital outputs far exceeding this voltage the edge 'sees' a rising impedance trend (44-53ohms), actively accelerating the risetime but also causing ringing. Any transport with a naturally fast risetime (like the Wadia's) will stimulate this ringing more readily. Overshoot and ringing will not cause jitter directly, I should add, but will bump up the background RF noise. And any increase here will perpetuate jitter further down the line while also causing RF IMD in the analogue stages.

By the same token, Wadia's variable impedance trend (solid line) stimulates a variety of indistinguishable resonances that are visible on the waveshape of every transport. It's rather like a

Wadia fingerprint, permanently stamped on the datastream emerging from all unsuspecting transports. Still, you can bet it's no coincidence that Wadia's transports are the only ones to squeeze a decent risetime out of the receiver. Is this the reason why the company has abandoned a transformer-coupled digital output in favour of one driven by an active buffer?

Matching the impedance

Nevertheless, by tailoring the digital drive to suit its own DAC, Wadia has simultaneously reduced its compatibility to cope with 'difficult' receivers like the Meridian 203 or 606. This certainly ties in with the impression gained throughout our extensive listening tests, suggesting that future surveys on DACs should take a close look at their input impedance trend. In that way we might have a fighting chance of picking a clutch of sympathetic CD transport/DAC combinations.

Someone ought to re-write the digital textbooks for it seems the 'one's and 'zero's are more fickle than we ever imagined!

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Conclusions, Best Buys and Recommendations

Paul Miller reports back from the group listening tests to tell which CD drives were the pick of the crop.

The sub-£1,000 category proved to be a very mixed bunch with Kenwood's *DP-X9010* turning out to be the least successful of all. It was just about the only transport to improve via the optical link, if only because this ameliorated the tiring and rough sound that plagued its coaxial output. Technical bugbears like the poor Class 2 clock accuracy, moderate jitter level and susceptibility to RF interference should have been addressed two years ago.

Then there's Philips' longstanding *CDD882* which is little more than a cannibalised *CD880* CD player. It would be very simple for Philips to tidy up the internal routing of the transport and perhaps cut down on interference as a result, yet even in this form the unit still proved a favourite with Meridian's *606* DAC. It seems to imply a slightly bright and enthusiastic sound that teams up nicely with richer-sounding DACs like the *606*, *203* and Arcam's *BB3* for example.

By contrast Teac's *P-500* provides an altogether more sober view of events, with a cautious rather than libertarian attitude to powerful bass and treble notes. The stunning aesthetics of the player are certainly no foretaste of the mild and inoffensive sound that is to follow, but its broad compatibility is excuse enough for Recommendation. Meridian's little *200* transport is no less compatible yet offers a genuine Class 1 digital output that partners Meridian and Teac DACs to yield sparkling results.

This encouraging outcome also holds true with other DACs like the *203*, Deltac *Little Bit* (optical) and Arcam *Black Boxes*, implying that the *200* should be generally successful with most like-priced products on the market. Either way it imparts a very fresh and open quality

to the basic 'sound' of the DAC, separating out subtle treble detail without introducing a hint of brightness. For some reason, however, the *200* mutes the audio output when used in fast search mode - a quirk that makes cueing all the more difficult.

Over the k

Between £1,000-£2,000 we had four more transports, including the *200*'s costlier brother. Meridian's *602* looks and feels like a classier version of the *200* though the range of controls available on the unit is strictly limited. For greater flexibility you'll need the *209* remote control.

Nevertheless the *602* seems ideally suited to partner the *606* DAC. It enjoys faster, cleaner digital 'edges' than the *200* while reducing RF interference to an absolute minimum. The sound of the *602/606* combination is equally luxurious, its near-holographic soundstaging textured with exquisite detail that'll have you enthralled for hour upon hour. For me this was the most captivating combination of the test, so its less impressive showing with either the Teac or Wadia DACs must be viewed with some disappointment.

Hooked into its own *D-10* DAC, Teac's *P-10* transport lived up to expectations with a particularly robust and involving sound, qualities of strength and solidity that were not lost on Meridian's *606* but that became thoroughly befuddled when paired with the *X-64.4*. Past experience with Deltac, Arcam, Meridian *203* and Kelvin DACs suggest that the first result is the more representative.

It certainly seems as if the *P-10* is the star player of Teac's range, for the *P-2* sounds rather weak and

insipid by comparison. A firm thumbs up from the listening panel, but Teac should select the clock crystal with a little more care.

Wadia's *WT3200* also inspired praise from our panel, for despite it relying very heavily on the *CD-95* it clearly surpasses the efforts of the basic Marantz design. The *CD-95DR* is certainly happier driving Meridian's *606* DAC but then the faster risetime of the *WT3200* works against it in this instance.

With our other DACs - and especially the *X-64.4* - Wadia's transport seemed livelier, detailed and more communicative on a musical level than the basic *CD-95DR*, properties that seem directly attributable to Wadia's use

of an active line buffer instead of a transformer to isolate the digital output. After all, it had the lowest recorded jitter of any transport in the survey.

This active line buffer is also built into the *WT2000*, Wadia's costliest transport. In this case it has employed Teac to modify the established *P-2* system, cladding the skeletal casework with slabs of black alloy and deploying two mains transformers in an outboard enclosure. Still, Wadia does not appear to have tampered with Teac's inverted platter, yoke, motor assembly or subchassis suspension beyond using a darker nextel for the CD tray. Teac's original power supply regulation, digital electronics and facilities also remain intact.

However, in both the *WT3200* and *WT2000* Wadia have supplemented the standard Toslink port with an SMC-connected AT&T optical output that is compatible with Wadia's various DACs. This output is rated at 50MBd/sec as opposed to the 6MBd/sec of the Toslink, an improvement that does not alter the rate of the datastream but simply speeds up the digital 'edges'. A finer glass-cored fibre also permits longer cable runs. Neverthe-



less, in the communications field this is still a low-cost optical link which could be cheaply improved by upgrading to 100MBd/sec devices terminated with screw-fitting SMA rather than Wadia's bayonet SMC-connections.

This brings me onto the final topic of cost. Our panel certainly seemed to think that the *WT3200* was worth the extra £500 over and above the Marantz *CD-95*. However I find it impossible to justify the difference in price between the *P-2* and *WT2000* in material terms.

There is no argument that the *WT2000* is better, but the premium is outrageous in my view. In which case you'd be much better off spending £3,500 on some new CD's and plumping for the *WT3200* instead!

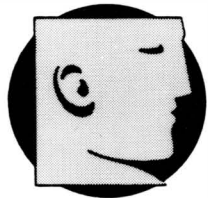
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Quite a solid case could be made for running this review along with CD midi systems, though it doesn't fulfil all the qualifications of a true midi. For one thing, it sounds rather decent (I'm joking, before the letters start pouring in), but the real reason is that the components are not midi in width and in any case there aren't enough of them. In the form in which it is usually offered, this system omits a tuner and cassette deck, though either or both can of course, be added.

Sansui's *The System* (why has it taken until 1991 for someone to use this as a product name?) is the result of an unlikely marriage of unequals between Mission Electronics, erstwhile British independent specialist manufacturer, and Sansui Electric, Mission's new parent company, and itself a one-time Japanese independent specialist manufacturer which quite recently became part of the Polly Peck group. *The System* is a one-box complete package whose main constituent parts are a Sansui CD player and amplifier and Mission made loudspeakers. Certain extras are also supplied, and will be discussed shortly,

The Byzantine politics of the Sansui Mission group could help explain *The System*, especially if our world view is suitably cynical. What better way is there

to dispose of a warehouse full of unwanted Sansui gear than linking it to a desirable loudspeaker design (the ones included here are *Choice Best Buy* awardees, no less) from another company and calling the result a system? There is another view though, more or less diametrically opposed to the above, which suggests that the Sansui system is a good example of synergy in action, and that cherrypicking from two ranges of equipment has given the company an unrivalled opportunity to produce a greater system than would have been possible by picking from either range alone.

The system comes packaged in one simple box, and with one important exception, which I'll come to shortly, is supplied complete. In addition to the main hi-fi components, you get two appropriately fused mains plugs, a screwdriver for the use thereof, two five meter lengths of unterminated stranded loudspeaker cable (Mission branded), an instructional video cassette and a demonstration disc. Clearly the *Sansui System* is aimed at the first time non-specialist buyer, and it was tested with this in mind, I gave the whole system to an eleven year old going on three-and-a-half and told him to get on with it. He had no

previous experience wiring any kind of system.

I have one criticism of the way the system is presented. It's all very well supplying mains plugs, a screwdriver and videotaped instructions about how to use them, but I can think of no adequate excuse for not supplying equipment with plugs prefitted, especially with equipment explicitly aimed at the first time buyer. Of course I accept, though not as an excuse, that Mission is in good company and even supplying loose plugs is more than other hi-fi manufacturers manage.

Of course mains wiring was not a job for the tame 11 year old, however old, and I handled this part of the job in my usual way, by using a Safebloc which saves wiring plugs which I would otherwise be doing at a rate of up to several a day. Everything else was done correctly first time through, and this goes a long to vindicating what Mission set out to achieve.

Sansui CD-X111 Compact Disc Player

Roll together every mainstream commercial CD player there is or ever has been, and you have yourself a *CD-X111*, at least to look at. Built around a standard-looking MASH low bit convertor, the



Sansui's exterior layout is completely practical, utterly sensible - yet singularly uninspired. It is however, decently finished and unfussy in a way that demands little familiarisation of the kind provided by the instruction booklet.

The display is a simple, orange-on-black panel limited mainly to time and track number readouts. The drawer mechanism is slow to the point where the laser carriage gets out of the way, and extremely rapid from then on, though it slams rather hard into its buffers at the limits of its travel.

The usual facilities are offered, including a well engineered audible cueing feature. Up to 16 tracks can be memorised for programme play, and a number of repeat modes are available. Synchronised recording is possible using a Sansui brand cassette deck. A thin stick type remote control handset is supplied with this component, but this is the only part of the Sansui system so equipped. There is no headphone socket, but the amplifier makes up for this omission. Which brings us to . . .

Sansui AU-X111 Amplifier

In common with the partnering CD player, this is an utterly conventional though thoroughly modern amp. It has three line inputs, a moving magnet phono input and two tape circuits. The last will be welcomed by many, not least for the opportunity it provides to patch a video recorder into the hi-fi system, or even a DAT or DCC recorder in times to come.

Controls provided by Sansui include independent switching for two pairs of loudspeakers, bass and treble and a loudness switch. Also provided is a CD Direct switch which bypasses the tone and loudness controls and even the input selector switchbank. A comparable facility for all the inputs would have been welcome: I see no special reason to single out the CD player for this very worthwhile

attention. Eliminating the loudspeaker switching would have helped too, albeit at the cost of a loss of versatility. Finally, the loudspeaker terminals are cheap and nasty spring terminals - which brings us to . . .

Mission 760 Loudspeakers

Equipped like the amplifier with spring terminals, the 760 is a compact design of surprising capabilities and impressive engineering.

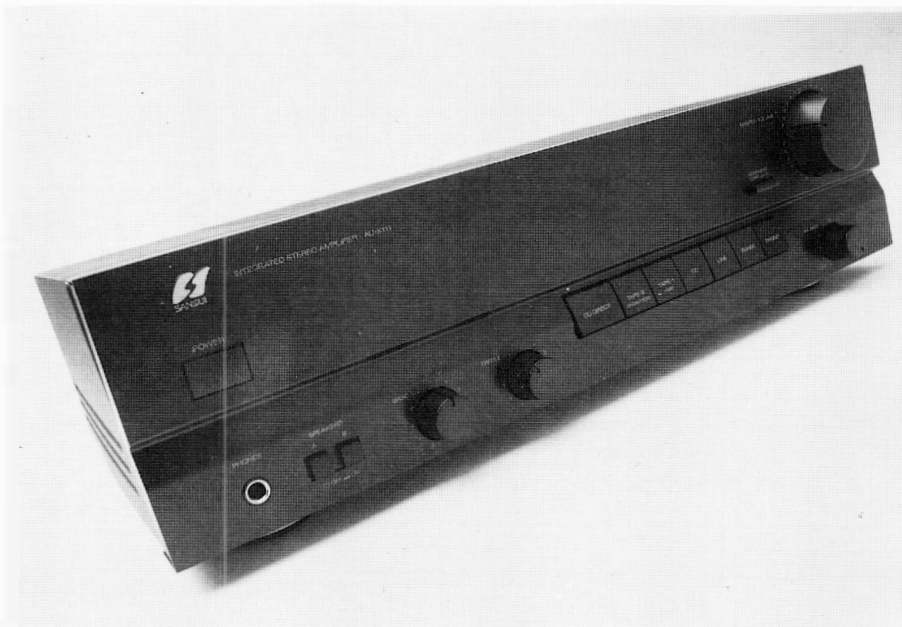
The baffle is an injection moulded mineral loaded polypropylene item, ribbed for reinforcement and open box shaped to fit inside the thin-wall wood carcass that forms the sides and rear. A reflex port is incorporated into the moulding. There is some mutual reinforcement when the wood and plastic components overlap, and the baffle cover is shaped to continue the lines defined by the wood carcass, minimising diffraction and improving aesthetics. In short, the 760 is an object lesson in cost effective

build techniques which is particularly well adapted for its role as a low cost, high volume model. The drive units are conventional, and include a soft dome tweeter which is rolled into circuit unusually late, around 5kHz, which means most of what you're hearing comes from the bass/midrange driver. This in turn helps explain the unusual homogeneity of the design, though the high crossover point exacts a toll in occasionally obvious phasiness or at least obviousness in the treble region.

The 760 is designed to be used inverted, that is with the bass driver above the tweeter, and on stands (not supplied here) or solid shelves with a wall close behind. It is important to set the height (if possible) and the toe-in angle of the speakers with some care, since they have quite a strong influence on sound quality. Sensitivity is fairly high, making the most of the Sansui AU-X111's substantial real life power output to produce quite high maximum volume levels. Which brings us to another topic, to wit . . .

Sound Quality

As a reference point for further comparisons, I started by comparing the Sansui CD player plus the early stages of the partnering amplifier (auditioning in this case via Sennheiser HD580 Ovation headphones), to a Philips CD850 which was auditioned via its on-board headphone socket, and also via a Marantz PM-40SE amplifier. In either case the comparison was short and utterly conclusive: the Philips left the Sansui sounding coarse, rather shallow and coloured and lacking in airiness in the midband and through the treble. To add



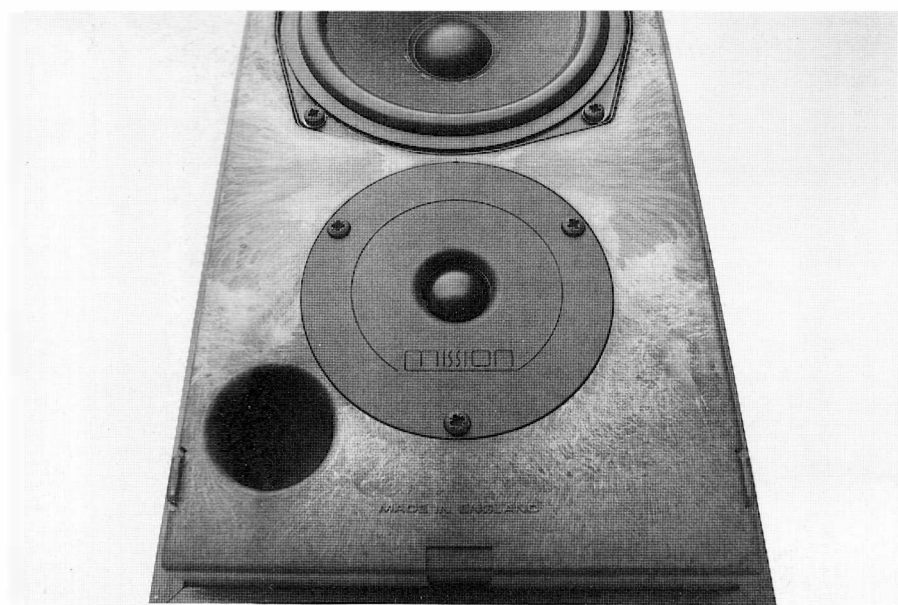
insult to injury, this was first made apparent using the excellent demo disc supplied with the Sansui system. The Philips was a little more distant sounding and relaxed in presentation, but it also felt clearer and more organic, and it was much sweeter in the best sense, lacking the residual hardness and rather transitory mid/top of the Sansui. To use a well known cricketing analogy, it was game, set and match to the Philips.

Blame for these findings is shared by the two Sansui items, though in the final analysis the CD player turns out to be somewhat more culpable than the amplifier. The *CD-X111* falls into the wide middle ground of commercial mediocrity inhabited by vast swarms of budget and middle price players from major electronics companies. But this is a points loss, and there are compensations when the two components are used with the Mission loudspeakers.

The *760s* really come into their own in this system. Whilst it is less than the most refined amplifier in its class, The Sansui *AU-X111* is at least powerful and dynamic, and the Mission is a real rocker, with high inherent sensitivity and a surprising ability to handle power without audible stress or compression (the usual get out clauses of small loudspeakers). The *760* is dominated to an extent by the midband giving the system an upfront tangibility missing from many of its peers, and minimising the rather wooden quality of the electronics when considered in isolation.

The Mission itself is not exactly an object lesson in refinement. It has a somewhat ragged top end by the best standards. Comparisons with the only slightly more expensive Wharfedale *Diamond 4* and Celestion *3* are instructive. Both are fitted with proprietary metal domes of real quality, but the Mission treble can claim to be superior to most other metal domes, and better also than most soft dome units in this price area. Meanwhile, the Mission bass is gratifyingly meaty and extended, even taking the effects of wall reinforcement into account.

Overall the system sounds somewhat lean, as would be expected when using any loudspeaker this small, but the *760* still more than qualifies as a match for much larger loudspeakers. Most of all, however, the *760* is detailed, lively and engaging, and genuinely hard to faze with difficult material. Female voice (eg Mary Black) sounded sweet and pure, orchestral strings had ebullience and sheen, whilst large scale recordings set up a large scale and solid sounding image from



appropriately positioned loudspeakers.

The idea of appropriate positioning begs certain questions. The *760* is billed as a boundary design and is shown in the accompanying video positioned on what look like bookshelves. The trouble with loudspeaker stands that look like bookshelves is that such shelves invariably colour the sound. The fact that no dedicated stands were included in the package is mute encouragement not to bother, especially in a system which purports to be (and in other respects certainly is) complete to the last nut. Be warned then that although the Missions will perform on shelves, they are transformed by stand mounting, and also by being a few inches clear of rear walls.

I took the opportunity before wrapping up this test to use the Sansui system with a turntable, namely the Thorens *TD280* employed in another system in this test. This produced some tantalisingly lifelike noises, but the amplifier sounded slow and flat via the phono input, and much better results can be obtained from records using an amp with a more sympathetically designed phono input. Of course, the fact that the amplifier's CD Direct switch is inoperative with the phono input doesn't exactly help, and it's hard to avoid pointing out that Sansui Mission's alternative budget amplifier, the Mission *Cyrus One*, just happens to have a simple but excellent phono input, as well as being rather tasty in other directions too.

Conclusion

This system is carefully tailored to sell component high fidelity to the kind of buyer who lacks the confidence to buy from multiple sources, and who would normally end up with a multisource midi system of indifferent quality. As such, it is a very considerable success, and the fact that many readers of this magazine don't fall into this beginner category doesn't make this any less true.

There are serious criticisms to be made of this system, however. In particular, the Mission Cyrus group has missed a trick by supplying the Sansui *AU-X111* amplifier instead of the much superior Mission *Cyrus One*, though lack of visual unity might have been a criterion.

The *AU-X111* may not be the finest way of driving Mission's immaculately conceived miniature, the *760*, but the two exploit each others strengths well, and the effect is to minimise shortcomings in both units. Taken together, the system communicates music in a lively and entertaining fashion, and allows flashes of insight into densely scored passages that eludes some more costly systems of good repute. All in all then, good value, and a sensible first step into the hi-fi jungle.

As a postscript, I feel a special affection for any manufacturer that supplies a demo disc (a compilation of tracks from two Mary Black albums) that is not only well recorded, but is also worth listening to as music. No other manufacturer in this test showed the same sensitivity or good taste.

GENERAL DATA

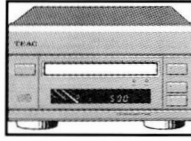
Typical Retail Price
Sansui: The System £379.90 complete with cables, plugs, instructional video etc.

Compact Disc Player
Remote control yes
Headphone socket no
Digital output no
Dimensions 43x9.4x28.6 (wxhxd)cm

Amplifier
Power output 30watts/channel
MC cartridge compatible no
No of inputs (ex tape) 4
No of tape circuits 2
Dimensions 43x12.6x28.6 (wxhxd)cm

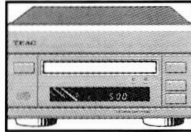
Loudspeakers
Type bass reflex loaded, 2-way inverted
Recommended placement near wall
Impedance 6ohms
Sensitivity 89dB
Power handling 75 watts (approx)
Dimensions 29.5x18x20 (wxhxd)cm

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THORENS TURNTABLE, DENON AMPLIFIER, JPW LOUDSPEAKERS



Pricewise, this package is not far removed from the Sansui system known as *The System*, but there are major differences on two counts. First, one is CD based, the other - this one - plays records. The other is the way in which they're supplied. In the case of the Sansui you go to any Sansui dealer, buy a single box which contains everything you need down to the screwdriver for fitting the plugs and an instructional videotape which covers setting up in simple steps. On the other hand, our Thorens/Denon/JPW based record playing system comes from as many sources as there are components, and all accessories are purchased separately (unless your dealer takes pity on you - try wearing shoes with holes when you buy). In common with all the other systems in this product but in contrast to the Sansui, you are thrown back onto your own resources, or rather yours and those of the supplying dealer. Unless you know what you're doing then, you should choose your dealer with as much care as you would expect to lavish on the equipment itself

The subtext to this review, however, is the fact that this system plays records, whilst the Sansui plays CDs. There is an obvious interest not just in which system sounds better, but also which is the better

sounding medium, records or CD. Of course this topic has been the subject of constant review since Compact Disc was first mooted, and in practice may be rendered redundant by other factors, the most important being whether or not you have a good record collection. Unless you do, you should think very carefully before committing to vinyl, and realise that you'll inevitably end up trawling the shops for cutouts and secondhand bargains. Mind you, that can be a wonderful way of building up a collection.

Thorens TD280 Mk II Turntable

The sheer quantity of hardware you get for your £170 is surprising. Although far from being a luxury machine, the price includes a two-part platter with a very well made (tightly toleranced yet free running) main bearing, a diecast outer platter, and a slow running belt drive motor. The latter is powered by an outboard transformer feeding a two phase supply which synthesizes the waveform used to drive the motor. The *TD280* is fitted with a simple but adequate arm and Ortofon derived magnetic cartridge based on the *OM10*, all coupled to an auto lift-off arm mechanism with switch speed change for the two running speeds - 33

and 45rpm. The optically triggered (and therefore friction-free) end-of-side arm lift detects lateral arm velocity rather than position, and so is not affected by how far towards the centre the runout groove starts. The *TD280*, which is a non-suspended design, is simply decorated but well finished and well documented in the accompanying instructions.

I experienced one operational problem which pointed to a constructional fault, namely a tendency to shed belts whilst running, initially only when I stepped the deck by hand without switching off - a bad habit, but a natural one, and harmless enough with most turntables, especially with other Thorens models which employ slipping clutches. However, as the review progressed, the belt started springing off a lot more often. I finally noticed that the motor pulley was fitted inaccurately so that it appeared to rock as it rotated. A second sample cured this problem, and improved perceived levels of programme wow. From experience this is not a typical problem with this model or marque, but it's worth watching.

Denon PMA-350 Amplifier

The *PMA-350* purports to be what it plainly isn't, yet it gets away with it. Confused? You won't be . . .



The *PMA-350* is a very straightforward, and apparently highly commercial package which boasts 50 watts/channel output and a full range of facilities - gross and trouble (sorry, bass and treble) controls, switching for three line sources, two tape decks and a moving magnet cartridge equipped record deck. There are also sockets for two pairs of loudspeakers. Yet the Denon also purports (in the accompanying propaganda) to be a sort of purist special, and to this end the main speaker pair is unswitched to improve the purity of the feed, and the headphone socket doesn't interrupt the speaker line, which means that speakers connected to the main circuit need to be disconnected when headphones are plugged in. The speaker terminals are 4mm binding posts instead of the usual spring clips. There's also a 'source direct' switch to bypass the tone and balance controls.

JPW Sonata Loudspeakers

By some definitions, this is *the* budget loudspeaker. It is a little larger than some, and boasts a rather ordinary tweeter and a decent but conventional bass/midrange driver. What's special about the *Sonata* is not to be found in the moving parts, or even the very simple crossover that joins them together. It is the enclosure: which is extremely solid, largely by virtue of a real veneer facing, balanced internally by another wood facing which makes the chipboard panel into a structural sandwich with desirable properties of a kind almost unknown at this price level. The *Sonata*, which by the way demands a protracted running in period before it loses an initially rather gritty treble, settles down into something uncommonly accomplished. Another consequence of the wood veneer finish is that the *Sonata* looks more like real furniture than most, despite a vaguely old-fashioned styling job.

Sensitivity is quite high and power handling good, which means the *Sonata* can sustain the odd foray into ear busting territory.

Sound Quality

First I must praise the Thorens for being so pleasing to handle. The tall bit - you know, the thing that sticks up in the middle - made centering the record without scraping the vinyl easier, and the front panel cueing lever, the speed change and the stop/start controls were an absolute joy. In my more cynical moments (more cynical than usual, that is), I often feel that it is the mystique and machismo that surrounds turntables that has kept them manual, and that the so-called engineering reasons for avoiding a bit of automation are just so much doggie-do.

Be that as it may, this is not what this review is really about. I have already introduced the idea of analogue versus digital, but it is becoming difficult to say anything fresh on a topic that is fast

becoming as hackneyed as it is irrelevant. Yet the subject is not totally exhausted, and probably won't be until vinyl has finally laid down and died as a viable commercial product. This will eventually happen of course, but it may take some time.

In a way, that is precisely the point I want to make. If you have a worthwhile collection of records, you need a record player, just as if you like tea, you need a kettle. If you're starting from scratch, however, it would be irresponsible to recommend a medium whose source material is fast drying up, and the choice then may be unpalatable but it is also inevitable.

There is a little more to it than this, however, which brings us back to the main topic, the performance of this system, which I have to say veered erratically between acceptable and somewhat disappointing. My reaction is partly tempered by the fact that for simple professional reasons, I spend an increasing proportion of my time listening to digital rather than analogue sources, a consequence of which is that I'm becoming increasingly intolerant of the problems of records that won't go away: the noise, the mistracking and groove jumping (not that CD is always entirely free of the latter), the lack of real pitch integrity and the softness and lack of precision at the frequency extremes.

These problems can be minimised and even eliminated in cases where both the turntable and the amplifier are of a high enough standard, and in the very best cases record reproduction is as good as or better than anything that CD can offer: a proposition that the better vinyl based



systems in this project confirm. But it is rapidly becoming obvious that a sympathetically chosen budget CD system is by no means necessarily musically inferior to most comparably priced vinyl based systems, and CD additionally offers all the obvious cosmetic qualities that vinyl so clearly lacks - lack of noise, accurate tonality etc.

In this case all the signs appear to point to a good result, yet I spent hour after hour with this system struggling to get to grips with it. And with too many records I failed. Even with the second turntable sample, pitch integrity was sometimes suspect on sustained notes (piano, woodwind etc) and the bass was heavy and dull, with a poor sense of pitch and a laid back pace that seemed incapable of quickening its pulse when the music demanded. The effect tended towards the unwieldy, as is often the case with low end record playing systems.

There are, I found, things that can be done to improve matters, though all involve spending at least some money. One very simple way is to replace the dreadful rubber mat that Thorens supply. I tried a felt mat from a Dunlop *Systemdek IIX* which had a useful effect lightening textures in the bass and midband, generally making the sound picture clearer and easier to follow. It would be too strong a claim to suggest that changing the mat transformed the turntable, but it helped.

So does using a high grade support. The Thorens 'reads' the surface it is stood on more effectively than many, and it reacts badly to the kind of heavily laden but rather wobbly furniture that often stands in for dedicated supports by default. A lightweight but rigid equipment support helps, but if this represents too much of a cost burden, try a lightweight coffee table. Ikea has proved a fruitful source in the past; I'm afraid I used a Roksan equipment table with excellent results, but the cost is outrageous in the context of a sub-£450 system.

The final and most obvious improvement is to replace the cartridge. The low-end Ortofon included with this package is no great shakes, and can sound muddled and confused on heavily modulated passages, and simply raw and coloured otherwise. There is a simple solution to this problem, namely upgrading the stylus to a higher grade type. But an alternative is to replace the complete cartridge with something like a *Corus Black* (also from Roksan), which does a great deal to freshen up and make the sound which on test became a lot more transparent and detailed. But this change



is not really worthwhile unless the other improvements are made first.

Even with the Thorens at the peak of its capabilities, with all the suggestions carried through, the system still somehow lacks the spark that sets the music alight, though it did have its moments, generally with better recordings (the ones that sound good when played on an old baked bean can with a thorn for a stylus). Taken individually, the Thorens is an excellent £180's worth, and the Denon *PMA-350* is difficult if not impossible to catch at £160. But use the two together and the outcome is a little less than the sum of its parts, and the JPW *Sonata* is just transparent and demanding enough to trip them up. The turntable and amplifier are both a little slow and soft edged, the Denon's phono input taking more than a little toll here since the Thorens sounds considerably tauter and more dynamic through a Pioneer *A-400*, say, whereas the Denon itself comes to life when driven by a good budget CD player (a Marantz *CD-40* for the purposes of this test).

The combination lacked focus and control, and there was a flatness in the midband that wouldn't go away. The *Sonata*, which can sound so crisp and solid in the right kind of system, can do nothing to hide these things, and the result is a little untidy, a little edgy, and a little lacking in presence and pace.

Conclusion

The outcome of this test is clear enough: the system consists of three very fine components which somehow don't really get on in each other's company. The objective shortcomings I found with the Thorens were more or less right on sample two and in that case are no worse than expected at this price, though there are budget price decks where the rough edges would simply be inconceivable. The Rega *Planar (2 or 3)* must be the best example of this.

The amplifier looks like just what you'd expect at the price but turns out to be a little better in some respects. No, that's wrong; it turns out to be a *good deal* better in *most* respects. It goes loud and does so with considerable gusto and finesse, it only really sounds a little under par when playing records which is something of a pity since this is a record playing system.

The JPW *Sonata* is perpetually surprising. It is packaged better than most and makes better music by virtue of its rigid, non-resonant enclosure. It is a scavenger of detail *par excellence*, but can sound a little untidy in a system that fails to control it very firmly indeed. The slightly lazy sounding front end of this system does not show the *Sonata* in its best light, or put the other way the *Sonata* is rather too revealing in this combination. And that's it for a system that has everything. Everything, that is, but synergy.

GENERAL DATA

Typical retail prices	
Thorens TD280	£180
Denon PMA-350	£160
JPW Sonata	£115

Turntable	
Type	Belt drive, manual
Speeds	33/45
Cartridge	Ortofon MM
Dimensions	44x13.6x35(wxhxd)cm

Amplifier	
Power output	50watts/channel
MC cartridge compatible	no
No of inputs (ex tape)	3
No of tape circuits	2
Dimensions	43x11.5x25.5(wxhxd)cm

Loudspeakers	
Type	2 way sealed near wall
Recommended placement	8ohms
Impedance	87dB
Sensitivity	70watts (approx)
Power handling	23x32x21(wxhxd)cm
Dimensions	

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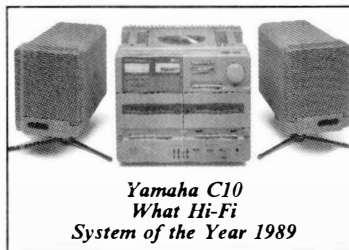
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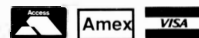
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£600 System

REGA TURNTABLE & ARM, ROKSAN CARTRIDGE, ARCAM AMPLIFIER, MONITOR AUDIO LOUDSPEAKERS



Very much a classic record playing system of the kind that specialist dealers sell by the truckload the length and breadth of the land, the story here is as much one of the manufacturers and dealers as it is of the hardware involved.

Rega Planar 2 Turntable & Arm, Roksan Corus Blue Cartridge

The introductory comments are aimed more at the celebrated Rega *Planar* turntable than the other components (though they all qualify). The Rega range has been in existence, practically unchanged, for more years than the author has fingers (and he believes he has a full set). The intervening years have seen one important engineering change: from a Japanese sourced arm to Rega's own very sophisticated design which, yes, does sound better than the original. Rega lovers are a conservative lot though, and some cried foul when the arm was announced, though the advantages of the improved arm are indisputable.

But the arm was yonks ago, and the Rega has stood still most of the time since. If the *Planar 2* had been a CD player, it would have been thoroughly out of date by now, but then again, if it had been a CD player, it probably would not have been

given the name Rega.

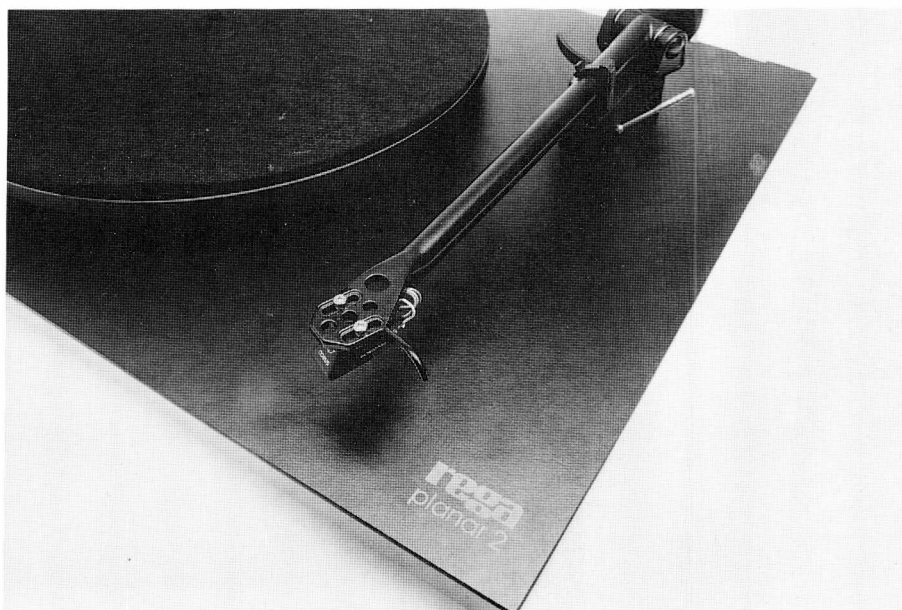
What I did notice from the outset was just how polished a player this model is. And I mean polished in every sense. The test turntable was supplied by The Cornflake Shop in central London, which included a note to say that the sample was about a year old, and had been taken in as a result of a part exchange deal (for a Rega 3 of course, what else?). Whoever had owned it originally had clearly looked after it. Yet even taking this into account, the deck has an indeniably taut feel. Although the materials used - glass, faced chipboard etc - are fairly ordinary, the quality of build, fit and finish really is very special. In this respect, Rega has no peer in this price area. There are turntables that cost not too much more that sound even better in my view, but by year two or three, the Rega is going to end up looking fresher, perhaps sounding fresher - and certainly earning more in part exchange (or on the secondhand market) when the time does come to upgrade.

Backing Rega up in the field is a relatively small number of highly motivated specialist dealers, who have the training to help you get the most from the deck, and supply other components which are as suitable as they reasonably can be. They in turn can call on Rega for

backup, whose servicing must by now be the best in the business. The longevity of Rega models makes long term serviceability a doddle.

This is the beauty of the *Planar 2*, the details of the design seem almost unimportant by comparison. In fact it has a solid chassis in the form of a sheet of black laminated chipboard to which the main bearing and arm are bolted. There is a plastic subplatter which is rim-driven from a rubber suspended synchronous motor, and a main platter which is simply a thick sheet of glass which interfaces with the record via a sheet of felt. The arm uses a one piece arm tube and headshell. There are no joins at all until behind the arm pivot which gives the unit a consistency in the way it handles energy which is certainly not equalled by arms with joins which are 'stronger than the original arm tube'. Which is the way I've heard one illustrious competitor justify his inability to produce a similar feat of engineering. The arm cable has very few breaks, but this is at the expense of a rather ordinary grade of copper, dielectric and connectors - a blind spot chez Rega, but scarcely relevant to any discussion of the virtues of such an inexpensive deck.

Because there is no suspension (unless you count the three stiff rubber feet) the



Rega prefers solid surfaces, and can work well on shelves bolted to walls, or spiked tables. Don't use it on a flimsy support of the kind sometimes suggested for use - not wholly appropriately - for suspended chassis turntables. Operation is manual of course, and speed change involves removing the main platter and manually repositioning the belt on the motor pulley.

Arcam Alpha II Amplifier

The ageless charm of Arcam's budget amplifier, the *Alpha II* has seen it through a long lifetime without looking or sounding any less competitive than it did at the outset, though newer introductions have tended to make more noise in the media of late.

The *Alpha* was and is a mainstream amplifier with a modest power output level and a decent but not extravagant range of facilities. Considerable care has been taken to prevent the extras from spoiling sound quality, so the speaker cutout when headphones are inserted can be bypassed by using alternative loudspeaker connectors (they're 4mm sockets, by the way). Similarly, the tone controls are restricted both in the amount they cut and boost output and in their ability to affect the all important midband. The case is fabricated from alloy panels to prevent magnetic coupling effects that can occur with steel panels.

The rest of the design is equally sensible and well informed. Inputs are provided for vinyl (ambiguously labelled 'disc' by Arcam), three line inputs and tape, which is not over generous but should be enough in most cases. Thoughtfully the CD input has a slightly reduced sensitivity to allow for the higher output voltage of CD players compared to analogue sources like cassettes or tuners, though I formed a slight preference for the sound of the other inputs and (especially) the tape circuit. Although the vinyl input is suitable for high output cartridges only, an accessory

plug in board is available to provide the correct termination for low output moving coils, if required.

A few words finally on build and finish. The *Alpha* must have been under considerable pressure of late from newer and highly acclaimed models from Denon, Pioneer and Marantz, and the success of the latter companies is fully deserved. They're well built and apparently reliable too, but the *Alpha* is made to a different and still higher standard. The casework is especially impressive, and the controls feel smooth and are well calibrated. Ergonomics are equally hard to criticise, and internally too the *Alpha* exudes real quality from its toroidal power transformer and onwards. Serviceability is a strong point with Arcam, and the long model lifetimes traditionally associated with products from outfits like Arcam mean a reduced likelihood of quick obsolescence. There is a criticism though: Arcam is somewhat over-protective when choosing internal fuses, and if you find

yours blowing, a slightly higher fuse rating is permissible. Your dealer will advise further on this.

Monitor Audio 7 Loudspeakers

There is no shortage of suitable talent that could have auditioned successfully for the role of noise boxes to the Rega and Arcam *Alpha*, but without doubt the Monitor Audio 7 is certainly a hard act to follow.

The 7 is a little different to most loudspeakers in the £170 - £180 price area. It has an unusually small base but is quite tall, which makes it look like a slightly overgrown miniature. The enclosure is all MDF (medium density fibreboard) and is wood veneered rather than being vinyl covered, and then treated with an almost opaque black coating with a lustrous surface finish. It's difficult to say much about the wood that lays beneath, but there's no doubting the appearance of quality the 7 exhudes.

The drive units are not rebated, a simplification that saves weakening the baffle. The bass driver is a small, long-throw treated pulp design, while the tweeter is a small metal dome offering from the family of high grade units that are used throughout the Monitor Audio range. The back is home to a small port.

Experimentation quickly shows that the 7 is not happy when hemmed in. The bass is correctly balanced when the system is used on tall, open stands at least 25 cm from the rear wall. For most of my period with this system, they were positioned at least twice that distance from any room boundary, and I never once experienced any obvious lack of bass.



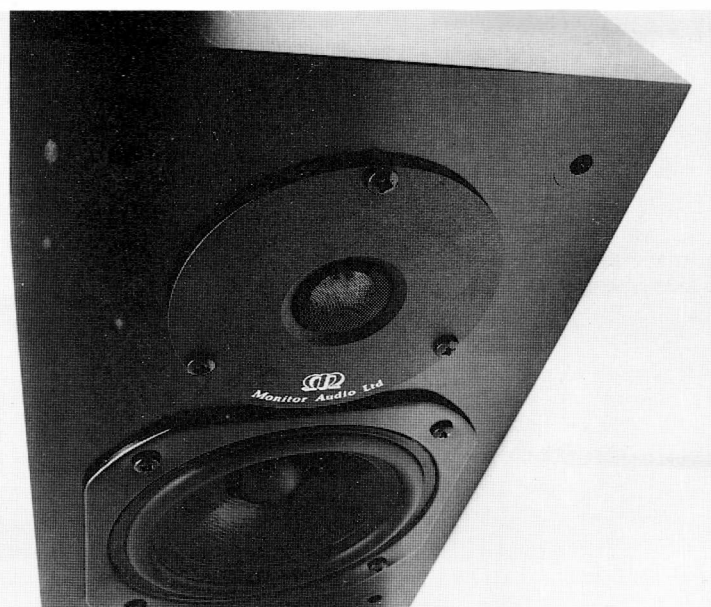
Sound Quality

Let's take a quick tour through the individual components before putting them back together.

First, the Rega performed extremely well. The Roksan *Corus Blue* and the Rega player and arm could have been made for each other; it was an inspired match which made the kind of noise that even those used to much costlier systems might be happy to live with. The cartridge is detailed but not ruthlessly so, has excellent bass but is not bass led, and has a real sparkle at the top without being bright. The record player as a whole has a spring in its step with rhythmic material, and is refined and loquacious with complex material that can defeat others. All the time, the Rega has a sense of solidity and consistency, with is more of a Compact Disc property than one necessarily associated with budget turntables. Much of the above was determined using the Arcam *Alpha*, but the opportunity was taken to pull a sample of the latest modified Marantz *PM-40* into the listening with results that more than confirm what has been written.

The Arcam amplifier has a slightly different character. It is, well, warm and comfortable and much easier on the ear than you might expect - both in the short and long term. Detail is produced freely and in abundance, while string and clarinet tone are excellent, especially in the higher registers, with little apparent loss of precision. The bass was reasonably deep and full, but there was a slight lack of focus, manifest sometimes as a loss of tunefulness and fine explicit detail, that to a certain extent stretched right through the midband. The Arcam was never less than pleasing and informative, and tonal quality was always good. Stereo soundstaging offered a real sense of presence, yet I sometimes wished for a tad more grip and control.

This was especially the case when driving the Monitor Audio 7s. Once run in, which takes a considerable period I should add, the 7 has the all round attributes to make it competitive way beyond its price range. The midband is open and explicit, and the treble pure and even, with just the mildest suggestion of masking of fine detail in the upper midband and treble. The really striking feature of the 7 however, was at the low frequency end of the passband, which drew from the speaker a solidity quite out of keeping with its diminutive stature. The effect was at times quite extraordinary, and it was not achieved at the cost of detail, and with only the subtlest loss of dynamics, the important point here being



the consistency of dynamic contrasts.

But - and this is an important caveat - all this is a potential, and further it is a potential that is not fully realised by the rest of the system, and in particular the amplifier. Although quite reasonably priced, and despite being quite small, the 7 has the appetite as well as the performance attributes of a more substantial loudspeaker. It is important to use it on solid, spiked pedestal stands, and its tastes in amplifiers stretch upwards of a *Delta 90* (taking an example from the Arcam range). The 7 needs firm control and plenty of clean power, and good as it is, the Arcam was never built for this role.

As part of the test process, I spent some time auditioning this system with a Compact Disc source, with somewhat inconclusive results. I used an Ariston *Maxim* (borrowed from another test system for the purpose). I felt that Compact Disc might overcome something of a lazy tendency, an inability to really get up and make waves. There were two obvious reasons why this might have been the case but the one I thought most likely was that the amplifier's phono input was removing some of the zest from the reproduction. The other of course is the usual rather sharper and more firmly resolved sound that comes of a decent CD player, sharper than all but the very finest turntables. And good as the Rega is, it remains what it is - a budget price unit with at least some budget price limitations.

Well CD did add back a spark of the missing vitality, but it was not an altogether happy ending since the system's innate balance went, and it began to sound a little untidy and ragged, more so than can be strictly accounted for by the nature of the Compact Disc player itself. It was almost as though the CD player was providing a signal that was too hot for the rest of the system to handle. The best explanation: the Arcam was being driven to the edge of its performance

envelope, and indeed further (brief) listening using a Bit Stream player - the Philips *CD850* - confirmed that its rather gentler, flatter style of presentation was more in keeping with the system as a whole. Perhaps the limitations of systems such as these explain why some observers consistently prefer one-bit players whilst others consistently prefer multibit?

Conclusion

We'll treat the latter as a rhetorical question, and go back to the real one. Despite the reservations expressed above, this remains an excellent system. It is good looking, compact, purposeful and carries the promise of long term serviceability with good backup from the manufacturers involved. But the system is not ideally matched and system synergy is not ensured. To make the best of the considerable abilities of the *MA7*, a somewhat more potent amplifier is strictly required. As an alternative, a slightly less demanding loudspeaker could be considered. How about Arcam's very own *Alpha* loudspeaker?

GENERAL DATA

Typical retail price	
Rega Planar 2/Roksan Corus Blue	£185/65
Arcam Alpha II	£190
Monitor Audio 7	£179
Turntable	
Type	Belt drive, manual
Speeds	33/45
Cartridge	MM
Dimensions	44x11x35 (wxhxd)cm
Amplifier	
Power output	30watts/channel
MC cartridge compatible	see text
No of inputs (ex tape)	4
No of tape circuits	1
Dimensions	43x8.4x23 (wxhxd)cm
Loudspeakers	
Type	reflex
Recommended placement	open, stand mount
Impedance	8ohms
Sensitivity	84dB
Power handling	60watts (approx)
Dimensions	34x16.5x17 (wxhxd)cm

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DSR 70 PRO (Dolby Prologic, 5 channel volume control)	£189.90
MX 35 (4 channel power amp)	£169.90
YST SE10 (effect speaker DSP E300)	£99.90

Reel to Reel

Revox B77 II	£1850.90
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Miscellaneous

Air Delta 150 (Nicam Decoder)	£359.90
A&R BK Box 3 (Bit Stream)	£359.90
Yamaha YSTC10	£399.90
YST C11	£599.90
Revox — Style system (exc tape deck)	£3999.90

Tuners

A&R Alpha 2	£184.90
A&R Delta 80	£339.90
Denon TU260L	£109.90
Denon TU560L	£149.90
Denon TU660L	£189.90
Musical Fidelity TI	£249.90
NAD 4225	£159.90
Rotel RT850AL	£179.90
Quad FM4	£359.90

Turntables

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Michell Gyrodel/RB300 ARM	£789.90
Rotel RP855	£169.90
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Kef C55	£269.90
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Kef 104/2	£1300.00
Kef 105/3	£1995.00
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Spendor SP 2.2	£549.90
Spendor SP1.2	£899.90
Tannoy M15	£189.90
Tannoy DC2000	£339.90
Wharfedale Diamond IV	£119.90

Amps

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Audio Innovations S500 (Valve)	£999.90
A&R Alpha 2	£199.90
A&R Delta 90.2	£409.90
Carver CM1090	£495.00
Denon PMA 350	£169.90
Luxman LV107U	£759.90
Musical Fidelity B1	£199.90
Musical Fidelity B200	£349.90
Musical Fidelity A100	£499.90
Micaelson Odysseus	£990.00
NAD 3240	£199.90
Nakamichi Amp 2	£315.00
Rotel RA820AX	£159.90
Rotel RA820 BX4	£199.90
Rotel RA840 BX4	£259.90
Rotel RA870 BX	£309.90
Yamaha AVX700	£409.90
Marantz PM40SE (Modified)	£239.90

PRE AMPS

A&R DELTA 110 (Bitstream)	£719.90
Carver C5	£395.00
Denon PRA 1200	£299.90
Musical Fidelity Pre Amp 3A	£379.90
Musical Fidelity P173	£699.90

Michaelson Audio Chronos Preamp & PSU	£3999.90
Quad 34	£329.00
Quad 66 with R1 (remote panel)	£713.00
Rotel RC 850	£149.00
Rotel RC870 BX	£229.00
Sonograph SC22 (by Conrad Johnson)	£

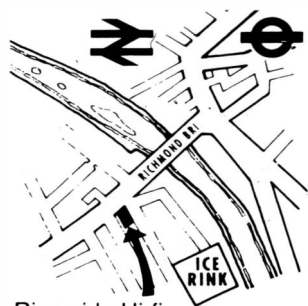
Power Amps

A&R Delta 120	£519.90
Carver TFM 25	£595.00
Denon POA 4400 (Monoblock Pair)	£599.90
Hafler XL600	£1145.00
Musical Fidelity P180	£799.90
Musical Fidelity P270.2	£1399.90
Michaelson Chronos Monoblocks (Pair)	£3999.90

Quad 306	£289.90
405-2	£429.90
606	£569.90
Rotel RB850	£169.90
Rotel RB870	£239.90
Sonograph SA 150 (By Conrad Johnson)	£

Compact Disc Players

A&R Alpha CD	£419.00
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NAD 5440	£299.90
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Nakamichi CD3	£465.00
Philips CD850	£409.90
Rotel RCD 855	£259.90
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This is it: the new face of budget hi-fi. In place of a Rega Planar, Dual or Ariston turntable you buy a CD player from an anonymous multinational. Matched to the CD player is an amplifier which would once have been from a small specialist manufacturer but which in this case is also from an anonymous electronics multinational (the same one in fact - Marantz, which is part of one of the largest anonymous consumer electronics multinationals on the planet - Philips). Only the loudspeakers come from a specialist, though Celestion is a larger one than most, reflecting the fact that this at least is one area the industry majors have found hard to crack.

Marantz CD-40 Compact Disc Player

Philips has been in the vanguard of the low-bit revolution, with Bit Stream (one-bit) convertors now used in virtually all its products. Marantz, which outside North America is a subsidiary of Philips and whose mainstream players are made on the same European production lines, normally follows the party line fairly closely, but there are exceptions, and Bit Stream has been one. With a more pronounced enthusiast bent than the parent company, Marantz has been able

to justify holding off from a wholesale endorsement of the new technology, and although this will change in the next few months as Marantz is expected to bring a new range of Bit Stream CD players to market, the *CD-40* continues for now as what is looking increasingly like an anachronistic loner.

It is however, a welcome one, since its now highly developed 16-bit, four times oversampling convertor, based on the *TDA1541A* IC (this must be one of the few ICs whose name is popularly known and recognised) genuinely delivers the goods. But more of this shortly.

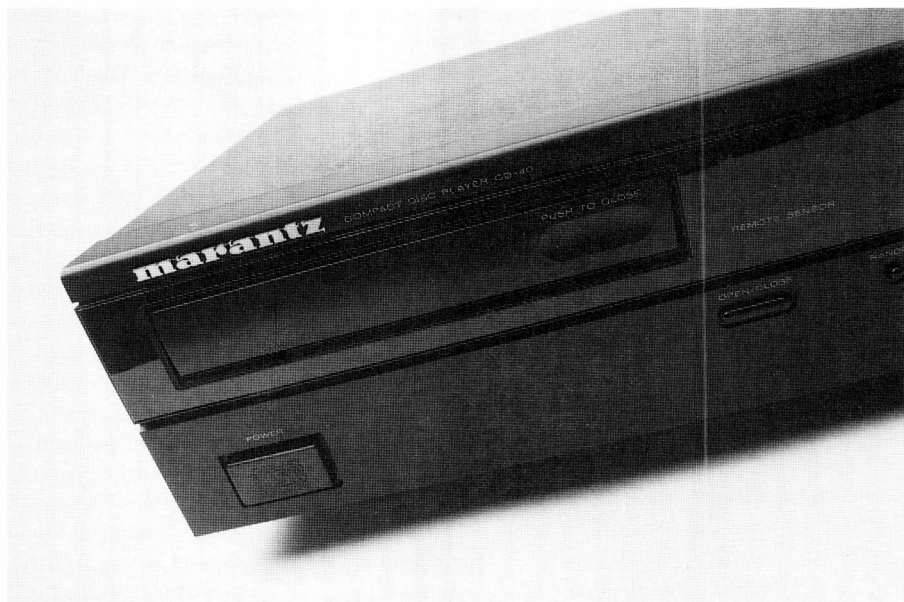
To look at, the *CD-40* is nothing special. Wrapped in a very ordinary looking plastic box with a metal lid, the *CD-40* uses a rather mannered and cramped control layout in keeping with most other recent Marantz components (though the system amplifier in this case is an exception). In a comparatively slimline package, the Marantz features a limited range of facilities which extend from the usual track skip and audible search, with 'play' reverting to the start of the current track when selected in play mode, to a short row of keys adding such extras as random play, intro search (AMS), standard track programming and repeat. A headphone socket is fitted, but at fixed

level only - there's no volume control. Rear panel fittings include remote control bus connections (the partnering amplifier has no comparable facility) and an electrical (coaxial) digital output. The display includes a calendar style readout which unfortunately is not defeatable. It is in better taste than some of the overdressed displays used by some manufacturers, however. Naturally a remote control is provided,

Like most Philips players, the *CD-40* is an accomplished tracker. It will plough its way through discs that cause other players to skip or at least complain audibly.

Marantz PM-40SE

There is quite a story behind this product. The *PM-40SE* was first released a little over a year ago. It had been developed over a considerable period of time and at great effort in a sincere attempt as an audiophile first amplifier constrained only by the selling price. There was to be no attempt to make any inappropriate compromises (like tone controls, loudness buttons and the like) of the kind often included simply to make it more attractive to those who buy according to the features count. Unfortunately for Marantz, Pioneer had the same idea at the same time, and



unbeknownst to each other, both makers released their designs at the same time. There were important differences between these products under the skin, but they looked almost identical, down to the florid script used on the front panel. They had similar power output figures - 50 watts/channel - a similarly minimalist set of controls, and identical pricing. It was inevitable that they would be compared, and a consensus in favour of the Pioneer was quickly established. I was part of that consensus: the Pioneer A-400 was the better amplifier.

It has taken a year for Marantz to respond to this unexpected and unwelcome challenge, but they have now done so. The PM-40SE has been upgraded. It turned out that no wholesale redesign effort proved necessary in the end, just a replacement set of power supply reservoir capacitors (which incidentally can be fitted to existing PM-40s at low cost). The Sound Quality section that follows pays ample tribute to the effectiveness of Marantz' belated upgrade; suffice it for now to note that it leaves the old model standing and at the very worst interpretation leaves the playing field level.

The PM-40 is very close to being a true minimum facilities design, but it does indulge itself with a moving coil option on the phono input, an investment that might have been better used elsewhere.

Apart from the phono input, there are two tape circuits and three line inputs, plus volume, balance and a headphone socket. Inserting a headphone plug interrupts the loudspeaker circuit, by the way. On the Pioneer it doesn't, an inconvenience amply repaid by shortening and simplifying the circuit path, which inevitably improves sound quality. In common with the Pioneer, the Marantz boasts 4mm loudspeaker terminals, but also in common with the Pioneer, they're not of particularly good quality, and are probably inferior

electrically (though much more convenient) than the usual spring terminals that adorn many commercial amplifiers. Finally, and I have no other complaints after this one, I did not like the muddled source switching which can prove confusing even after quite a long period of acclimatisation. A source direct switch is fitted to bypass the tape circuits and the balance control, and proved beneficial.

Celestion 5 Loudspeakers

The 5's smaller brother, the Celestion 3, is billed in the accompanying literature as the 'first high technology, all British built, budget priced bookshelf speaker'. Many would disagree with this claim, but Celestion stakes a higher claim to advanced technology in the 3 than most, and the same applies to the 5 which is nothing more nor less than a scaled up Celestion 3 which, for an extra few groats, will provide you with a few extra Hertz for a few less watts. What?

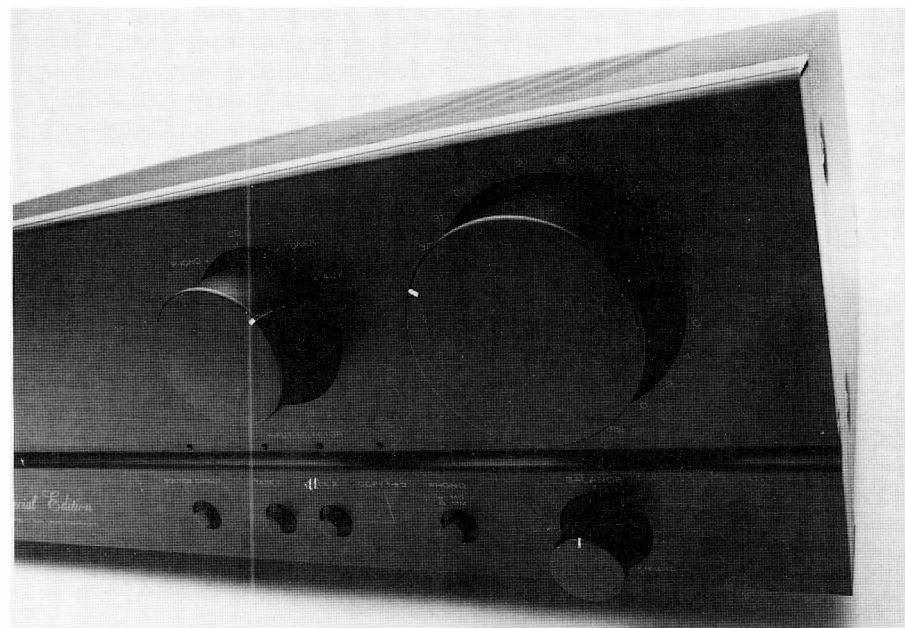
It's like this. The 3 was special for a number of reasons, one of which was its use of large polycarbonate mouldings which acted both as drive units chassis and baffle faceplates. At a stroke (and a significant investment in tooling, which is perhaps why most others have not followed suit), this helps alleviate the usual troublesome interface (especially on a bass driver) between the driver chassis and the loudspeaker baffle, and also provides some reinforcement and damping for the baffle itself. The 3 was also unusual for its use of a high grade one-piece metal dome tweeter, in marked contrast to the rather shoddy metal domes that many competitors are using, and which are giving the genus a bad name.

The Celestion 5 retains all these features in a sealed box covered in a wood effect vinyl which looks a little more real than many yet which is still indisputably plastic.

The 5 matches a titanium dome tweeter to a 150mm felted cone bass driver fitted into a 12 litre sealed enclosure designed for use against a wall or - if you're pushed - on a convenient bookshelf. As usual, dedicated stands are preferred. Celestion's own pillar stands (examined on a previous occasion, but not submitted for review this time) are a reasonable mixture of user friendly aesthetics, price and performance.

Sound Quality

Ladies and gentlemen, *this* is what it's all about. I'm wary about making blanket statements which in the future might turn out to be hostages to fortune. A new CD player/amp/loudspeaker which upsets the applecart may appear as early as next week, or the system may not suit



individual expectations or a different listening environment for any one of a thousand different reasons. Nevertheless, my judgement after a suitably protracted period of listening is that the Marantz/Celestion system produced marvellous results of a standard which has simply not previously been generally available at this price level.

One of the reasons for its success is that budget amplifier design has improved significantly in the last few years; another is that old country cooking style non-bitstream Compact Disc technology has finally attained a level of maturity that means it must be treated very seriously as a music source - just as the manufacturers concerned are about to consign it to the scrapheap of superseded technologies. Ironically, more than a few manufacturers and dealers are reporting that it is getting increasingly difficult to sell multibit CD players to a public apparently dazzled by the promise of bitstream, which amongst other things means that you might be able to strike some good bargains. Another reason for the success of this system is that budget loudspeakers are also steadily improving under pressure from a tremendously competitive marketplace.

It is true that state of the art turntables have improved significantly in the last few years, but budget deck design has not been so progressive as manufacturers struggle to maintain the integrity of their products in the face of a shrinking market and increasing unit costs. There is also evidence that the new generation of super budget amplifiers, which are increasingly of Japanese or other Far Eastern origin, are concentrating on the line sources rather than the phono inputs. The dearth of good Far Eastern budget turntables is clearly a contributory factor here, feeding a virtuous (or is that vicious?) circle that militates against black vinyl. This then is the backdrop against which the success of this CD based system is assured.

I'd guess a lot of readers will have heard (if they don't actually own) the Celestion 3, but fewer will be familiar with this newer model. The two are united by much more than separates them, and the 5 continues the smooth, airy tradition so much a part of the 3. The differences however, are important. The Celestion 5 has somewhat more bass, it goes much louder and it doesn't need a super amp to do so, which to an extent the Celestion 3 does. Just as its smooth, rich sound makes it a good match for the Marantz CD Player, the 5's improved sensitivity makes it a good match for the *PM-40SE* which can drive it well into regions of discomfort with the greatest of ease. It even sounds



more obviously dynamic at lower volume levels. And like the 3, the treble still sings.

In an analogue system the Celestion 5 can play a little slow and loose in the bass, but the Marantz CD player has an inherent tautness that suits the Celestion particularly well. The *PM-40SE* has a physical kind of bass as opposed to that produced by the more detached, ethereal Pioneer *A-400* or most other high grade low cost amps for that matter. Those amplifiers that do offer a comparable bass (several British names spring to mind) mostly offer inferior performance higher up the audio band. In many ways then the Marantz is the ideal near-budget amplifier, especially with smaller speakers which can sound a little lightweight with alternative amplifiers.

So the prime requirements of a fine sounding system are met. The individual components are each of high standard individually, and each complements the others' virtues, while not exaggerating the weaknesses. Another highly relevant point is that each of the three components has a broadly matched set of capabilities. None of the three components is excessively detailed, and all three have a broadly middle ranking bass depth, weight and power.

The result is a supremely well balanced and neutral performance. The system has a pleasant, open quality: vocals are open mouthed and articulate whilst string tone has a silky, unexaggerated feel. Yet although it's easy on the ear, this should imply no lack of blood and thunder when the occasion calls.

Conclusion

This is a first class system which should suit a wide range of musical tastes and which doesn't cost the earth. All three of the components are strong performers and are amongst the best of their kind. At least one of them is at the state of the art at its price point.

It is a system that is singularly lacking in the rather pointed, aggressive quality of many. There is nothing overt about it, and if you prefer the sound of a system that paints everything in lurid, Technicolour strokes, or if you want it all reported in the finest possible detail, you should perhaps look elsewhere. If your requirements are for a system that plays music in an easy, unexaggerated way, this could well be the one for you.

It is the kind of system I could imagine flopping in front of at the end of a hard day, one which will play music unobtrusively in the background, yet one which allows the exploration of large scale, densely scored works without any sense of holding back.

GENERAL DATA

Typical retail prices	
Marantz CD-40	£200
Marantz PM-40 SE	£239
Celestion 5	£149

Compact Disc Player	
Remote control	yes
Headphone socket	yes
Digital output	coaxial
Dimensions	42 x 13.5 x 28 (wxhxd)cm

Amplifier	
Power output	50 watts/channel
MC cartridge compatible	yes
No of inputs (ex tape)	4
No of tape circuits	2
Dimensions	42 x 11.8 x 28 (wxhxd)cm

Loudspeakers	
Type	infinite baffle
Recommended placement	near wall
Impedance	8ohms
Sensitivity	88dB
Power handling	90 watts (approx)
Dimensions	20.6 x 35 x 25 (wxhxd)cm

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ARISTON CD PLAYER, HARMAN/KARDON AMPLIFIER & KEF LOUSPEAKERS



£1,300 for a single source system - vinyl or compact disc - is at the foot of the ladder marked 'serious.' We're still far from talking about cost no object components; the ones used in this system are well below the knee in the curve of diminishing returns that often crops up in discussions about the pricing of high fidelity gear. Yet we're not talking about budget equipment either, where the compromises are serious and obvious.

There is another point about systems in this price range which can prove interesting whether or not you're in the market to buy. When you reach into four figure territory as we have done here, the products begin to look a little more ambitious. On the one hand this can mean that the equipment is no longer of necessity the middle brow, safe as houses stuff that seems to be the lowest common denominator at lower prices. Many designers of more costly equipment, realising they are playing for smaller niche markets of enthusiasts, will attempt to respond in kind. But this also means that there is just that much extra room to make mistakes, and in the same way that a really good expensive system can turn heads, a bad one is much more likely to disappoint, even leaving questions of higher levels of expectations at higher

prices to one side.

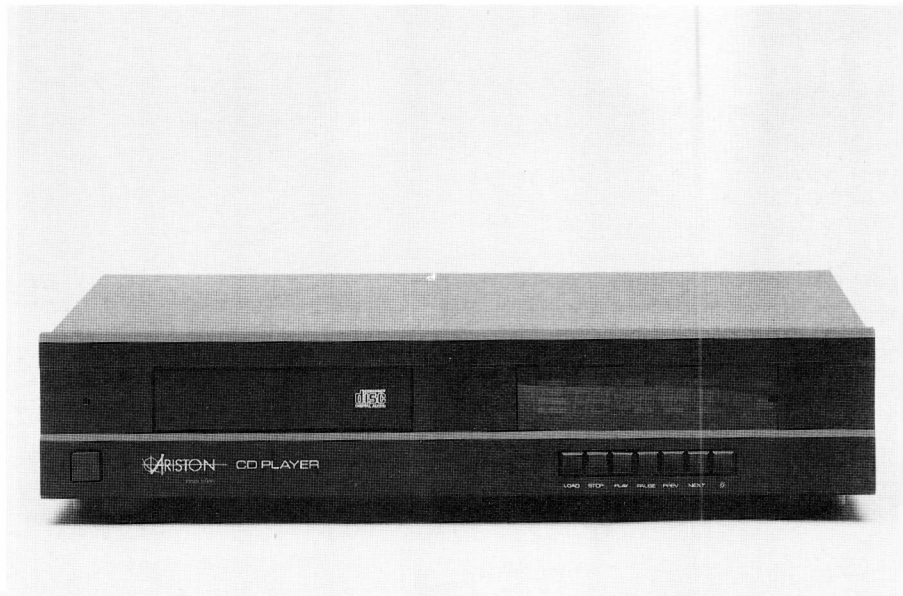
The radical product in this system is the Kef *Quattro*, and it's only really radical by the conformist standards that prevail in the loudspeaker industry. The other two products exhibit a rather different approach, the determinedly unfashionable. There is the Harman/Kardon *HK6500* which is an absolutely typical American amplifier in many ways, yet which has a long and proud design pedigree. Its accumulation of what are popularly known as bells and whistles is a straightforward reflection of American tastes and looks a little out of place in what most would suggest is the more sophisticated British market. Yet the Ariston CD player is an equally old-fashioned beast in many ways, and not just in the technology that drives it. Both products are arch conservative, the very opposite of the Kef's neo-radicalism. The question we have to ask is this: can such apparently ill sorted ingredients make a unified system that work. And if it does, how can this be?

Ariston Maxim Compact Disc Player

In common with many specialist audio companies, Ariston was late onto the Compact Disc bandwagon. When Ariston

did jump on board, the route it took was a familiar one. In broad terms the company brought to the medium those elements it understood best - primarily in the areas of power supply and analogue output stage design - while leaving the digital circuitry plus the laser and transport alone. In fact Ariston has taken a very well trodden path here by using a Philips kit of bits. This includes the *CDM4* transport mechanism, which has received some damping treatment at Ariston's hands, and the 16-bit, four times oversampling chip set at the core of which is the *TDA1541AS1* digital convertor. The power supply is based on two separate transformers, one for digital and one for analogue purposes, and 12 separate regulated supplies for the various circuit blocks. A similar level of almost pedantic care is evident throughout the design, which is built into a solid, high grade case.

Controls are deliberately kept simple. A row of positive but noisy microswitches perform the usual play, pause and skip functions amongst others, while a remote control adds the remaining features, though even the full list is fairly simple. The player obeys Philips' conventions, as an example it replays the current track when 'play' is selected in play mode.



Harman/Kardon HK6500 Amplifier

They do things differently in the - no, let's start again. They do things different in the States. While British amp makers and lately about half the Japanese industry is busy making amplifiers as simple and as purposeful as possible, their American counterparts inhabit an unchanged world that would have been familiar to their parents, and their parent's parents.

The *HK6500* presents the kind of face to the world that has lately become deeply unfashionable, yet there is no doubt about the seriousness of the thinking behind it, or of the quality of Harman/Kardon's pedigree, even if build quality is no better than most other mass production items. Like a number of other American names, while much of the thinking may still come from America (a declining amount I'd guess), the units are actually built in Japan, a fact betrayed as much by the rat's nest of internal PCBs as by the label on the back panel. In all respects, the amp worked smoothly on test, and gave every indication that it will last out its usefulness.

With some curious exceptions, the *HK6500* is very well equipped. One exception is the provision for inputs, which numbers just three line sources and two tape decks, plus phono, which is no more than you get with many cheaper minimalist amplifiers. For what it's worth (not a great deal as it turns out), the phono stage will accept moving coil cartridges if required. Perhaps more usefully for those with large systems, there is a facility to patch in an external processor. It is possible for example, to couple a Dolby surround processor with rear channel amplification using the processor sockets without using up a tape circuit, which is the usual expedient where the facility isn't provided. I was surprised to find no tone bypass or source direct facility though. A bit of hands on showed me that such an inclusion might have had a beneficial

effect.

Other facilities include switching for two pairs of loudspeakers, tone controls and loudness (which, though phase corrected, was still singularly inappropriate musically on most occasions, especially with the rather fruity loudspeakers selected for this system. Tape dubbing is allowed from Tape One to Two only. Subsonic (high pass) filtering and mono/stereo switching are provided. Rear panel fittings include Japanese flavoured bare wire clamps for the loudspeaker connections, and there is also a loudspeaker impedance switch for low (4ohms) or normal (8ohms) loudspeakers, which optimises voltage and current delivery for the chosen impedance setting. For low impedance loudspeakers, the voltage and wattage output figures are lower, but peak current capability is increased. The *6500* is normally rated at 70 watts/channel, making it something of a powerhouse, in practice as well as on paper.

Kef Quattro 15 Loudspeakers

Here is a curious little hybrid design from the powerful house of Kef. The single product name *Quattro 15* is a little misleading since what actually emerges from the little pile of boxes are two subwoofer enclosures, two satellite loudspeakers which handle the mid and treble - otherwise known as the *C15* which is a budget standalone loudspeaker in its own right - and a pair of brackets to support the latter. To add further to the confusion, each of these three items is available on its own, though you save a few pounds buying them together.

The central component of course is the subwoofer, which is explicitly designed to match the *C25* as well as the *C15*, but which can be used with a wide range of Kef and non-Kef designed loudspeakers, though they should generally be standard 2-way box loudspeakers a la *C15*.

The subwoofer, which rejoices under the title *C200SW* (memorable, huh?), is a passive device which is inserted between the system amplifier and the satellite loudspeakers. There are two pairs of 4mm binding posts for this purpose. The subwoofer itself has a strange seven sided shape which is featureless on all surfaces except one which houses the terminals and a large exit hole which has been carefully shaped to avoid turbulence. The solitary drive unit is mounted internally in a 'single coupled cavity' version of Kef's proprietary loading technique which is designed to provide the efficiency of a ported loudspeaker with the superior transient behaviour of a sealed enclosure. The *C200SW* has a built in crossover which rolls itself out of circuit very early (system response claimed is -3dB at 120Hz) and



which rolls the low frequency output of the satellite system off in a complementary fashion, though the nature of the system is such that using speakers other than the Kef will juggle the variables with unpredictable results.

The way Kef has chosen to add bottom end to their small C series loudspeakers is interesting in several respects. Point one, they have opted to use two subwoofer enclosures rather than one. Bass frequencies are commonly said to be omnidirectional which in principle suggests that one enclosure, positioned anywhere in the room, should suffice. As Kef points out, however (and as a number of reviewers have been saying for years!), this simplistic view doesn't accord with reality. This is easy to demonstrate by simply placing the two subwoofers together, playing a piece of music, moving them apart and repeating the exercise. There are various possible reasons for this; Kef points to subharmonics of frequencies emitted by the satellites as being responsible; my own idea revolves around long line sources (which are inherently directional even at long wavelengths) being set up by the driver and its reflected 'image' from room walls.

Reducing the low frequency feed to the satellite system relieves it of much of the work it normally does, and power handling is increased in consequence. So maximum output level also increases and so of course does bass output. Kef specifies the low frequency cutoff at 40Hz/-3dB, but this is a notional figure which will be influenced strongly by room position.

The C15 itself is a well known small, budget speaker but it is not strictly a boundary design, and is best used on stands a little away from rear walls, though you could use shelves if pressed. It boasts a polypropylene cone bass driver and a rather fearsome looking aluminium dome tweeter mounted into a small, sealed vinyl wrap enclosure of acceptable appearance. The cloth over frame baffle covers are sonically intrusive, but on the whole the effect is beneficial.

Sound Quality

I have been using two CD players on a day in, day out basis for some months now, and one, you'll be totally dumbfounded to discover, is the very same Ariston *Maxim* reviewed here. In fact it was an early sample; a more recent version was submitted for this test which has been the subject of some internal refinement, though sound quality appears very similar and the basic product description remains unchanged.

During this time, I've come to think of

the *Maxim* as a kind of all purpose CD playing brick. Built like a brick, it plays and plays, and without quite plumbing the depths and scaling the heights of the top stratum of CD players (all of which cost a great deal more), it always sounds consistently musical. It is neither as detailed nor as refined as a Philips *CD850* or any of the current Meridian models, but presents musical architecture and the spatial relationships between instruments well. Instrumental separation is also extremely good.

So these was no problem with the source, but the same can't be said of the system as a whole. Remembering a point made in the course of the other £1,300 system, that with higher costs go increased opportunities for getting things wrong in style, I believe that this system is spectacularly misjudged. I reached this conclusion for a number of reasons. One point that rapidly became obvious was that the amplifier simply wasn't quite the right one for this system. The H/K is powerful and articulate, but it also sounds a little brash. The midband seems supernaturally lit and the effect, over a period of time, tended to be wearing. Much lower powered and less expensive amplifiers from Pioneer and Marantz worked less obtrusively in this system and were judged superior overall.

The real problem with this system however, lies with the loudspeakers. The design of the *Quattro* allows for a considerable degree of flexibility in the placement of the various boxes, and I undertook some experimentation with the aim of getting the subwoofers to contribute weight to the proceedings without adding boom and overhang. I eventually ended up with the satellite C15 speakers on tallish stands well into the listening room, and the two subwoofers, facing away from the listening position, just outside each satellite. As promised this provided a large and deep soundstage, but the quality of

bass was poor. It lacked real depth compared to the Elite *Sir David* say (a very different kind of loudspeaker, but of similar size). It subsequently bumped and boomed away without any real sense of integration, though the effect was undeniably exciting on some recordings - primarily studio based rock featuring electronic or synthesised transient-free bass, and - yes - Clannad.

Unfortunately, the satellites also disappointed. The metal dome tweeter is an aggressive and raucous sounding beast by modern standards, and although it settled in somewhat over the test period, the system never sounded properly integrated or neutral.

Conclusion

This system gets the big thumbs down. It is not especially well matched component to component, but the real problem is a loudspeaker design that despite some technical interest simply fails to deliver the goods. I never escaped the feeling that the music I was listening to was being heavily processed before reaching the ears. Reasonable hi-fi - but poor music.

GENERAL DATA

Typical retail prices	
Ariston <i>Maxim</i>	£510
Harman Kardon HK6500	£380
Kef <i>Quattro 15</i>	£379
Compact Disc Player	
Remote control	yes
Headphone socket	no
Digital output	coaxial
Dimensions	44x13x36 (wxhxd)cm
Amplifier	
Power output	70watts/channel
MC cartridge compatible	yes
No of inputs (ex tape)	4
No of tape circuits	2
Dimensions	44.3x13.7x36.2 (wxhxd)cm
Loudspeakers	
Type	twin subwoofer/satellite
Recommended placement	see text
Impedance	4 ohms
Sensitivity	87dB
Powerhandling	150watts (approx)
Dimensions	subwoofer 26.5x18x15, satellite 25.5x18x15 (wxhxd)cm

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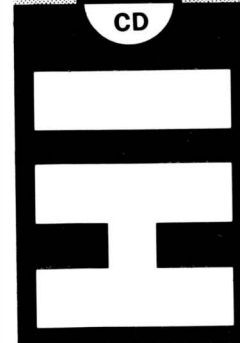
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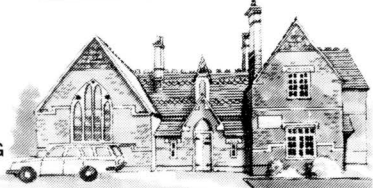
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Systemdek IIXE/900 Turntable, Moth Arm & Shure VST-V Cartridge

The Systemdek IIXE is almost too well known to need description, but there must be a few readers who don't own one and never have, for example if you live in Lapland. Especially for Laplanders then, the IIXE is Dunlop's bread and butter model, a well engineered but fundamentally simple three point floating subchassis turntable that appears to have benefitted from having been made in

quantity for so many years.

The IIXE is not exciting, at least on paper. Although the box type chassis is wood veneered, the styling is everything that British design skills are famous for as far away as, oh, Bognor and Scarsdale. The test sample was dressed in that bane of the late Eighties and early Nineties, black ash, which means taking a lump of wood and vandalising it with grotty black paint to hide all but a parody of the original in the form of the grain structure. A very good imitation of vinyl wrap it is too, but I understand there are those who like this kind of thing, and there is a decent real wood finish available for those with a modicum of taste. Only kidding - or am I?

The drive system - which is in very good taste - consists of a 24 pole synchronous power plant which drives a thick plastic platter by flat belt, and is energised by an outboard power supply housed in a rather inconveniently wide and shallow box. Speed change is by switch, but everything else is manual. The arm on this occasion was the Rega RB250, chosen because it is an excellent all rounder, has a fine reputation for consistency (like the Dunlop player itself) and is excellent value for money.

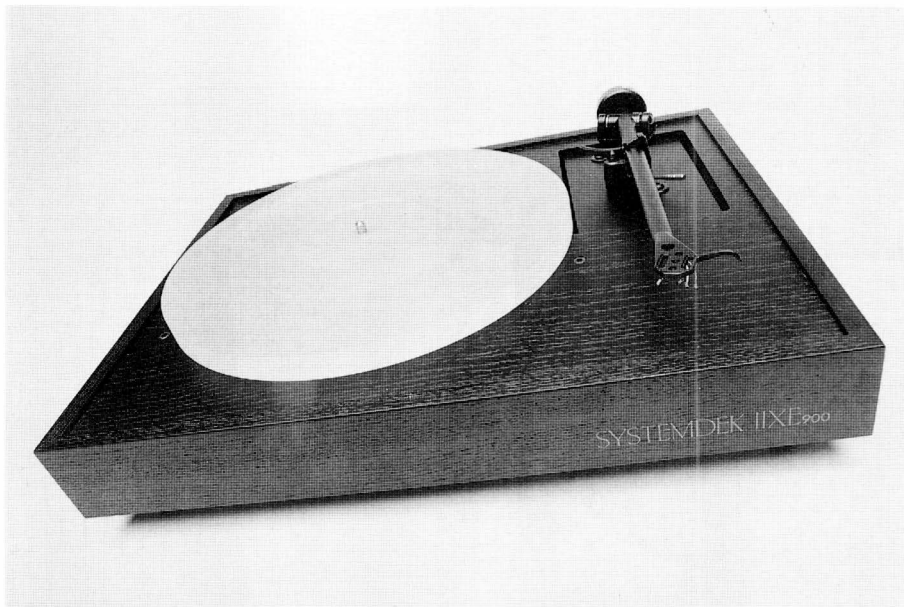
It is the cartridge that will cause the greatest interest here. Shure was once *the*

name in cartridges, and although it lacks the kudos of old, it remains a popular brand with an enormous installed base, and a low key presence in the upmarket arena courtesy of various versions of models like this VST-V high output moving magnet type. On paper the Shure looks rather expensive for this application, but there are no physical problems. The Shure fits the Rega, and appears to work well with it. Matching problems are eased in any case by the damped carbon fibre brush built into the front edge of the cartridge, though this can be retracted. More on this later.

Pioneer A-400 Amplifier

Pioneer's A-400 has been an outstanding success in the time it has been on sale - just over a year - attracting buyers in droves and the ire of specialist dealers unused to the idea of an amplifier of this quality being sold in many cases through non-specialist outlets. Be that as it may, from the end user's point of view, the A-400 package is an obviously attractive one.

Engineered with full regard to audiophile requirements, the Pioneer is close to being a straight line amplifier with the shortest audio signal paths and an essentially passive preamp. Source selection is independent of the tape feed.



The phono input is suitable for moving magnet and moving coil cartridges, and the single set of loudspeaker outputs (on 4mm sockets) is uninterrupted by the headphone socket. The volume control is a split, friction coupled device; there are no tone controls or filters. Internal component quality of this painstakingly developed model is high, but in other respects the design corresponds to normal commercial standards of build, fit and finish. It is, of course, this very ordinary (though attractive) packaging that is largely responsible for the low pricing.

Audio Note AN/K-B Loudspeakers

The manufacturers name may be unfamiliar, at least on a loudspeaker, but the *K* appellation should ring a few bells. The Snell *Type K* has long been a favourite with *Hi-Fi Choice* and, as was revealed last month, the company which used to import Snell products, Brighton based Audio Innovations, has started to manufacture a series of Snell 'lookalikes'.

Since we ran the review of the Audio Innovations *Model J* in last month's *Sessions* pages, the man responsible for the speaker project, Peter Qvortrup, has parted company with Audio Innovations and taken the speaker project with him, the British manufactured speakers now coming under the Audio Note brandname and being known as the *AN/K-B* and the *AN/J-B* for designs broadly based on the Snell *Type K* and Snell *Type J* respectively.

Both the Snell *Type K* and *Type J* have recently been updated by the American manufacturers (see *Readers Write* on page 41) and, speaking to Peter Qvortrup, it was apparent that he was not altogether happy with the later model *Type K* and *Js* that he had heard, or with the standard of some of the loudspeakers Audio Innovations had received from the States over the last few months. At the same time Snell had been 'reluctant' to supply the

old models any longer. Talking to Peter, I formed the distinct impression that he thought Snell had forgotten what made their loudspeakers tick.

From this, it was a short step to setting up unlicensed UK manufacture of the *AN/K-B*. According to Peter, the UK models feature tightened up production tolerances and a slightly different tweeter, a custom version of a SEAS small soft dome. Crossover tolerances have been tightened up too and the full system response shape up to 20kHz is held against a target curve to within $\pm 0.25\text{dB}$, an unheard of level of repeatability in the domestic hi-fi industry, and one that requires equalisation over the audio band, not just in the crossover region.

Again according to Peter Qvortrup, these tolerances are an important component in the *AN/K-B* story in a manner which Peter could not fully explain ('we're working on a technical explanation that makes sense' I was told), but one element is slow (12dB/octave) crossover slopes so

that the effective crossover phase behaviour is very constant. I ended this conversation scratching my head, Peter was laughing. In any event, it seems that the system is aligned in such a way that lateral dispersion is extremely good, even in the crossover region and well into the treble. Other details of the system have been changed too, not least the internal damping, but the rest remains as before.

The *AN/K-B* looks remarkably unprepossessing in the flesh, but it is plainly well built. Positioning is fairly flexible, though medium height stands are necessary, but the system should not be positioned close to side walls due to the confusing effect of early reflections. Impedance is fairly low - about 5.5 ohms, but the system is said to be an easy, non-reactive load, and sensitivity is close to 90dB, which is high. There's nothing here to cause problems for the Pioneer amp, either in theory or in practice.

Sound Quality

Some systems design themselves. There are brands whose products can be freely mixed and matched whilst paying special attention to no more complicated factor than the price list. As a general rule you shouldn't mix Fred Blogg's £150 turntable with anyone's £2,000 amplifier, but this should be obvious, even to a specialist dealer (sorry. No I'm not.) Then there are slightly subtler mismatches. Certain loudspeakers, for example, are just not normally regarded as suitable for use with certain amplifiers because their respective designers may have had a rather different world view, or designed their progeny for different markets. It could even be that they indulged in different substances



when the dirty deed was being done.

At first sight, we have just such a case right here. No, I don't know anything about substances, but I was surprised to discover that the one-time Snell now Audio Note AN/K-B was to be teamed with the Pioneer A-400, or any amplifier in its class. This is not just because there is a considerable disparity in price between the two, but also because I almost subconsciously expected to find them teamed with a more powerful amplifier with a more heavyweight style of sound. The *Type K* has always been a loudspeaker with which to explore the rocky terrain of difficult music, rather than to separate out the subtleties and nuances of musical expression. The *Type K* is a model for the macro rather than the micro view, and in this kind of application I would probably have chosen something else.

I would have been wrong. Of course, there are probably plenty of other amplifiers that the AN/K-B could be teamed with when driven from the same source, but many of them would have cost a great deal more for a possibly rather small performance advantage, and the Pioneer proved to be a remarkably good match. There was another factor at play here though: if my memory is not deceiving me, the Audio Note version of the *Type K* is a somewhat different animal to the original. It was always solid and capable of performing with a tactile kind of presence that could prove very convincing. The new one is no less so, but also seems to be just a little more finely tuned. A trace of upper bass waffle has been excised from the beast, and the top end is definitely smoother and sweeter. The bass end is still very strong, and the system as a whole sounds very tactile, but there's also freshness and openness to the sound that I don't remember from old. The Pioneer is very much of the same ilk, and consequently matches the speakers rather well.

In the beginning

So much for the middle and the end, what of the beginning of the story? The turntable is an acknowledged performer which sounds a little more like a Pink Triangle each time I hear it. It offers a high level of resolution with the Rega arm when fitted with the Dynavector *Karat 17D2*, which became the de-facto standard test cartridge during this test on sheer talent grounds. Used in this and other systems, the *11XE* (which I preferred without a platter mat) sounded firm and assured, and reproduced a mass of coherently presented detail, quite without the cloying heaviness that afflicts some of the

competition. In short, the *11XE* has a light touch, a quality that the Pink Triangle *PT Export* also possesses, though in both cases absolute bass weight and power are a little lacking. Compact Disc (and the Elite *Rock Reference*) often strikes a slightly better overall balance, though the mere fact that the bass performance of these different animals can be compared directly is a credit to the Dunlop. *Rock* apart, turntables traditionally struggle in this area, though of course they often excel in the midband, which in the end probably counts for more.

The *Systemdek* certainly did excel in the midband when used with that excellent, short cantilever Dynavector. With the Shure the story wasn't quite so positive. The problem with the cartridge is fairly easy to explain: I just don't think it works particularly well in this system. It sounds sweet and pure and has a marvellously tuneful bass along with a purity in the treble that can bring tears to the eye, but it also sounds a little thin and compressed. It lacks weight in the bass of the kind that grabs attention. Low frequency notes are reproduced all right, they're not actually omitted from the final brew, but there's little sense of urgency or of power. The massive weight of a Brucknerian orchestra was never properly realised in this combination. And it's here perhaps that the Pioneer amplifier begins to look on slightly shaky ground.

The power and the glory

Why the Pioneer? Simple. The Pioneer is an excellent amplifier of its type as has been said here and elsewhere ad nauseam, but its excellence resides mainly in the power amplifiers. The preamp is good with line level sources - it's essentially passive - but as a phono amplifier it's only moderately good. The Shure makes a certain kind of sense as a high grade moving magnet, but there are more vital and engaging moving magnets that cost

less (for example the new Goldring sourced Roksan *Corus* range). Another way of rejigging this system would be to substitute an amplifier with a better phono stage. The Mission *Cyrus 2* springs to mind here, and nice things are being said about the new Audio Technica moving coils which could well provide a suitable match.

Conclusion

A nice one. This is an interesting system which is a little hamstrung by the shortcomings of the Pioneer's phono input. In a way the Pioneer's position would have been stronger with Compact Disc as the source. Never mind. This was still a genuinely engaging system that will show your record collection in a new and positive light, and which in my judgement is worth every penny.



GENERAL DATA

Typical retail prices	
Systemdek 11XE 900/Moth tonearm	£269/83
Shure VST-V	£173
Pioneer A-400	£230
Audio Note AN/K-B	£499
Turntable	
Type	belt drive, external PSU
Speeds	33/45
Cartridge	moving magnet
Dimensions	47x14x36 (wxhxd)cm
Amplifier	
Power output	40watts/channel
MC cartridge compatible	yes
No of inputs (ex tape)	4
No of tape circuits	2
Dimensions	42x12.6x35.2(wxhxd)cm
Loudspeakers	
Type	2 way/sealed
Recommended placement	medium stands
Impedance	5.5ohms
Sensitivity	90dB
Power handling	100watts (approx)
Dimensions	8x55x30 (hxwx)cm

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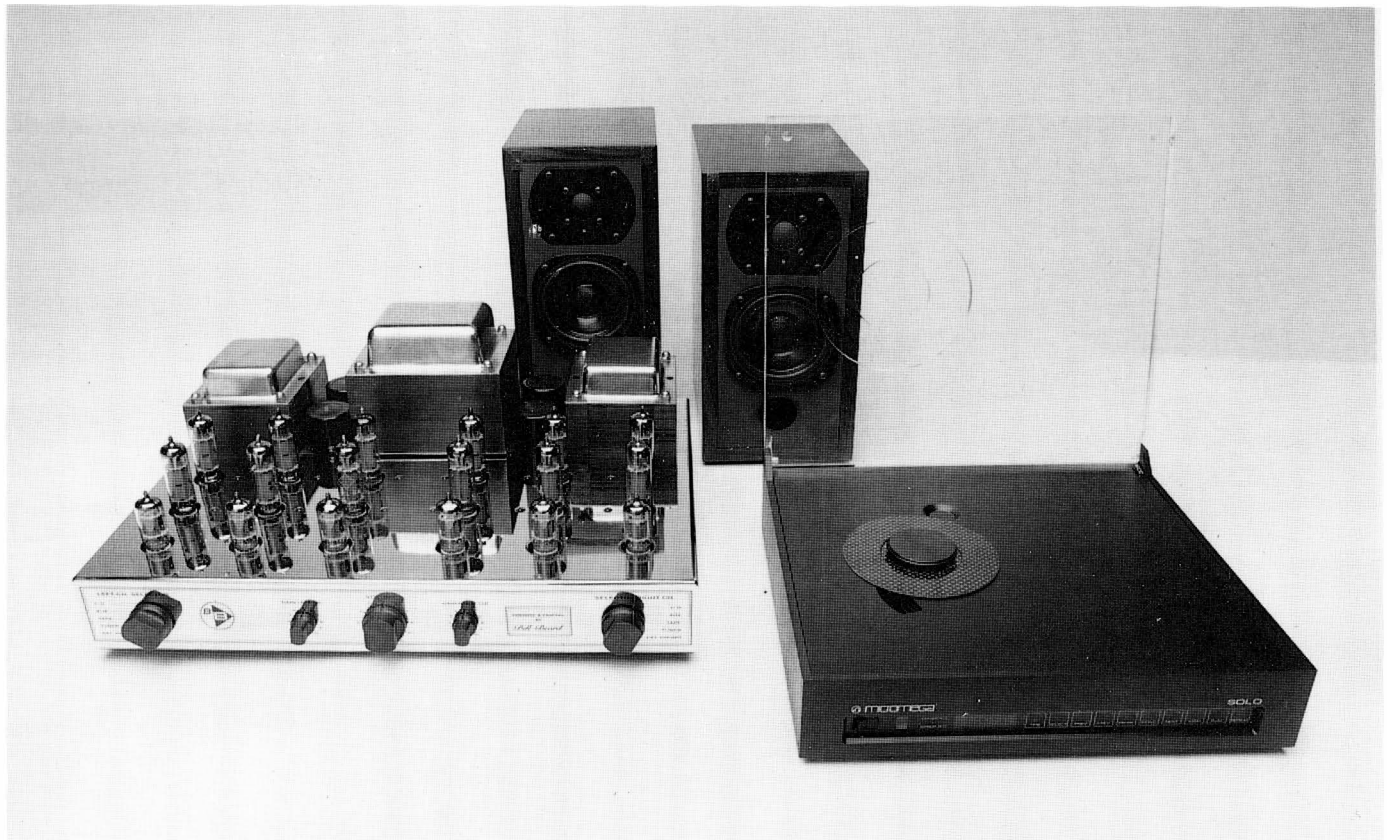
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Here we have a Franco-German-British high end salad, from three manufacturers, at least two of which you may not have even heard of. The CD player is from a French company, Micromega, and is an undated version of its first player which, like the current one, was based on Philips' technology - multibit in those days - with extensive power supply and analogue circuit improvements and design - and a price to match. The amplifier is a valve jobbie from the house of BBAP (British built audiophile products). Our final product was a completely unknown quantity to the author: a small but evidently well engineered design with an unusual line in speaker supports.

Micromega Solo Compact Disc Player

When I read passages (in the manufacturer's literature) like 'the ideal conditions for CD reproduction are defined by near identical parameters to those governing analogue LP replay' my first thought is 'ah - an analogue outfit trying to make its way in the digital world.' When I further read that the *Solo* is top loading, and that this is justified with the question 'after all, how many successful drawer loading turntables have you seen?' I begin to wonder about the competence

of their designers - or their scriptwriters. I have no argument with top loading CD players, but I can think of several good drawer loading CD players. In the area of the market that Micromega is involved in, I need only mention Wadia and Meridian. Come to think of it, how many good record players have you seen with a laser cartridge and a digital convertor?

In the real world, there are good reasons for designing the *Solo* the way it is, though I'm sure part of the charm is encapsulated in the opening sentence from another review from a confirmed vinyl junkie which was included with the *Solo*'s documentation: 'It was love at first sight when I espied the Micromega *Solo*, a CD player that looks like a record player.'

The bitstream equipped *Solo* clearly revels in its traditional charm. The display is of the simplest kind possible: just four digits with a colon spacer which in the default state indicate track and index numbers, with a simple elapsed track time readout a button push away. All the operating controls are lined up in a row next to the display, but these are membrane switches, mostly without LED indicators, of the kind that many of us learned to swear at in the Sinclair ZX80 home computer. There are not too many controls, so there is no excuse for bad

ergonomics, yet Micromega has conspired to make a real dog's dinner of the *Solo* layout. Mnemonics have been avoided: each key has a tiny written label on the front which will be very difficult to read (remember this is a top loader, and most conveniently positioned low down). The designer then appears to have arranged the controls - track skip, cueing, programming and not a lot else - in an entirely random sequence. The effect is maddening, and the controls themselves need a firm push to ensure correct operation. Maybe the *Solo* was designed by someone who not only liked analogue, but was going to carry on listening to analogue after the deed was done.

These comments are not aimed just at Micromega; the *Solo* merely epitomises the kind of nonsense that buyers of high-end equipment are often asked to put up with.

The other side of the coin is an evidently well thought through and built player based largely on Philips kit. The disc is positioned directly on the mechanism whose servo has been adjusted to allow for the extra inertia of a full disc-width puck which also damps the disc surface. A thick, heavy Perspex lid is then lowered prior to play, which helps shield the disc from vibration. The mechanism is sprung and damped to reduce microphony. The



literature talks in terms of three transformers: maybe I missed one, or the design has been altered. Either way, the digital electronics and each channel of the analogue side have their own independent supplies, which are definitely of the no-holds-barred variety.

Analogue outputs are complemented by coaxial and standard optical connectors. There is no headphone socket. There is a safety related issue with this player: a mains voltage switch is fitted to the rear which is a little too easy to change, and which is not shrouded. Otherwise, construction is first class - a real quality product, though an expensive one.

BBAP BB100 Integrated Amplifier

There are not too many valve integrated amplifiers, but this monster is one. Standing a full eight inches high, 18 inches wide and 14 inches deep (somehow it doesn't seem right to measure valve gear in centimetres) and dressed in bright metal with a perforated black cover which modestly reveals acres of glowing bottle, this is an intimidating looking beast that requires a considerable amount of house room next to the CD player. It is constructed in dual mono form, the only shared control being a centrally mounted volume knob, though it is flanked by two separate gain controls which used differentially provide a means of adjusting channel balance. There are two input selectors, one for each mono power amp, and around the back a similar split arrangement with the left and right input leads going to their respective sides of the panel. Such are the tribulations of the high end, or perhaps medium high-end in this case, but the controls are large and extremely well shaped, and the feeling of quality is unmistakable.

The BB100 has four inputs plus a tape circuit. One of the inputs is described as 'ext. phono' on the front panel. This refers

to the fact that it is electrically identical to any other line input, but that this one has been set aside for a record player fed via an outboard step-up of the kind that is beginning to become popular (eg Roksan *Artaxerxes*).

Valve amplifiers can be temperamental and/or flaky. This one is neither. It feels solid, and warms up quickly. No bias adjustments are required and noise and hum levels from the valve circuit are effectively in the transistor amp class. Just be careful not to leave your cheese sandwiches on top!

Kontrapunkt Loudspeakers

The name - Kontrapunkt - had a clearly Germanic edge, but aside from this I was in the dark when I received these speakers, with their extraordinary column stands which continue the lines of the speakers - a diminutive two-way - to the ground. The volume is filled with sand or lead and sand. I was unable to ascertain which, but they were damn heavy - it was springtime

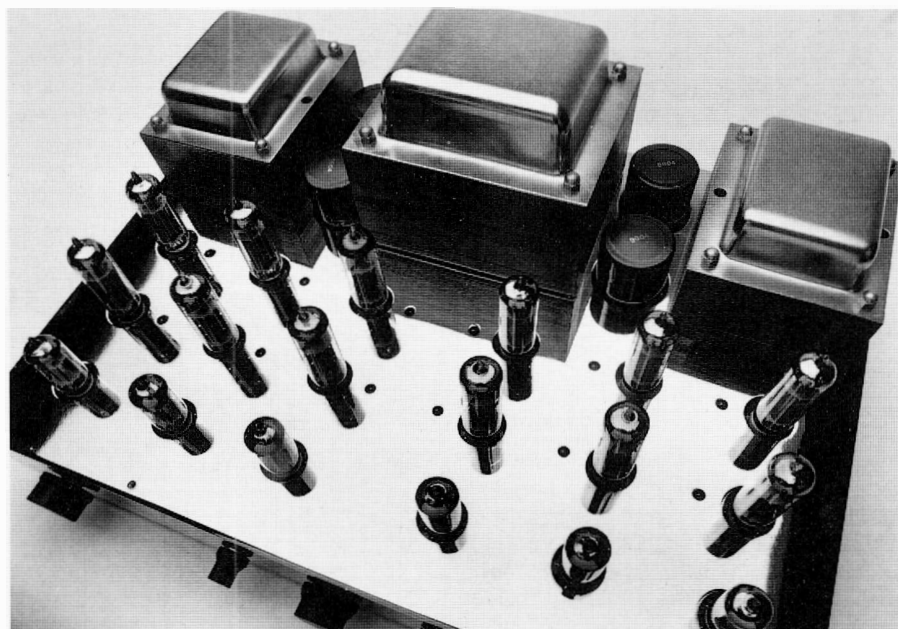
again when I tried them on the kitchen scales . . .

The issue of physical support is clearly important to Kontrapunkt. The floor standing columns are tapped for carpet piercing spikes, and the speakers are also spiked, the points engaging in cups tapped into the top face of the column. The speakers, which are not biwired, are internally lined with foam and wired with an unidentified heavily stranded cable, with the crossover housed in its own sealed chamber inside the deep enclosures. The bass driver is small but has a massive magnet; the tweeter is a soft dome unit.

Sound Quality

This is not an easy system to pin down. There is admittedly a certain unity of purpose about the three major components, each of which has a very distinct character of its own, and to this extent at least they are a sympathetic match, though whether the stronger term synergy is appropriate is a matter of interpretation.

The CD player is a particularly interesting item. I have now used the *Solo* in a wide range of systems and made a number of comparisons to other high-end players. From first to last, and that includes this system, it has been easy to listen to. Compared to a notional standard player it has a more weighty bass and a silkier, more restrained treble. As you might have guessed, this is very much a vinyl lover's CD player since its responses are archetypically vinyl like in origin, even down to a background which lacks the usual 'inky-black silence' that characterises Compact Disc (and which



can be a liability with an improperly dithered signal).

The trouble is that in disposing of the bathwater, and engineering such a civilised style of presentation into the bargain, Micromega has also chucked out the baby. Listening to the complex string parts in the finale of *Sibelius 5* was rather like viewing a film through slightly dirty glasses. The bass had plenty of weight and presence, yet somehow lacked power and speed, though this was only apparent through other wideband systems (eg the Meridian 6000 system); the BB100 and Kontrapunkt were well chosen to conceal the fact. I don't wish to overstate the shortcomings. Anyone coming to the *Solo* fresh from a diet of budget or middle price players from the usual commercial sources will find the Micromega a revelation. It is a fine player, and I would not have used it so consistently has it been otherwise. Yet for all this, in the end I found its lack of resolution a little frustrating, and its fruity and constant feeling of depth, almost irrespective of what the source material was like, a caricature.

I had some difficulties with the loudspeakers too, and of a more fundamental nature than I experienced with the Micromega, which I could still live with happily despite the criticisms. These I couldn't. In contrast to many German speakers, the Kontrapunkts are not bright, in fact they're positively dull, which suggests that they're specifically designed to counteract the chrome plating of many German electronics products. In addition, the midband had a congested quality bordering on hardness and which resulted in far more loss of information than could possibly have been contributed just by the reduced top end presence.

The bass is better. It doesn't go especially deep, but like other classy miniatures (sorry, like other classy miniatures; this one is not to be counted among their number) it is adept at covering its tracks. You might easily walk away at first thinking that the entire enclosed volume of the stand was loading the bass, which is how it looks. But hook up another speaker with real bass and you soon notice the bass lines that have completely disappeared.

For this at least the Kontrapunkt can't be held responsible. What there is of the bass is of extremely fine quality. It's tuneful, even and quick on its feet. The system is spoiled mainly by the smeared midband and a quick change to the (slightly larger) Acoustic Energy AE-1 has an effect akin from switching from a Ford Escort to a Ferrari. At last the music

sounded clear, colourful, transparent and had a real sense of internal shape and dynamic which almost literally shone through.

It transpires that one of the reasons why the Kontrapunkt sounds the way it does is the wood pedestal stand. Replacing it with the slightly taller stands produced by Acoustic Energy for the AE-1 alleviated a great deal (though by no means all) of the midband clutter, and gave the system a suggestion of sparkle for the first time. The only suggestion that springs to mind is that the large, flat frontage of the support acts as a secondary radiating area which produces a series of only slightly delayed reflections which would be expected to muddle and confuse the sound. But the stands were not the whole problem . . .

The BBAP amp, which is actually chrome plated, certainly does not sound it, and here at least I encountered something close to audio nirvana. I compared the BB100 to a Pioneer A-400 in this system (don't laugh: you'd be surprised what you can learn this way), but this turned out to be a joke, leaving the Pioneer floundering and sounding like a bag of loose transistors, which as a rule it definitely doesn't. The BB100 is a serious sounding piece of kit with a deeply satisfying bass and a midband which boasts a wholly natural layering in depth and tonal colour. Without actually appearing to highlight detail, the BB100 is exquisitely detailed. Dynamics are fully formed but quite unforced; the treble is naturally integrated, whilst the music just flows as though from an opened faucet. But it takes more than the rest of this system is capable of to exploit fully the BB100's potential.

Conclusion

The stern, severe sounding presentation of this system caused by the odd tonal balance of the loudspeakers, proved oddly winning at times, especially with middle

European and German music from Mahler through to Strauss (or should that be the other way around?), but I could not and would not wish to adapt to the loss of clarity and muddle in the mid and upper midband.

The Micromega is a folly but an endearing one, a player for those who miss vinyl and can't accept that CD should sound any different. It might seem like a good buy initially, but could quickly prove limiting.

The amplifier was a real surprise. Lacking most of the negative connotations of a valve amplifier, the BB100 simply sounded like a very good amplifier, providing music full of dynamic, tonal and spatial variety. It's only a pity it didn't have a better environment in which to demonstrate its virtues.



GENERAL DATA

Typical retail price	
Micromega Solo	£1,500
BBAP BB100 amplifier	£1,295
Kontrapunkt speakers	£800
Compact Disc Player	
Remote control	no
Headphone socket	no
Digital output	optical/coaxial
Dimensions	23x9.2x30.2 (wxhxd)cm
Amplifier	
Power output	n/a
MC cartridge compatible	no (see text)
No of inputs (ex tape)	4
No of tape circuits	1
Dimensions	45.8x20.1x35.5 (wxhxd)cm
Loudspeakers	
Type	reflex, 2-way
Recommended placement	open, stand mount
Impedance	n/a
Sensitivity	85dB (est)
Power handling	60 watts (est)
Dimensions	24x30x15 (wxhxd)cm

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This record playing package is built around a fine turntable, the latest version of the Pink Triangle, which in its new space saving guise dispenses with the large outboard power supply that used to be required. Separate pre and power amplifiers are specified though only the former needs to be on show if you want to keep things as inconspicuous as possible. The preamplifier is something of a bargain: a genuinely excellent valve preamp which is smaller than most transistor preamps, and which costs less than most good preamps of any kind (genuinely good preamps are still the rarest of all audio products). The loudspeaker is the semi-legendary Acoustic Energy *AE-1* which at an admittedly high price set new standards for near miniature loudspeakers when it was first shown a few years ago.

Pink Triangle PT Export Turntable, SME IV Arm, Shure VST-V Cartridge

The *PT Export* is a development of the Pink Triangle *PT-TOO* which was designed to mitigate the upwards pressure on prices that threatened to make the existing two box *PT-TOO* uncompetitive. To this end, the sophisticated external power supply has been dropped in favour of a simpler built in capacitor coupled power supply. By sharing the player's clothing, the price can be kept down (I'm not sure if that's the right word, but we'll let it pass) to £698. The outboard supply, which provides a more finely tuned drive signal that strongly reduces motor vibration, remains available. It's called

the *Pacesetter* (I'm pleased it's not called the *Pacemaker*; I'd have worried about what happened if it failed) and it costs £285.

With a couple of minor exceptions, the rest of the deck looks, and is, more or less the same. It is a lightweight structure with a finely built and superbly veneered box section plinth, a fabulous pink tinted lid and an opaque acrylic platter which is used 'nude.' The subchassis is Aerolam, a light, stiff honeycomb material, and the geometry of the deck - the size, shape and orientation of the various components - remains a key priority, the idea being to reduce the loss or muddling of information caused by structural resonances and feedback.

The arm chosen for this system was the SME *Series IV*, which is one step down from the top of the range *Series V*. This sophisticated tapered tonearm is of a complexity that most of SME's competitors simply would not be able to match at anything like the price, and enables the system to be adjusted optimally for a very wide range of cartridge and turntable types. The *PT Export* has a long travel, low rate and essentially undamped suspension which needs handling with care, especially when fitted with the SME *IV* arm whose cueing lever has a short and rather stiff action. It is possible to use the headshell fingerlift instead, but this is a flimsy and resonant item that ideally should be discarded.

The player is completed with a Shure cartridge, the *VST-V*. SME and Shure were once all but synonymous, so the combination bought a touch of *deja vu*,

not dispelled by the fact that this cartridge (an upmarket moving magnet with interchangeable stylus) is a derivative of the *V15-V*. It features a lightweight body and an optional damped tracking brush which takes a lot of the energy out of the arm/cartridge resonance while at the same time, preventing side swipe damage - and as a sideline, making a nice hot cup of tea.

Oakley Image Six Preamplifier & Musical Fidelity P180 Power Amplifier

A curious combination this one, but our two protagonists are not out of sympathy with each other if we see the *P180* as being closer to the world of valve amps than many amplifiers of its type.

The thermionic Oakley arrived a complete stranger to the author, and leaves only with regrets, though its time with me has not been wholly without incident. At first I found it difficult to resolve a severe hum problem which in the end turned out to be caused by an earth loop, solved (on the importers suggestion) by removing the earth to the system power amp. It then worked, tantalisingly well, for just about long enough to allow me to reach some sort of judgement about how it sounded and then - kapoom! - it started making disconcertingly loud noises through the system, and I had to pull the plug. I trust that my problem was atypical, and can only say in the Oakley's defence that apart from some minor details (the fit of the controls to their shafts was loose) the Oakley appears to be well built.

Despite the name, which conjures up images of English Heritage and Morris dancing, the Oakley is manufactured in Yugoslavia, and is sold here at a price level that would be difficult to match were it manufactured in this country.

The external simplicity of the design - there are two line inputs, a phono input (1mV sensitivity, and therefore not ideally suitable for most low output MCs), a tape circuit with monitoring, plus a volume control, with associated phono based circuitry, stage rear - belies a circuit of some sophistication. There are six valves in total, with four independently stabilised and regulated PSUs for the various gain blocks, an Alps volume pot, plastic film capacitors, and on the outside, decent phono socketry and machined controls. Finish is in a champagne gold, not the smoothest on earth but very presentable. The real surprise, however, is how they managed to cram it into such a small box.



conflicting ideas about music reproduction and/or the art (and it *is* a kind of art) of system building. On the whole though the system did rather well, both component by component and when looked at as a complete system.

The advice given earlier about speaker positioning is no mere recounting of a standard refrain. The *AE-1* is demanding in every possible respect. It is almost totally lacking in the forgiving qualities of other speakers, and nowhere is this care and attention more necessary than in the geometrical considerations - where to put the walls and floor in relation to *AE-1*, and how to keep the floor and the loudspeakers apart. If you put the *AE-1*'s on poor stands, or with their backs to a wall, or near a side wall (which is worst of all), it will kill the sound stone dead. The speakers will work of course and everything will seem perfectly normal, but very quickly you'll find yourself wondering why on earth you spent so much money in the first place.

The issue of stands is every bit as important. I have now used two pairs of *AE-1*s (the first pair has nothing to do with this test) over long periods with a range of stands, and have found only two stands which did the *AE-1* justice: the ones made by Acoustic Energy themselves, which unfortunately cost a lot of money, and a comparable pair made by Monitor Audio for the *Studio 10*, which unfortunately cost a lot of money. These are both tall column stands, spiked upwards as well as downwards, which are mass loaded to reduce resonances and lower the centre of gravity. With the *AE-1*, lightweight or short stands are a waste of space.

The Musical Fidelity *P180* power amp is the basic version of an amplifier which can grow by stages to a system that uses two *P180*s driven in mono, each with its power supply and current delivery boosted by the addition of outboard *CRPS* units. See the feature in issue 95. In its base form, the *P180* comes in one full width slimline box and a smaller outboard unit which houses most of the power supply (one bank of power supply capacitors is fitted in the main power amp). The *P180* is stuffed to the plumb-line with individually heat-sinked metal-cased power FETs, of which there are ten pairs in total. The circuit is derived from the *A270* and *A370*, but with less wellie, bulk - and for less money. Build quality is good but not exotic, though the front panel is a neat piece of work.

Acoustic Energy AE1 Loudspeakers

Last but certainly not something or other, the Acoustic Energy *AE-1* was chosen to complete the system. The *AE-1* was originally introduced about three or four years ago, and has been the subject of a certain amount of fine tuning over that period. A bad patch when certain *AE-1*s were escaping with poor crossover alignment seems to have been left in the past, and the current *AE-1* is back on top form.

When first introduced, the *AE-1* was the first loudspeaker in modern times to feature a true metal cone bass driver (as opposed to a standard cone with a metal strip between the dust cap and the suspension) apart from the Jordan Watts module (see *Elite Sir David* on page 95). Coupled to a metal dome tweeter, the combination provides a potential homogeneity or common purpose not otherwise achievable when using a metal dome as a tweeter. The two drivers are built into a heavy but compact and unobtrusive box which is partly filled

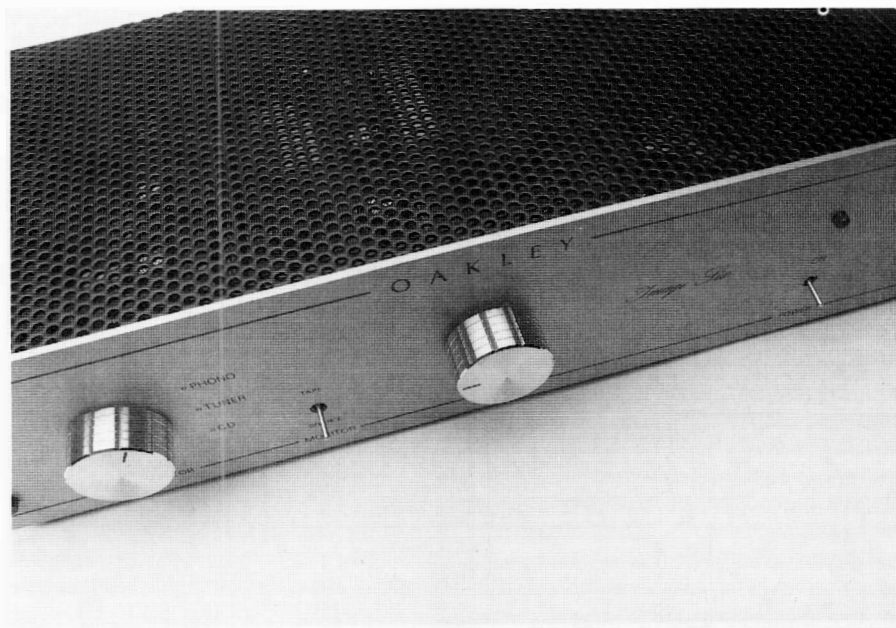
with a plaster like material which makes the internal cavity irregular in shape and bolsters the enclosure itself. Both of these things reduce unwanted acoustic output from the system, and inhibits resonances associated with (otherwise) parallel internal panels.

*AE-1*s used only to be available in a rather stylish stippled grey finish. The test pair was finished in a first class veneered finish which is a welcome development.

The *AE-1* is comparatively insensitive, and the *P180* isn't left twiddling its thumbs when driving them. Although small, the *AE-1* is also somewhat space consuming, because it should be used on tall stands (around 60cm high) well clear of walls and other obstructions. Biwiring is particularly beneficial with this system.

Sound Quality

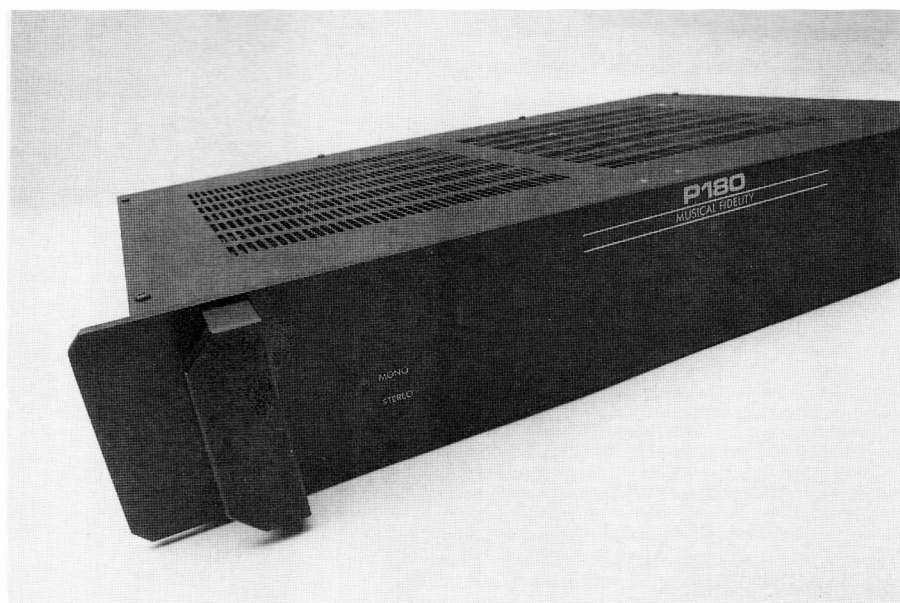
Few systems come in more mixed flavours than this one. The components are from sources which in some cases espouse



The reason why the *AE-1* is so demanding is less to do with any intrinsic peculiarity or fussiness than its unusually explicit character. This is a gusty, dynamic and forceful transducer which has a bass end so solid and so tight you won't believe it issues from the hi-fi equivalent of a matchbox. The midband and treble are no less explicit, and the result is nothing less than an astonishingly vivid performance standard with an emphasis on large image scale and authority quite out of keeping with the *AE-1*'s diminutive proportions.

The test as far as the *AE-1* and the system as a whole is concerned is whether the turntable and the amplifier are up to the task, and the answer is clearly, yes. Tested with other speakers from this test and confirmed with the *AE-1*, the combination of turntable and amplifier gave a large scale and boldly painted sound. But there were caveats. The Pink Triangle was tested briefly with a Dynavector 17D2 (from another test system) and compared to the *Rock Reference/Excalibur* and my own Roksan *Xerxes/Artemiz* with the same cartridge, which tended to confirm an impression that the PT is fairly close to the Roksan. The latter however, offers a somewhat more stable and solid bass and superior soundstage recreation and depth imagery. But both are extremely polished performers which sound subtle and sweet with the Dynavector. The *Rock* simply sounded like a train, or a very good Compact Disc player (in the positive sense), and it proved difficult to make direct comparisons.

The Dynavector, which in many ways is a well above average moving coil, is an improvement on the Shure which



however, remains an excellent cartridge of its type with real vitality and life. It tracks well (this was always a hallmark of the better Shures) and offers excellent analysis of complex passages, even in the bass, though I formed a general preference for the sound when the tracking brush was raised (and the tracking force adjusted to suit) which had the subjective effect of lowering the noise floor, providing an apparent greater dynamic range and more vivid tonal colours. This effect wasn't always noticeable I hasten to add.

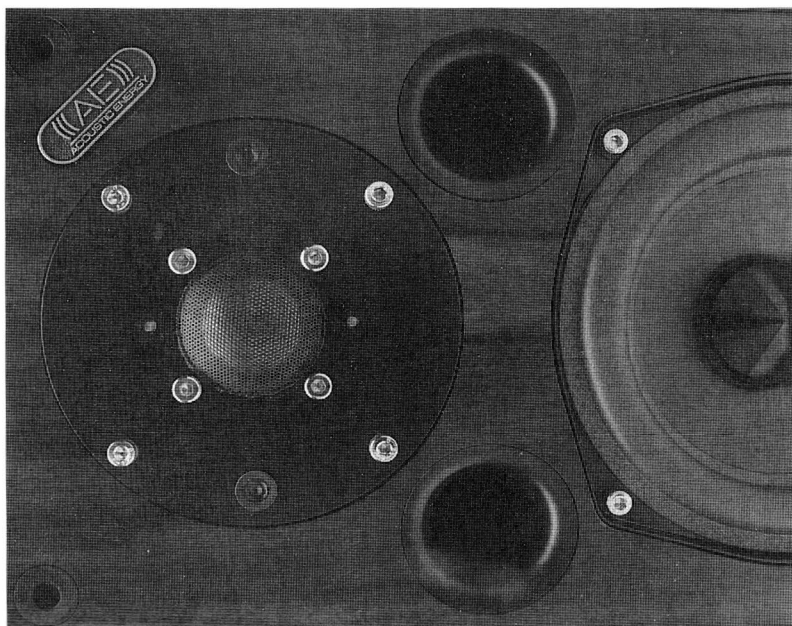
The amplifier acquitted itself well. Apart from the teething problems I experienced with the preamp, I can report that it performed excellently, with a rather unvalvelike liveliness and lack of noise - yes, even through the phono input! The effect was very fluid and lucid, but it had a solid bass to match, and the Musical Fidelity proved faithful to these qualities whilst controlling the speakers well. However, the system responds well to adding a second *P180*, which exerts much

more effective control over the loudspeakers.

Conclusion

This could be described as a compact high-end system. Each piece of equipment is neat and easily housed, the only problem here being the loudspeakers. Although close to qualifying as miniatures, the *AE-1*'s usage of floor area is by no means as abstemious as the physical dimensions imply because of the requirement to use tall stands and to keep them away from reflective surfaces.

Musically the system sings. Despite being a very assorted bunch of components, they all do the important things right and in combination they pull in the right direction. There are real gains to be had in consistency, stability and imagery, however, by doubling up the power amplifier complement. The *P180* can be switched from stereo to mono for this purpose.



GENERAL DATA

Typical retail price	
Pink Triangle PT Export/SME IV/	£651/827
Shure VST-V	£176
Oakley Image Six	£499
Musical Fidelity P180	£799
Acoustic Energy AE1	£747

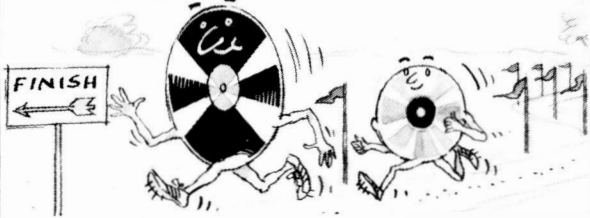
Turntable	
Type	belt drive, manual
Speeds	33/45
Cartridge	low output MC
Dimensions	45x16x39 (wxhxd)cm

Pre/power amplifier	
Power output	100 watts/channel
MC cartridge compatible	no
No of inputs (ex tape)	3
No of tape circuits	1
Dimensions - pre	39x9.3x19 (wxhxd)cm

Loudspeakers	
Type	2 way bass reflex
Recommended placement	open, stands
Impedance	8ohms
Sensitivity	88dB
Power handling	200watts (approx)
Dimensions	18x29.5x25.5 (wxhxd)cm

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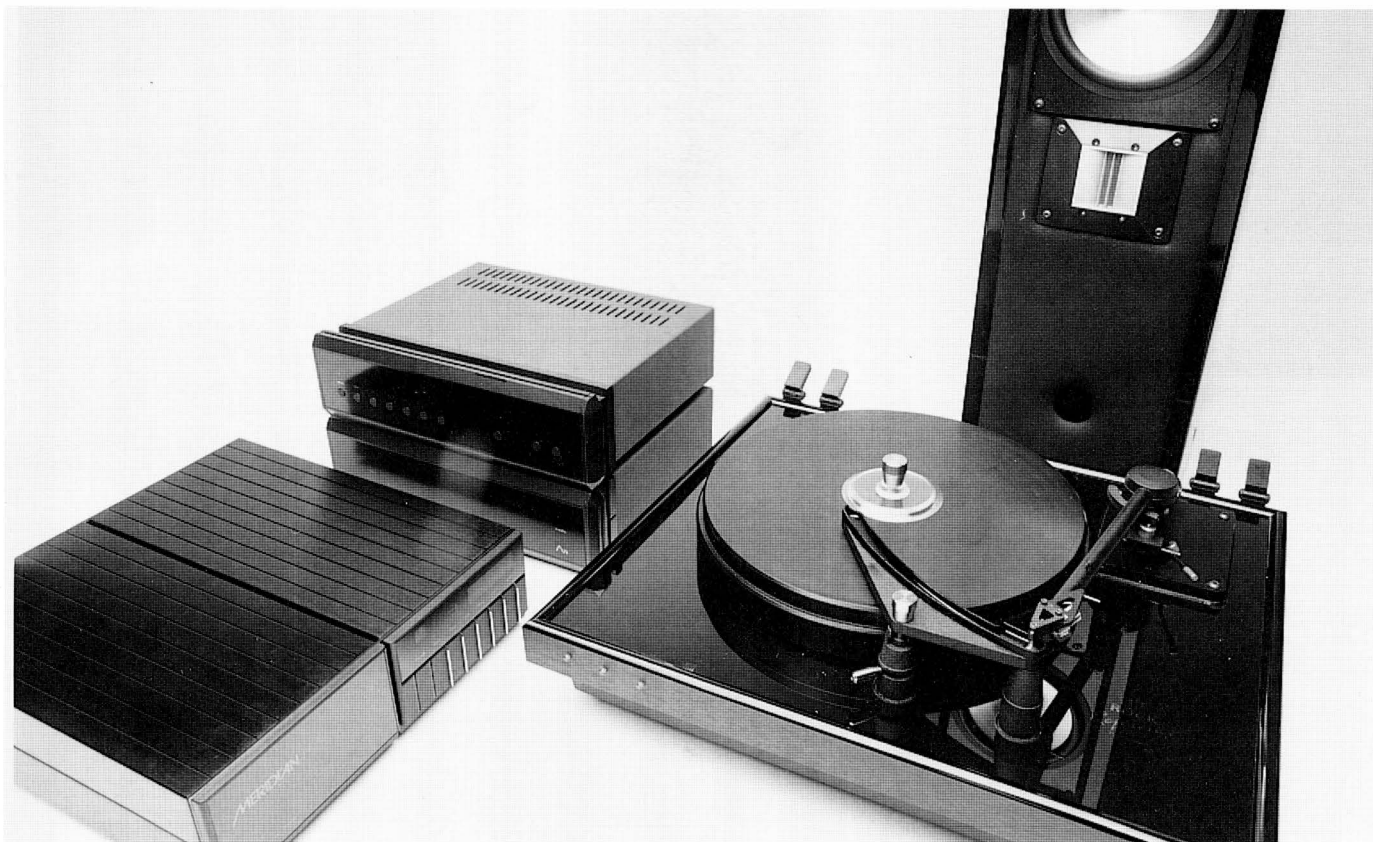
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ELITE TURNTABLE & ARM, DYNAVECTOR CARTRIDGE, AVI AMPLIFIER, MERIDIAN COMPACT DISC PLAYER & ELITE LOUDSPEAKERS



By any standards this is a heavyweight system. Costing around £7,000, and featuring both record and CD playing source components, at least some of which can be legitimately described as state of the art, while some are highly innovative. Now read on . . .

Elite Rock Reference Turntable, Excaliber Arm, Dynavector 17D2 Cartridge

Already well known to many readers, the *Rock Reference* is one of three or maybe four turntables made in this country, or at best twice that number worldwide, to which the title 'best turntable in the world' could be attached. In this country its key competition comes from Linn and from Roksan, but the differences between these three are such that they cannot be compared directly. This is especially so of the *Rock Reference*.

In the past five years or so, the *Rock Reference* has been through a number of upgrades. The *Reference* is in every sense the culmination of the series, and of all the ideas in materials technology, bearing design and above all damping as a means of controlling the stylus/record interface, that Elite has developed (with more than a little help from the Cranfield Institute of Technology) over a long period of time.

As always, the *Rock Reference* chassis, bearing and platter have been conceived as an inert platform for the record, which is bolted into intimate contact with the carefully shaped platter using a screw-on centre clamp. The plinth is an enormously heavy item filled with plaster of Paris, which sits on three heavily damped suspension units. The platter is a tour de force, a sandwich construction with many inserts around the periphery made of a different material to provide differential damping of resonances, which are largely dissipated as heat. The processes which the platter in particular goes through are long, labour intensive and costly. With this turntable at least you're not paying for mystique or cachet. You're paying for engineering and hard graft, pure and simple.

The arm is also Elite's own, and carries an outrigger paddle (improved in the latest version) which tracks through a silicone filled trough that is positioned over the record. This applies damping which is at its most effective at the arm/cartridge resonance defined by cantilever compliance and arm mass, and which flattens the response in this region, typically cleaning up low frequency garbage by orders of magnitude. The effect of the damping tails off at higher

frequencies. So slothful is the fluid used that the chances of contamination of records is negligible.

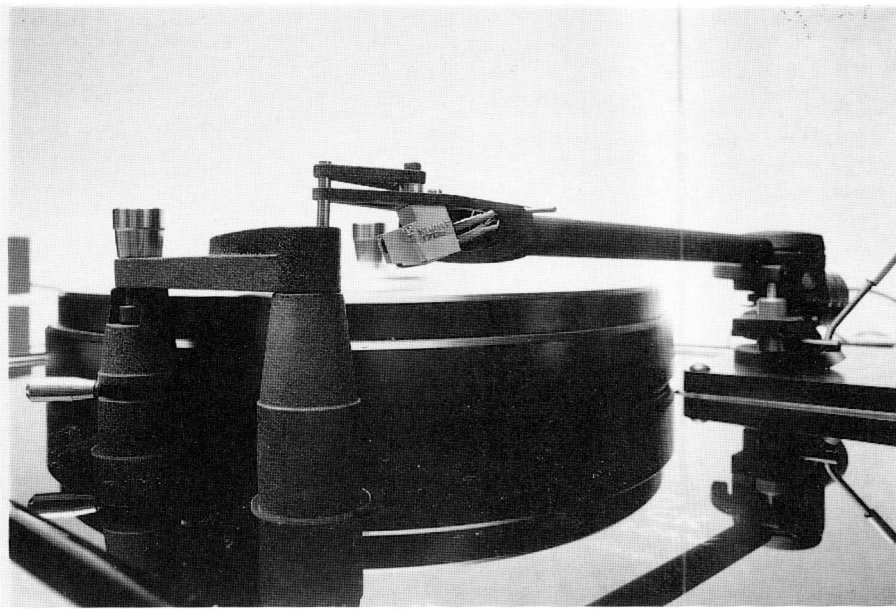
The *Rock Reference* has one feature that previous *Rock* variants lacked: a suitably exotic looking suit of clothes. In general it now looks worth the money it costs, but there are still a few rough edges, and in the test sample, the touch sensor 33/45/off switch progressively failed to respond. It went wrong more frequently as the test progressed. A more modern and reliable type of switch should be substituted.

The cartridge chosen on this occasion was the Dynavector 17D2 Mk II, a low output moving coil featuring a short diamond cantilever.

Meridian 602 & 606 Compact Disc Player

This flagship CD player is housed in two separate units, each consisting of two of Meridian's standard width boxes bolted together. The 602 is the transport and provides a digital output in standard optical or coaxial (electrical) formats. The 606 is a D/A converter, capable of handling the output of the 602 and of other sources.

The 602 has a very solidly engineered transport mechanism which slides out on command to accept the disc. A number of



in the future) and other status information. When volume is adjusted, the source selectors change to a bar graph mode to show the volume level selected. During standby, the unit remembers its full operational status as though it was a mechanically operated unit.

Elite Sir David Loudspeakers

Nobody could accuse any of the products in this test of slavishly following fashion, or of taking the easy way out. Even by these standards however, the *Sir David* is what you might call unusual . . .

The *Sir David* (I've made representations about the name, but it's done no good) is described by Elite as a 'miniature' loudspeaker. Anyone who knows Max Townshend of Elite will not be surprised to learn that his 'miniature' measures 33x65x38cm and at 25kg would incur a substantial excess baggage penalty if taken on board an aircraft. And those figures are *each!*

The *Sir David* in effect is a derivative of the *Glastonbury*, and uses a single almost full-range drive unit, a 12cm unit with a soft aluminium cone (from Jordan Watts) which as Elite points out, easily predates the units from sources like Monitor Audio and Acoustic Energy, who have often been ascribed (not least by myself) with the modern reinvention of the metal cone driver. In fairness to all concerned though, each of these units uses rather different technologies. The one used here has the tremendous advantage in that it can cover the range from 23Hz (in this case - with appropriate loading) to 14kHz.

This alone is sufficient to explain the open, coherent sound from this speaker,

measures have been taken to reduce microphony.

Controls are limited to basics, with control conventions broadly comparable to the familiar Philips instruction set, though there are differences. Sadly the ability to select the start of the current track in one operation and audible (but not non-audible) cueing have been excluded. The display area is a dot matrix panel with a full alpha-numerics capability, though Meridian has erred on the discrete side as befits such a polished looking (and immaculately constructed) product. Like the 606, the 602 has a high grade anodised case finish with a glass front panel.

The 606 has four inputs, two optical and two electrical, and can accept signals with all the usual sampling frequencies, 32, 44.1 and 48kHz. Predictably, the audio circuit is very carefully designed with a pronounced 'sound first' emphasis, the convertor being built around the Philips 7350 dual differential Bit Stream chip. Key transport and laser components are also from Philips.

AVI S2000MP & S2000MM Pre & Power Amplifier

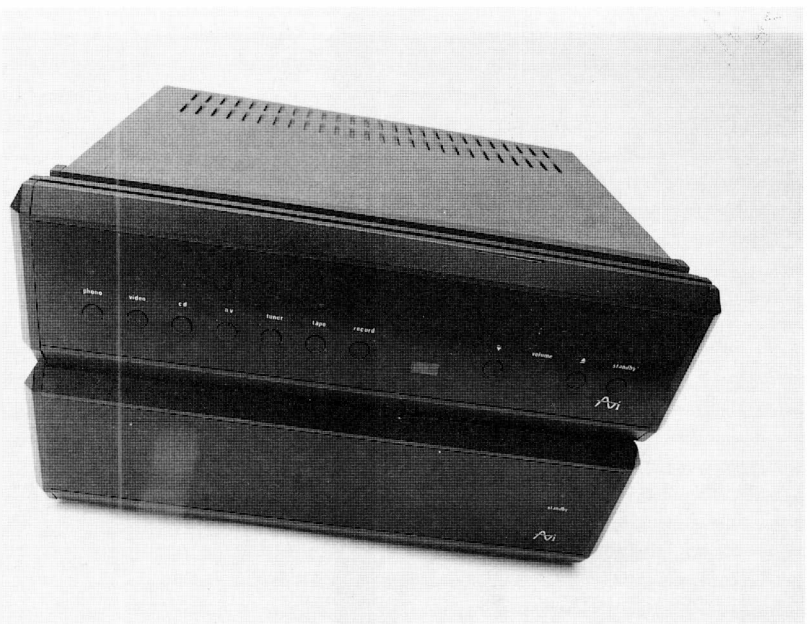
AVI is a new company which was founded by the talented ex-designer of Kelvin Labs, who produced a brand of excellent, functional amplifiers. The AVI range is somewhat more glamorous, both visually (though it has some way to go before it can equal the B&O's of the world) and, more important, operationally.

The amplifier chosen for this review is a full component design consisting of a preamplifier and twin monoblocs (though a stereo power amp is available). The three compact boxes are uniformly styled, and feature a rather Gothic machined front panel fronting a standard metal case. Build quality is excellent, both inside and out, and if I feel slightly surprised as I write this, it is because bigger, better established

companies often do much worse.

In contrast to most amplifiers of the genre, the AVI has an ambitious and sophisticated user interface. There are no useless inclusions such as tone controls or filters, but it is possible to select a source to record separately from the one that feeds the loudspeakers. Inputs provided include phono (MC or optionally MM) tape and four line inputs.

The AVI can be operated by a remote handset which accesses one function, muting, which is not available locally. The handset is not supplied: the deal is that AVI will programme a programmable handset of your choice. Volume control is achieved using a motorised ALPS potentiometer rather than a stepped ladder type network which is often used on remote control amplifiers, and which usually takes the edge off sound quality. LEDs above each input show which tape and listen source are selected (but not which is which until bicolour LEDs are introduced, which is scheduled to happen



which is lacking in the phase distortion and general kludge that crossovers normally bring to the upper midband. The leaf (cf. ribbon) tweeter takes over above 14kHz, by which point the ear is essentially deaf to phase anomalies and other crossover nasties, the only crossover component required for the tweeter being a solitary series capacitor.

In one telling paragraph in the accompanying technical notes, it is explained that no attempt was made to achieve a rigid cone construction, which is frequently held up as the theoretical ideal. 'Simple maths alone shows that any cone will start to flex at frequencies above 300Hz no matter how much stiffening is applied - the finite speed of sound in the cone sees to that!' Soft aluminium and a carefully contrived termination ensures good self damping, and the cone is said to be the 'lightest cone in any bass speaker' - just 4gm!

Again, I can only quote the technical notes in support of the proposition that the enclosure is built 'like no other.' It is designed to offer unprecedented levels of stiffness to avoid blurring the sound. To this end, the enclosure is based on a complex steel girder construction welded from 30 individual parts. The six open sides are then built up from fibreglass reinforced plaster of Paris to a depth of 320mm and then baked for five days prior to being covered in foam rubber, cloth and finally black gloss finished steel sheet. The aim of the system to is to be able to respond to transients and not to dissipate the energy in the cone by allowing the baffle or the structure of the speaker to move. This of course is nothing more than any loudspeaker is supposed to do.

One unusual feature of the *Sir David* is that it sits directly on the floor. The base is tapped to accept carpet piercing spikes. Bass alignment loading takes the floor into account, whilst the tweeter faces upwards by about ten degrees, which brings the listener to above tweeter height at a normal listening distance.

Sound Quality

Each time I have come to grips with the *Elite Rock Reference* in the past, I have been delighted by the way it makes music. A Linn, Roksan or Pink front end each have their own, somewhat more gentlemanly virtues, and in comparison the *Rock* can sound rather brightly lit, almost as though the music was being hyped up. This may be due to small scale resonances in the arm affecting treble performance, which are perhaps more exposed in the *Rock* where the low and mid bass are so finely controlled, but either way the matter is



more one of taste than of substance.

The bass is in a class of its own. The *Rock Reference* has a combination of lustiness, depth and control and genuine tunefulness that compare to a good CD player, and which I'm afraid makes most more conventional turntables sound a bit sick. But you'll never know anything about this unless the system has an unusual resolving power in the bass.

In this system, the *Rock Reference* has the measure of the Meridian, which easily matches the *Elite* at low frequencies, but which acquires a somewhat lighter and more laid back tone higher up. The CD player is perfectly at home with Meridian's own speakers but can fall slightly flat with the *Sir Davids*. A good match still, but this is one system that sounds special with vinyl.

I'm not wholly convinced that the AVI is quite on a par with the source components or the loudspeakers; a sample of the Beard valve amp used elsewhere in this project was pressed into service for part this test, and turned out to suit it remarkably well, complementing the system's big, open mouth quality.

Still, in its characteristically slightly more antisepic way the AVI is good too, and in both combinations the system truly earned its stripes as articulate and easy to live with. The speakers ought to have sounded over the top, but didn't, though their bass end proved strong medicine which will take even experienced listeners a long time get to grips with. But there's no gainsaying the attractive, open quality the speakers provide, mainly it seems because of their extraordinary LF capabilities. There is none of the dryness that afflicts many smaller systems, yet the highly prominent bass entirely sidestepped the charge of sounding heavy or leaden, which systems with an extended LF often do. In the end, I'm not sure that realism is entirely well served, but the bass sure made a damn fine noise!

There were problems higher up. The midband and treble were open, lucid and offered superb resolution, but this was accompanied by more than a suggestion of tinselly and of feathery colorations. There was something raucous going on, which sounded like an unrestrained resonance associated with the top of the main driver passband. At the same time, the sound had such tremendous lucidity and range, that such cosmetic failings receded in importance to the point where they generally didn't intrude, at least not excessively. Nevertheless some added development work is called for to get this aspect right.

Conclusion

I'd sooner have a system that opened its door wide at the expense of occasionally sounding a little ragged than one which was always punctiliously correct but was as dry and as sterile as dust. If you agree, and you can afford the entry price, this system, or something very like it, should be near the top of your shortlist.

GENERAL DATA

Typical retail prices	
Elite Rock Reference/Excaliber/	£1,995/£695
Dynavector 17D2	£280
Meridian 602/606	£1629
AVI S2000MP/S2000MM	£499/£699
Elite Sir David	£1,195

Turntable	
Type	belt drive, manual
Speeds	33/45
Cartridge	low o/p MC
Dimensions	48x15x46 (wxhxd)cm

Amplifier	
Power output	100 watts/channel
MC cartridge compatible	yes
No of inputs (ex tape)	6
No of tape circuits	1
Dimensions	31x9x25 (wxhxd)cm

Loudspeakers	
Type	2-way
Recommended placement	floor standing, open
Impedance	8ohms
Sensitivity	85dB
Power handling	75watts (approx)
Dimensions	33x65x38 (wxhxd)cm



Bill Hutchinson Ltd.



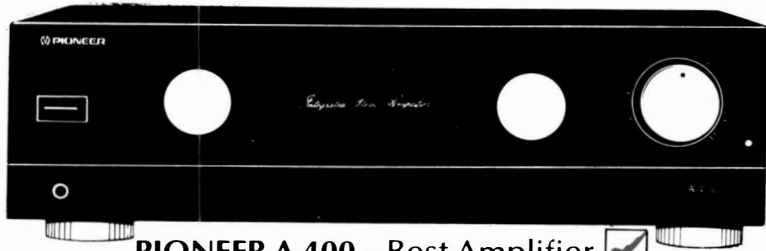
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PIONEER A 400 – Best Amplifier

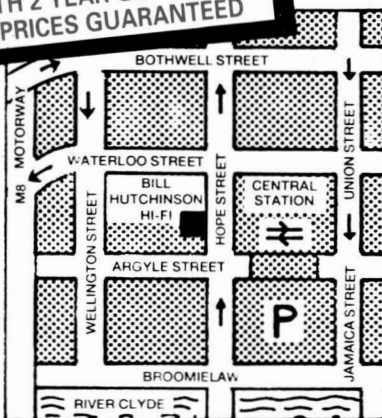
AUDIO TECHNICA AT 110E – Best Cartridge

WARFEDEALE DIAMOND IV – Best Speakers

SYSTEMDEK IIX – Best Turntable

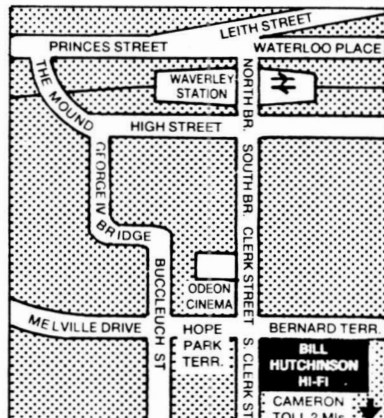
TECHNICS RS B465 – Best Cassette Deck

ROTEL RCD 865 – Best CD Player



43 HOPE STREET
GLASGOW G2 6AE

041-248 2857



43 SOUTH CLERK STREET
EDINBURGH EH8 9NZ

031-667 2877



87a CLAYTON STREET
NEWCASTLE NE1 5PY

091-230 3600



Reader Offers

Welcome to our new mail order section, where along with old favourites such as the Furakawa interconnects and CD extracts you will now find a whole new range of goodies to improve the performance of your system. These pages are only the start of the service that we hope to provide and we will be sourcing a number of new and interesting products as the next few months go by which will be added to our offers pages as they become available.

Static Elimination Spray And Lubricant £7.99

200ml of specially formulated record cleaning and lubricating fluid, contained in a pump action fine spray bottle which affords a protection from static electricity. The fluid forms a fine, harmless, lubricating layer in the grooves of the disc which results in lower stylus drag, a cleaner, smoother high frequency sound delivery and prolonged record life when applied regularly.



Static Elimination Spray And Lubricant With Four Wet/Dry Record Cleaning pads £10.99

As above but with the addition of four wet and dry record cleaning pads.

Record Clamp £11.99

Damps vinyl resonance by clamping the record to the turntable's platter thus increasing the ability of the stylus to retrieve information from the disc's grooves without the disc's own inherent resonant frequencies interfering with the groove to stylus interface. Will work with most popular turntables.

Record Cleaning Pad And Stylus Cleaning Kit 1 £12.99

An entire record cleaning kit containing 50ml of static elimination spray and lubricant, a Teak handled

velvet applicator pad and 20ml of isopropyl alcohol based stylus cleaner and brush.

Everything necessary for prolonging the life of LPs and cleaning stylus all in one handy kit.

Record Cleaning Pad And Stylus Cleaning Kit 2 £4.99

An entire record cleaning kit consisting of 75ml of isopropyl based record cleaning fluid, four applicator pads and a stylus cleaner and brush.

Manual CD Cleaning Kit £5.99

45ml of CD cleaning fluid together with an applicator, jig and a cleaning pad for the removal of harmful dirt from Compact Discs.

Carbon Fibre Record Groove Cleaning Brush £4.99

A record cleaning brush for the removal of dirt and dust from deep in the grooves of records. Should be used before every play of a record in order to remove dirt and dust which otherwise interferes with sound and becomes deeply imbedded in the record.

The fine carbon fibres reach deep into the grooves to remove dirt and eliminate static all in one sweep of the record.

The carbon fibres are single strand as opposed to two joined strands and as such are less likely to fall out. A copper conductor contacts the strands and removes static electricity through a metal handle.

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. This can be easily cleaned with the supplied cleaner after use.



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 Compact Disc cleaner and cleaning fluid and a carbon fibre record cleaning brush.

System Cleaning Kit 2 £11.99

As above but for those of you who don't have a turntable to contend with. Contains auto



reverse wet tape head cleaner and cleaning fluid, a manual CD cleaner and cleaning fluid

Tape Head Cleaner £1.49

Dry type cassette head cleaner to remove the build up of oxides from the tape heads.

Monotrak Support Cones £8.00

Supplied in packs of four, these turned steel support cones are ideal for supporting just about any item of hi-fi, from sub-woofers through to amplifiers. Effective isolation and de-coupling at a bargain price.

Interconnects

We have a variety of interconnects on offer, all sourced from the respected Japanese specialist Furakawa.

The FV11 Series unbalanced digital interconnect cables

The FV11 Series comprises a range of unbalanced digital interconnects designed to carry a high frequency square wave pulse signal such as that transmitted from a CD transport to a separate DAC, or a video to a TV set. The cables consist of a one piece PCOCC co-axial cable terminated in hard gold plated all PCOCC RCA plugs. The carrying conductor consists of seven strands of 0.4mm drawn PCOCC insulated with foamed polyethylene.

The PCOCC braid gives 95 per cent coverage and a soft PVC outer sleeve covers the entire cable. The maximum conductor resistance is 21ohms per kilometre, the nominal capacitance is 57pF

per metre at 1kHz and the characteristic impedance is 75ohms at 10MHz.

The *FV11 Series* of cables is available in 0.5, 1, 1.5 and 2m lengths at a cost of 42.50, 45.50, 52.50 and 57.50 pounds each respectively.

The FD11 Series unbalanced digital interconnect cables

The *FD11 Series* of digital interconnects, which is supplied in matched pairs, differ from the *FV Series* insofar as they are designed for the interface following conversion from digital to an analogue signal of 75ohms impedance such as that from a CD player or a tuner to preamp or an integrated amplifier.

The carrying conductor consists of 37 drawn strands of PCOCC dual insulated for maximum isolation from vibration, in polyethylene with a further foamed polyethylene insulation between it and screen. The screen also acts as a return signal path on this cable and has in excess of 95 per cent coverage for maximum isolation for RF interference.

The outer sleeve consists of soft PVC and Furakawa hermetically sealed all PCOCC plugs are employed for termination. The maximum conductor resistance is 25ohms per kilometre, the nominal capacitance is 56 pF per metre at 1kHz and the characteristic impedance is 75 ohms at 10MHz.

The *FD11 Series* of unbalanced interconnect cables are available in matched pairs of 0.5M, 1M and 1.5m lengths at a cost of 75.00, 85.00 and 95.00 pounds respectively.

The FA21 Series balanced analogue interconnect cable

The *FA21 Series* of analogue interconnects is supplied in matched pairs employing the Furakawa all PCOCC RCA plug with a flying earth or ground lead which is designed to be terminated to the ground tag of the source component for the purpose of transmitting a balanced signal with a totally separate ground path.

The signal and return conductors consist of 30 0.18mm drawn PCOCC strands which are insulated in polypropylene and twisted down a further insulation of foamed polypropylene in order to isolate the delicate audio signal conductors from

vibration. Twisting the conductors ensures optimum rejection of electro magnetic interference.

Polypropylene, with its lower dielectric constant improves the analogue audio signals velocity and reduces signal loss. The PCOCC braid offers in excess of 95 per cent coverage and the entire cable is covered in a soft flexible PVC outer sleeve.

The maximum conductor resistance is 27ohms per Km, the nominal capacitance is 40pF at 1kHz and characteristic impedance is 120ohms at 10Mhz.

The *FA Series* of balanced interconnect cables is available in matched pairs of 1m and 1.5m at £95 and £105 respectively.

These interconnect cables are recommended for the connection of analogue devices where RCA sockets are provided, such as power amplifier to preamp and tape deck, turntable, step-up transformer etc. to a preamp or integrated amplifier. They can introduce a wide stereo image with good depth and height.

Furukawa FA11S Series balanced analogue interconnect cable

The *FA11S Series* of analogue interconnects is supplied in matched pairs employing the Furakawa all PCOCC RCA plug with a flying earth or ground lead.

The signal and return conductors consist of the purest form of solid cast PCOCC of 1.05mm diameter insulated in polypropylene and twisted down a further insulation of foamed polypropylene.

A PCOCC braid offers in excess of 95 per cent coverage and the entire cable is covered in a sleeve of soft, flexible PVC.

The solid conductor exhibits lower resistance to DC which carries the low to middle frequencies of the audio signal and the occupation area of the skin effect is greater than that of a multi strand construction, therefore resistance of the AC or the high frequency audio signal is lower.

The maximum conductor resistance is a low 21 ohms per Km, the nominal capacitance is 70pF at 1kHz and the characteristic impedance is 75 ohms at 10Mhz.

The *FA11S* super cast PCOCC

series of balanced cables represents the ultimate in cable design utilising very high quality cast PCOCC. The growth of the single grain structure during the PCOCC casting process is a slow procedure which runs at only a few centimetres per minute, however, the quality of the conductor thus produced is so superior that improvements in listening pleasure will be immediately apparent. The *FA11S* super cast PCOCC interconnect is available in matched pairs of 1m at £200 per pair. These interconnect cables are recommended for the connection of high quality analogue devices. Their ability to transmit a vast amount of information has the effect of creating an awe inspiring bass, transparent mid range and simply superb unfettered treble.

Used with appropriate components, the *FA11S* super cast PCOCC series interconnects have the ability to create a wall of sound with excellent focus, depth and height.

Speaker Cables

Furukawa FS-2T14 PCOCC speaker cable

FS-2T14 PCOCC speaker cable is Furukawa's entry level speaker cable consisting of two 1.4mm square drawn PCOCC concentric strands contained in a polypropylene insulation with a conductor resistance of 13.5 ohms per kilometre and capacitance of 58 pF/m at 1 KHz.

The conductors are twisted and protected from a mechanical shock by fillers of cotton and a carrier layer of paper.

The entire assembly is surrounded in an outer jacket of soft PVC with an outer diameter of 7.2mm.

Furukawa FS-2F09 PCOCC speaker cable

FS-2F09 PCOCC speaker cable consists of two 0.09mm square drawn PCOCC strands with a conductor resistance of 22 ohms per kilometre and capacitance of 35 pF/m at 1 kHz contained in a neat, flat, flexible PVC insulation.

The *FS-2F09* is highly regarded by audiophiles around the world.

Furukawa FS-2T30F Evencap speaker cable

FS-2T30F PCOCC speaker cable consists of two 3mm square drawn PCOCC rope lay strands with a conductor resistance of 10.7 ohms per Km and a capacitance of 50 pF/m at 1 kHz.

The conductors are contained in a polypropylene insulation and are twisted in a bed of cotton yarn in order to reduce adverse affects from mechanical interference. A sleeve of soft PVC covers the entire assembly.

A non magnetic cord is wound down the centre of each of the conductors in order to prevent attenuation of the audio signal at low and middle frequencies by reducing the effect of constant variations of electrostatic capacitance at each conductor's centre.

FS-2T30F speaker cable, by virtue of its low resistance and 3mm section, increases the audible bandwidth, most particularly in the low frequencies.

FS-2T20P PCOCC speaker cable

FS-2T20P consists of two twisted 2mm² drawn PCOCC strands laid in a concentric pattern. The two conductors are insulated in polypropylene and contained in a circular outer sleeve of soft PVC.

By virtue of its larger section, *FS-2T20P* has lower resistance at 10ohms per km, capacitance is 85pF per metre at 1kHz.

Furukawa FS-2T35P PCOCC speaker cable

FS-2T35P is a large cable with low DC resistance and an appropriately larger occupation area for the skin effect, therefore bass is larger and treble is even sweeter. The *FS-2T35P* is produced from six concentric laid conductors in a rope lay.

Twisted and insulated in polypropylene with a soft PVC outer sleeve, conductor resistance is 5.34ohms per km and capacitance is 80pF per metre at 1kHz.

Furukawa FS2T55F Evencap speaker cable

FS2T55F is a 5.5mm 2 rope lay cable of similar construction to the *FS2T30F*. Conductor resistance is very low at 3.8ohms per kilometre and capacitance is 50pF per metre. The diameter is 14.2mm.

Audiophile Recordings



Regular readers of our offers pages will notice that there have been quite a few changes this month. As you will probably be aware, we have been running a selection of titles sourced from America, most notably from labels such as Reference, Wilson and Sheffield. We are working as hard as we can to clear the backlog of orders

and would ask readers to bear with us. We readily admit that the situation with stock has been a little chaotic over the last few months and as a result we have decided to withdraw these recordings from the offers page until we can again be assured of a guaranteed chain of supply. Apologies to those of you who had to wait for a record,

or CD but we hope that you understand that by their very nature some of these recordings are very hard to get hold of - for us as well as you!

To offer you a bit of a change we have been looking around for other sources of supply and as a result you will see that we have a number of new titles on offer, new for us that is. With labels

such as Linn, Altarus, Largo, ECM and GRP to chose from there should be something for everybody.

Over the next few month we will be adding to the list and hope to be able to provide a much needed source of quality vinyl, although those of you with the silver disc bug will certainly not be excluded.

Hi-Fi Choice Records

Artist	Title	Label	Format
Carol Kidd	Carol Kidd	Linn	LP/CD
Carol Kidd	All my tomorrows	Linn	LP/CD
Carol Kidd	Nice Work	Linn	LP/CD
Carol Kidd	The Night We Called It A Day	Linn	LP/CD
David Newton	Victim Of Circumstance	Linn	LP/CD
Martin Taylor	Don't Fret	Linn	LP/CD
Chico Freeman	Brainstorm	In & Out	LP/CD
Buster Wliiams	Something More	In & Out	LP/CD
Gene Harris	Listen Here	Conord	CD
M&S Stockhausen	APARIS	ECM	LP/CD
Keith Jarrett	Paris Concert	ECM	LP/CD
Dave Grusin	Raven	GRP	LP/CD
Dave Grusin	Mountain Dance	GRP	LP/CD
John Surman	The Road to St Ives	ECM	LP/CD
Pat Metheny	As Falls Wichita	ECM	LP/CD
Steps Ahead	NYC	Intuition	LP/CD
Jon Hassell	Power Spot	ECM	LP/CD
Shanker	Song For Everyone	ECM	LP/CD
Susannah McCorkle	No More Blues	Concord	LP/CD
Carl Anderson	Pieces Of A Heart	GRP	LP/CD
David Torn	Cloud About Mercy	ECM	LP/CD
Ana Caram	Rio After Dark	Chesky	LP/CD
Clarke Terry	Portraits	Chesky	LP/CD

Classical

Composer	Artist	Label	Format
Busoni, Piano Music	John Ogdon	Altarus	LP only
Bartok & Enescu	Sherban Lupu	Altarus	LP only
Weill, Songs	HK Gruber	Largo	CD only
Kevin Volans	Various	Landor	CD only
Judith Weir, Operas	Various	Novello	CD only
Meridith Monk	Vocal Ensemble	ECM	CD/LP
Mozart, Vivaldi, Bach	Polish Chamber Orchestra	Linn	Double LP/CD
Bartok, Elgar	William Coway & Peter Evans	Linn	LP/CD
Cello sonatas	English Classical Players	Linn	Double LP/CD
Mozart 40th and Schubert 5th	Royal Philharmonic	Chesky	LP
Moussorgsk:	Boston Symphony Orchestra	Chesky	LP
Bare Mountain/Pictures			
Ravel: Daphnis et Chloe			

Choice Offers Order Form

Records and Compact Discs

- Carol Kidd: Carol Kidd**
 Ref LP39 (£9.99)
 Ref CD39 (12.99)
- Carol Kidd: All my tomorrows**
 Ref LP43 (£9.99)
 Ref CD40 (12.99)
- Carol Kidd: Nice Work**
 Ref LP41 (£9.99)
 Ref CD41 (12.99)
- Carol Kidd: The Night We Called It A Day**
 Ref LP42 (£9.99)
 Ref CD42 (12.99)
- David Newton: Victim Of Circumstance**
 Ref LP43 (£9.99)
 Ref CD43 (12.99)
- Martin Taylor: Don't Fret**
 Ref LP44 (£9.99)
 Ref CD44 (12.99)
- Chico Freeman: Brainstorm**
 Ref LP45 (£9.99)
 Ref CD45 (12.99)
- Buster Williams: Something More**
 Ref LP46 (£9.99)
 Ref CD46 (12.99)
- Gene Harris: Listen Here**
 Ref CD47 (£13.99)
- M&S Stockhausen: APARIS**
 Ref LP48 (£9.99)
 Ref CD48 (£13.99)
- Keith Jarrett: Paris Concert**
 Ref LP49 (£9.99)
 Ref CD49 (£13.99)
- Dave Grusin: Raven**
 Ref LP50 (£9.99)
 Ref CD50 (£13.99)
- Dave Grusin: Mountain Dance**
 Ref LP51 (£9.99)
 Ref CD51 (£13.99)

- John Surman: The Road to St Ives**
 Ref LP52 (£9.99)
 Ref CD52 (£13.99)
- Pat Metheny: As Falls Wichita**
 Ref LP53 (£9.99)
 Ref CD53 (£13.99)
- NYC: Steps Ahead**
 Ref LP54 (£9.99)
 Ref CD54 (£13.99)
- Jon Hassell: Power Spot**
 Ref LP55 (£9.99)
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- Bartok & Enescu: Sherban Lupu**
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 Ref LP72 (£12.99)
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Furukawa Price Table

Please circle the cables you require.

Interconnects

	0.5m	1.0m	1.5m	2.0m
FB11 (each) RCA-RCA	42.50	45.50	52.50	57.50
FD11 (pair) RCA - RCA	75.00	85.00	95.00	NA
FA21 (pair) RCA-RCA	NA	95.00	105.00	NA
FD11S (pair) RCA-RCA	NA	220.00	NA	NA

Fibre optics

	0.5m	1.0m	1.5m	2.0m
FO11 (each) TOSLINK	NA	37.50	42.50	NA
FO12 (each) TOSLINK	NA	90.00	100.00	NA
FO13 (each) TOSLINK	NA	105.00	120.00	NA

Speaker cables

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

	FS2T14	FS2FO9	FS2T20P	FS2T30F	FS2T35P	FS2T55P	FS2T15
1.0m	38.00	37.00	44.00	53.00	56.00	74.00	129.00
1.5m	42.50	41.00	51.50	65.00	69.50	96.50	179.00
2.0m	47.00	45.00	59.00	77.00	83.00	119.00	229.00
2.5m	51.50	49.00	66.50	89.00	96.50	141.50	279.00
3.0m	56.00	53.00	74.00	101.00	110.00	164.00	329.00
3.5m	60.50	57.00	81.50	113.00	123.50	186.50	379.00
4.0m	65.00	61.00	89.00	125.00	137.00	209.00	429.00
4.5m	69.50	65.00	96.50	137.00	150.50	231.50	479.00
5.0m	74.00	69.00	104.00	149.00	164.00	254.00	529.00
6.0m	83.00	77.00	119.00	173.00	191.00	299.00	629.00
7.0m	92.00	85.00	134.00	197.00	218.00	344.00	729.00
8.0m	101.00	93.00	149.00	221.00	245.00	389.00	829.00
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HYPERTEC, 66-68 Saint Lyles St, Bedford. (0234) 325066. Pioneer Reference Point, Tannoy, Bang & Olufsen, Musical Fidelity, B&W, Rotel, Wharfedale, Dual, Marantz, Alphason. Demo facilities, Private demo room by appt. Home trial facilities, Free installation, Service dept. Access, Visa, Hypertec, credit charge. Mon-Sat 9.30-5.30, closed Thurs. WENTWORTH AUDIO, 83 High Street North, Dunstable. (0582) 663383. Pioneer, Marantz, Pink Triangle, Musical Fidelity, Yamaha, Ariston, Linn, Acoustic Energy, Revox, Monitor Audio. 2 large single speaker dem rooms. 1 general showroom. No appt. nec. Home trial. Free install Service dept. Access & Visa. Tue-Sat 10-6

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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. NEWBURY AUDIO, 2 Weavers Walk, Northbrooke St., Newbury, Berkshire RG13 1A1 (0635) 33929. 6 days 9.30-6.00. Linn, Naim, Roksan, Exposure, Creek, Epos, Royd, Denon, Nakamichi. Single speaker dem. Room. Appts. necessary. Home trial facilities. Free installation. Service dept. Late appointments. Access, Visa. Interest free credit subject to status. 6 days 9.30am-6pm

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JEFFRIES HI-FI (PORTSMOUTH), 29 London Road, Portsmouth PO2 0BH (0705) 663604. 2 dem rooms, Closed Mon. Late night Wed. Parking. Bus Route. Credit fac.

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HYPERTEC, 6 Bancroft Road, Hitchin, Herts SG5 1JQ. (0462) 452248. B&W, Denon, Marantz, Musical Fidelity, Pioneer Reference Point, Rotel, Tannoy, Wharfedale, Bang & Olufsen, Linx, Alphason. 2 dem rooms without appt. Private dem room + evening dem by appt. Home trial. Free install. Service dept. Access, Visa, Hypertec credit charge. 9.30-5.30. Closed Wed

STUDIO 99, 82 High Street, Harpenden. (05827) 64246. Linn, Naim, Meridian, Rega, Nakamichi, Mission/Cyrus, Quad, Creek, KEF, Bang & Olufsen, Yamaha etc. Quiet single speaker dem room. Appts nec. Home trial, free install. Service Dept. Visa/c, Access/c & finance terms. 9-5.30pm (Mon/Sat). Closed Weds.

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STANDEENS, 92a High Street, Tonbridge, Kent TN9 1AP (0732) 353540. Pink Triangle, Kelvin Labs, TDL, Ruark, Marantz, Quad, Musical Fidelity, Micromega, NAD, Arcam, 2 Dem rooms, Home trials Free installation and Service dept Access & Visa. HP Terms and Bada credit charge. 9.00-5.30 Mon-Sat except Wed 9.00-1.00.

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TONBRIDGE HI-FI, 96 Woodlands Road, Gillingham, Kent (0634) 52858 Linn, Naim, Rega, Pink Triangle, Exposure, Creek, JRT, Sony, Ruark, KEF, Arcam etc If your interest is music pay us a visit & find out what we do
TONBRIDGE HI-FI, 31 High Street, Tunbridge Wells, Kent. (0892) 24677. Linn, Naim, Rega, Pink Triangle, Exposure, Creek, JRT, Sony, Ruark, KEF, Arcam etc. If your interest is music pay us a visit and find out what we do

VOLUME ONE, 41 Upper Wickham Lane, Wellington, DA16 3AD. 081 304 4622. Arcam, Creek, Dual, Epos, Exposure, Mordaunt Short, Monitor Audio, Nakamichi, Pink Triangle, Rotel. Large demo room, no appt nec, darts & snooker facilities Evening dems in shop by appt. Home trial & demo, free delivery & installation Access & Visa, credit up to £1000. 9.30-5.30 Mon-Sat

V J HI-FI, 29 Guildhall St, Folkestone (0303) 568600, Mon-Sat 9-6. NAD, Yamaha, Marantz, Cambridge Audio, Denon, Kenwood, Rogers, Dual, Musical Fidelity, Quad, Dem and home trial facilities, free install, credit to £1000. Amex, Diners, Visa, Access. Service dept

V J HI-FI, 119 High Street Margate. (0843) 226977. Mon-Sat 9-6. NAD, Yamaha, Marantz, Cambridge Audio, Denon, Kenwood, Rogers, Dual, Musical Fidelity, Pioneer. Dem and home trial facilities, free installation, credit to £1000. Amex, Diners, Visa, Access. Service dept

LANCASHIRE

MONITOR SOUND, 54 Chapel St, Chorley. (02572) 71935. A&R, Denon, Dual, Pioneer, Quad, Rogers, Rotel, Spondor, Technics, Thorens, etc. 2 dem rooms Open Mon-Sat, closed Weds. Free installation. Credit to £1000 Access, Visa Service dept

NORMAN AUDIO, 216 Church Street, Blackpool FY1 3PT 0253 295661. For details see Preston branch entry (below). Open 9-5.30, Closed Wed

NORMAN AUDIO, 131 Friargate, Preston PR1 2EE (0772) 53057. Fax 562731 Sony Hi-Fi News Area Winner. Aiwa, B&W Loudspeakers, Denon, Marantz, Mission, Cyrus, Monitor Audio, Nakamichi, Quad, Roksan, Rotel & many others! 2 lux. dem. lounge. Home trial by arrangement. Free install. Service dept Inst cred facs with several companies. Most credit cards accepted. 6 days 9-5.30.

LEICESTERSHIRE

ALPHA AUDIO, 1-3 Guildhall Lane, Leicester LE1 5FQ (0533) 530330. Allison, AR, Denon, Luxman, Proton, Revox, Teac, Thorens, plus lots more. 3 dem rooms Jovial, friendly, crazy staff. Relaxed atmosphere. Home trial facilities, free installation, service dept on premises. Credit facilities (sort of interest free) 10-5, closed Thurs afternoons (sometimes)

MJS HI-FI, 80 Stapleton Lane, Barwell, Leicester LE9 8HE. (0455) 46977. The Rock, Audio Innovations, Kelvin Labs, Snell, Helius, Sugden, Ruark, Concordant, Valdi, JPW. Dem and home trial facilities. Mon-Sat 9.30-7.00. Free installation and service dept. Visa, Access

THE LEICESTER HI-FI CO, 6 Silver Walk, St. Martins Square, Leicester LE1 5EW. Tel: (0533) 539753. Fax: (0533) 626097. Arcam, Creek, Marantz, Mission/Cyrus, Musical Fidelity, Nakamichi, QED Hi-Fi, Quad, Rogers, Roksan, "and oodles more" 2 dem rooms, home trial arranged, free install. service dept Credit facilities. Access, Visa, Diners, Amex. 6 days 9.30-5.30. Leicestershire's only Bada member.

BADA
SOUNDS AROUND, 146A Clarendon Park Road, Leicester LE2 3AE. (0533) 702442 (Specialists in used Hi-Fi). A.R. Celestion, TEAC, Mordaunt Short, Tannoy, Marantz, Wharfedale, Philips. No appts necessary, free installation. Service dept. Access, Visa. Tue-Sat 10-5.

LINCOLNSHIRE

BOSTON HI-FI CENTRE, 65a Wide Bargate, John Adams Way, Boston, Lincs PE21 6SG. (0205) 365477. Quad, Nakamichi, Creek, Ariston, NAD, Denon, Marantz, Castle, Rotel, JPW. Separate demo studio. Home trial. Free installation. Service dept. Access, Visa, Hi-Fi Markets Chargecard. Tues-Sat 9-5.30pm

LONDON

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

AUDIO ACOUSTIC, West Ealing. (081) 998 9041 Audio Dimensions, Audio Innovations, Audio Note, ATC, D.C.M. Glastonbury, Goldring, Helius, Infinity & Modulus, JPW, Lynwood, Mana Acoustics, Marantz Audiophile, Michell, Nuo, Ongaku, Oracel, Originative, Ortophon MC3000II + MC5000 + T3000, Piratas, Rata, Revox, Rotel, Rose Industries, Rock Reference, Snell, Supra, Systemdek, Target, Triangle Products, Valdi, Vecture, Voyd & Reference Voyd. Home demos Free install. Single Spkr Demo, Free System Design. Free knowledgeable service. Access, Visa, 9.30-6pm. Till late Mon-Sat. Demo by appt, please

AUDIO CHOICES, 66 High Road, Leytonstone, Stratford E15. (081) 534 6987 Marantz, A&R, Musical Fidelity, SD Acoustics, Rotel, Audio Technica, Ruark, Roksan, Moth, Nakamichi, B&W, Van den Hul, Dual, Pink Triangle, Alison Acoustics. Dem room, home dems within M25 area. 10.30-7.30
AUDIO VENUE, 24 Church Road, Crystal Palace, London SE19 2ET. (081) 771 7787 Linn, Naim, Nakamichi, Marantz, Dual. Credit available 2 yr warranty 2 demo rooms. Closed Weds

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

CORNFLAKE SHOP, 37 Windmill Street (just off Tottenham Court Road), London W1 (071) 631 0472. Mon-Sat 10-7. Rega, Roksan, Naim, Monitor Audio, Koetsu, Marantz, Yamaha, SME, DNM, Epos. Three dem rooms Delivery and installation service. Credit facilities. Access, Visa

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

BADA
GRAHAMS HI-FI, Canonbury Yard, 190a 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

BADA
THE HI-FI FACTORY, 103 Kirkdale, Sydenham, SE26 4JQ. 081 291 0095. Bose, Tannoy, Mordaunt Short, Cerwin Vega, Celestion, JVC, Kenwood, Philips and many more plus cheaper ex-demo systems & separates available. Demos available. No appts nec, 7 day exchange home trial, installation available, service & repair dept. Access, Visa, instant credit available up to £1000 subject to status. 10.30-7pm Mon-Sat

JUST MUSIC, 52 Upper Tooting Road, London SW17 7PB. (081) 767 1233 Aiwa, Dual, Denon, Marantz, Quad, Rogers, Thorens, Musical Fidelity, Sugden, Heybrook and many more. Dem facilities. Appts can be arranged. Home trial. Free installation available. Access, Visa, Amex, Hi-Fi Markets Chargecard, Creditcharge, finance arranged. 10am-7pm Mon-Thurs, 10-6 Fri & Sat

KAML A ELECTRONICS, 251 Tottenham Court Road, London W1. (071) 323 2747. Alchemist, Alphason, Audio Innovations, B&W, Cerwin Vega, Conrad Johnson, Furukawa, Infinity, Jeff Rowland, JPW, Kenwood, Kuzma, Linx, Micromega, Moth, Nakamichi, Oracle, Philips, QED, Revolver, Ruark, SD Acoustics, Systemdek, TEAC, Wharfedale & millions more. Demo facilities and home trial. Major cards and currencies accepted. Mon-Sat 10-6

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

NICHOLLS HI-FI, 430-434 Lee High Road, Lewisham, London SE12 8RW. 081 852 5780 Sony, Technics, Harman, JBL, Mordaunt Short, Kenwood, Panasonic, Halfer, Sumo, B&W. Demo facilities, no appt. nec., home trial facilities, free installation, service dept. Credit available, Visa, Access. Open 9.30-6 Mon-Sat. Thurs 9.30-1pm

SOUND ORGANISATION LONDON, 1 Cathedral Street, London SE1 9DE. (071) 403 2255/3088 Linn, Rega, Roksan, Micromega, Radford, Rotel, Nakamichi, Onix, Creek, Naim, Exposure, Royd, Heybrook, Epos. Interesting new equipment always under evaluation. Single speaker listening room. Credit facilities. Appts preferred, free install, Service dept. Open Tues-Sat 10-6. Late dem. by appt SOUND SENSE, 350 Edgeware Road, London W2 1DX. (071) 402 2100. Alphason, B&W, Nakamichi, Celestion, Cambridge Audio, Dual, Denon, Monitor Audio, Marantz, NVA, Sony ES. Appts preferred. Installations available. Access, Visa. Standard credit facilities. Mon-Sat 9.30-6.30

SOUTH LONDON HI-FI & VIDEO, 210 Brixton Hill, Streatham SW2 (081) 674 4433/2033 Denon, Rotel, Yamaha, Kenwood, Tannoy, B&W, Inakamichi, Dual, Thorens, Technics, Monitor Audio, Single speaker demo room. Appts. not nec. Installation available. Service Dept. Access, Visa, Amex. Interest Free & Standard credit. 9-6. 6 days

STUDIO 99, 79-81 Fairfax Road, London NW6 (071) 624 8855. Linn, Naim, Meridian, Rega, Quad, Nakamichi, Mission/Cyrus, KEF, Bang & Olufsen, Yamaha, Creek etc. 2 single speaker dem rooms. Appts. nec. Home trials, free install. Service dept. Visa/c, Access/c & finance terms. 10-7 Mon-Fri, 10-6 Sat.

BADA
TIME AND TUNE, 218/220 Whitechapel Road, London E1 1BJ (071) 247 0567/8/9 Akai, Aiwa, Bose, Hitachi, Kenwood, Mitsubishi, Panasonic, Philips, Pioneer, Sony, Technics. Home trial facilities. Free installation. Service dept Instant HP 9.30am-6pm Mon-Fri, 9.30am-2pm Sun, Sat. Closed TUNE INN, 124-126 St. Mildreds Road, Lee, London SE12 0RG. 081 698 4446 Huge range of fully guaranteed used equipment, Part exchange welcome. Full service facilities. Great after sales. Demos available on all equipment. Best offers for unwanted equipment...collection arranged. Access, Visa, Amex, credit facilities. Mon-Sat 10-6.30.

GREATER MANCHESTER

THE AUDIO COUNSEL, 12 Shaw Road, Oldham, Manchester OL1 3LQ. (061) 633 2602 Linn, Naim, Rega, Rotel, Arcam, Micromega, EPOS, Creek, Nakamichi, Denon. 2 dem rooms. Free install. Visa, Access. Licensed credit brokers up to £1000 instant credit. 10.00-5.30 Tues, Weds, Sat. 10.00-7.30 Thurs, Fri Closed Mon

CHRIS BROOKS AUDIO, 10-12 Oak Street, Hazel Grove, Stockport SK7 4EJ. (061) 419 9050. Tues-Sat 10-6. 2 dem rooms, credit facilities. All credit cards. Just like the Warrington shop - total absence of bull****

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MURRAY HI-FI, 19 Middle Hillgate, Stockport (061) 429 7666 Linn, Naim, Rega, Arcam, Yamaha, Royd, Epos, Creek, Nakamichi, Rotel. Full demo facilities, free installation & delivery, service dept. Full 2yr guarantee on all products. Access, Visa, Lombard Tricity, licensed credit broker. 10-6 Tue-Sat SWIFT HIFI DELIVERY, 12 Chapel Street, Cheadle (061) 428 7222. Arcam, Denon, Kenwood, Marantz, NAD, Cyrus, Rotel, Pioneer, Mission, Tannoy. Demo room 9.30-6. Closed Wed

MIDDLESEX

HARROW AUDIO, 27 Springfield Rd, Harrow (081) 863 9038 Mon-Sat 9.30-5.30. A&R, Audiolab, Cyrus, Denon, Dual, Heybrook, Linn, Monitor Audio, Musical Fidelity, Quad, Rotel, Tannoy etc
NORTHWOOD AUDIO, 126 Pinner Road, Northwood, Middlesex HA6 1BP. (0927) 420877. Exposure, Musical Fidelity, Pink Triangle, Manticore, Audio Innovations, Rotel, Ruid, Ruark, SD Acoustics, Moth. Dem room Home trial Free install. Access, Visa 9-6 Mon-Sat

The Choice Dealer Directory

BRITISH AUDIO DEALERS ASSOCIATION

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THE ULTIMATE IN
SOUND ADVICE

RIVERSIDE HI-FI LTD, 422 Richmond Road, East Twickenham, Middlesex TW1 2EB. Tel. (081) 892 7613 Fax (081) 892 7749. A.R., Arcam, Audio Innovations, Castle, Dual, Denon, KEF, Luxman, Michell, Musical Fidelity, Micromega, Marantz, Nakamichi, Rotel, 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.

UXBRIDGE AUDIO LTD, 278 High St, Uxbridge, Middx UB8 1LZ. (0895) 30404 (Multi-line) A&R, AR, Ariston, Creek, Cyrus, Denon, Dual, JPW, KEF, Manticores, Meridian, NAD, Nakamichi, Quad, Rotel, Wharfedale, Yamaha, etc. 2 dem rooms. Mon-Sat 10-6. **BADA**

MERSEYSIDE

BETTER HI-FI, 16 Cook St, Liverpool L2 9RF. (051) 227 5007. Linn, Naim, Quad, Arcam, Audio Innovations, Threshold, Creek, Denon, Yamaha, Mordaunt Short 3 dem rooms. Home trial. Free install. Service Dept. Access, Visa. Instant credit up to £1000. 0% on certain items. 9-5 Mon-Sat

W.A. BRADY & SON, 401 Smithdown Rd, Liverpool L15 3JJ. (051) 733 6859. 'Largest choice of specialist Hi-Fi in N.W. £100-£20K'. All credit cards. 3 dem rooms. Closed Monday. **BADA**

IN CONCERT HI-FI, 144 Seaview Road, Wallasey, Wirral, Merseyside. (051) 630 5055. Denon, Kenwood, QED, G-Alexander, Spica, Shan Acoustics, Systemdek, Musical Fidelity, Audio Dimensions, Voyd. Single speaker dem. room. Home trial, free installation. 10-6 - closed Mon. Access, Visa

WEST MIDLANDS

AUDIO CENTRE MAINWAY, Sharing Asda Car Park, High Street, Bloxwich, Walsall, W. Midlands. (0922) 473499/493499. Meridian, Kef Reference, Arcam, Quad, Rogers, Musical Fidelity, TDL, System Dek, Moth, QED Elect, Ariston, Linn, Audio Technica, JPW, Van den hul etc. The Midlands most exclusive Hi-Fi Centre with private listening studio. Open evenings by appt. Home trial. Free install. Own service dept. Inst credit. Chargecard. Interest free. Access, Barclaycard. Mon-Sat 9-5.30

BRIDGE HI-FI, 3 Tudor House, Bridge St, Walsall. (0922) 640456. NAD, Dual, Yamaha, Kenwood, Technics, Pioneer Mission, Celestion, Denon, Mordaunt Short. Appts required, Home trial & free install. Access, Visa, Diners, Amex Credit to £1,000. 9.15-5.30 Mon-Sat. Service dept

FRANK HARVEY HI-FI EXCELLENCE, 163 Medieval Spon Street, Coventry. (0203) 525200. All major agencies. Free inst. Service dept. Part ex 3 dem rooms. Mon-Sat 9.30-5.30. Wed til 8pm. **BADA**

GRIFFIN AUDIO LTD, 94 Bristol Street, Birmingham. (021) 692 1359/(021) 622 2230. Castle, Creek, Cyrus, Denon, Linn, Marantz, Naim, Quad, Rega, Rotel. Tues-Sat 10-6. **BADA**

HORNTON ELECTRONICS (1987) LTD, 8-9 Lower Temple St, Birmingham B2 4JD. (021) 643 0972. Aiwa, Acoustic Research, Denon, Marantz, Mordaunt Short, JVC, Mission, Sony, Technics, Wharfedale. Credit to £1000. Access, Visa. 9-5.30 Mon-Sat. Service dept

MUSICAL APPROACH, 37 High Street, Aldridge, Walsall, W. Mids. (0922) 57926. Linn products, Arcam, Creek, NVA, Revolver, Onix, Epos, Marantz, Rotel, Quad & more. Dem facs. Home trial. Service dept. Credit facs available. Access, Visa. 9.30-5.30 Mon-Sat. 9.30-1 on Thurs.

MUSICAL MATTERS, 351 Hagley Road, Edgbaston, Birmingham B17 8DL (021) 4292811. 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

NAAM HI-FI VISION, 122-123 New Street, Birmingham. (021) 633 4944. Pioneer, Akai, Aiwa, Panasonic, Toshiba, Hitachi, Bose, Wharfedale, Sony. Demo facilities available, appointments preferred. Access, Visa, 10 month interest free credit. Amex, Lombard Tricity Creditcharge. Mon-Sat 9-6.00

SUPERFI, 67 Smallbrook, Queensway, Birmingham B5 4HZ. (021) 631 2675. Specialist Hi-Fi stockists of: Audio Lab, Musical Fidelity, Quad, Pioneer, Yamaha, Rotel, Wharfedale, Tannoy, Celestion and many more. Single spker rooms by appt. **BADA**

NORFOLK

BASICALLY SOUND, The Old School, School Rd, Bracon Ash, Norwich NR14 8HE. (0508) 70829. Arcam, Linn, Naim, Denon, Spondor, Exposure, Audio Technica, Creek, Rega, Epos, etc. 2 comprehensive dem rooms. Home trial. Free installation. Visa, Access, HP facilities. Tues-Sat 9.30-1, 2-5.30

MARTINS HI-FI, 5 High Street, Kings Lynn (0553) 761683. Est 1968 **BADA**

MARTINS HI-FI, 85/91 Ber Street, Norwich. (0603) 627010. Est 1968 **BADA**

SOUND APPROACH, 161a Unithank Road, Norwich. (0603) 622833. Kuzma, Ariston, Castle, Denon, Exposure, Ion, Royd, NVA, Roksan, Ruark, etc. etc. Dem and home trial facilities. Mon-Sat 9-6.30. Free installation. Credit to £1,500. Visa, Access, Diners Club. Service dept

NORTHAMPTONSHIRE

CLASSIC HI-FI + VIDEO, School Lane, Kettering, Northants. (0536) 515766. Rotel, Musical Fidelity, Wharfedale, Monitor Audio, Yamaha, JBL, Dual, Marantz, Kenwood, Kef, Celestion, and many more. Home trial, free instal., service dept. Access, Visa, credit facs 9.30-5.30pm

CLASSICAL SOUNDS, 84E Watling St East, Towcaster NN12 7BS. Tel. 0327 359588, call for details

THE AUDIO SHOP, Coffee Tavern Court, High St, Rushden. (0933) 56651. Denon, Goldring, Ariston, Tannoy, Royd, Mordaunt Short, JPW, Ion Systems, Rotel, Creek, Dem room. Home trial and free installation. Mon-Sat 9.30-5.30 (Thurs 9.30-2). Service dept.

NOTTINGHAMSHIRE

CHANTRY AUDIO, Chantry Walk, 18a Eldon Street, Tuxford, Newark, Notts NG22 0LH. (0777) 870372. Pink Triangle, Royd, JPW, Rotel, S.D. Acoustics, NVA, Michell, Art Audio (valve), Kelvin Labs, Sumo and much more. 2 dem rooms, appts preferred. Home trial, free installation. Access, Visa & credit facilities and mail order. Mon-Fri 10am-4.30pm. Sat 9.30-5.30. Sun home dem by appt. Closed Weds.

DEFINITIVE AUDIO, (0602) 241000. For a carefully considered approach to building a true hi-fidelity audio system with components derived from the following manufacturers: Systemdek, Goldring, Revox, Voyd, Audio Innovations, Snell, Audionote, SME, Helius, Impulse, TEAC, Deltac, Wadia, Ortofon Premier dealer, Pioneer Reference Point dealer, Huygens loudspeakers. Demos by appt please. Please phone for further details. Installation free of charge. Mon-Sat 10-7pm, Closed Wed a.m.

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.

OXFORD AUDIO CONSULTANTS LTD, Cantay Hse, Park End Place, Oxford OX1 1JE. (0865) 790879. Oxford Acoustics/Audio Research, Krell, Magneplanar, Apogee, Aragon, Stax, Marantz, Wharfedale, Cambridge Audio. Home trial and free installation. Instant credit, Access, Amex, Visa. 10-6 Tues-Sat. Service dept

WITNEY AUDIO VISUAL, 28 High St, Witney, Oxford. (0993) 702414. Aiwa, Akai, AR, Bose, B&W, Cambridge, Dual, Mordaunt-Short, NAD, Onkyo, Pioneer, Roberts, Sony & Sony ES, Tannoy, Wharfedale, Yamaha, Reference Point Dealer. Dem facilities. Mon-Sat 9-5.30. Free installation, credit to £1,000. Access, Visa. Service dept.

SHROPSHIRE

AVON HI-FI, 12 Barker Street, Shrewsbury, Shropshire SY1 1QJ. (0743) 55166. NAD, Quad, B&W, Arcam, Kenwood, Aiwa, Bose, Nakamichi, Revolver, Onkyo. Dem room. Home trial. Free install. Service dept. Access, Visa. £1000 instant credit. Mon, Tues, Wed, Fri, Sat 9-5.30

CREATIVE AUDIO, 9 Dogpole, Shrewsbury, (0743) 241924. Linn, Naim, Roksan, Mission, Arcam, Rogers, Denon, Marantz, Rotel, Celestion, etc. Dem room. Home trial and free installation. Credit to £1000. Access, Visa. Tues-Sat 9.30-5.30. Service dept.

SHROPSHIRE HI-FI, St. Michael's St, Shrewsbury, Shropshire (0743) 232065. Ariston, Audio Technica, Cambridge Audio, Deltac, Denon, Dual, Infinity, Kenwood, Mordaunt Short, Musical Fidelity, Etc. Demo room, free parking, free installation, repairs.

SOMERSET

PAUL ROBERTS HI-FI, 32 North St., Taunton. (0823) 270000. For facilities see entry under Avon.

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

STAFFORDSHIRE

ACTIVE AUDIO, 29 Market Street, Tamworth, Staffordshire. (0827) 53355. Arcam, Ariston, Celestion, Denon, Heybrook, Kef, Cyrus, Musical Fidelity, Marantz, Revox, Rotel, Rogers, etc. etc. The only BADA Member in Staffordshire. Full dem & home trial facs. Account and credit cards. Ring for opening times and free FactPack **BADA**

ACTIVE AUDIO, 95 Stafford Street, Hanley, Stoke-on-Trent. (0782) 214994. Arcam, Ariston, Celestion, Cyrus, Denon, Kef, Kef Reference, Marantz, Rogers, Rotel, etc. etc. The only BADA Member in Staffordshire. Full dem & home trial facs. Account and credit cards. Ring for opening times and free Fact Pack **BADA**

GRANGE HI-FI LTD, 153 Branston Road, Burton-on-Trent, Staffordshire DE14 3DQ. (0283) 33655. Audio Innovations, Arcam, Castle, Denon, Pink Triangle, Rotel, Rogers, Systemdek, SME, Quad, Voyd. Demonstrations facilities available, appointments necessary on Saturdays. Free installation. Service department Access, Visa. 9.00-5.30pm. Closed Wednesday. Closed for lunch 12.00-12.30

INTERSOUNDS, 62 Bennett Precinct, Longton, Stoke-on-Trent. (0782) 336233. Arcam, Denon, Dual, Mission, Musical Fidelity, NAD, Nakamichi, Revolver, Rotel, Systemdek, etc. G 000 B different speaker manufacturer. 2 dem rooms. Free install. In-house service dept. Access, Visa. £1000 credit subject to status 9.30-5.30 Mon-Sat. Closed Thurs

MUSICAL APPROACH, Unit 7, Waddings Yard, Baileys Str., Stafford. (0785) 55154. Linn Products, Arcam, Creek, NVA, Revolver, Audiotec, Onix, Epos, Marantz, Rotel and more. Home trial. Free installation. Service dept. Credit facilities available. Access, Visa. 9.30-5.30 Mon-Sat.

SUFFOLK

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

THE STEREO SHOP, 94 Norwich Road, Ipswich, Suffolk. (0743) 233832. Linn, Exposure, Musical Fidelity, Creek, Epos, Monitor Audio, Mordaunt Short, Marantz, Rotel, Philips, NAD, 2 single speaker listening rooms. Multi rooms specialists. Free installations. Service dept. Plus 3 year guarantee. Access & Visa. Licensed credit broker. 10.00-6.00 Tue-Sat. Thurs 10.00-8.00 (by appointment).

SURREY

AUDIO INC, 44 Walton Road, East Molesey, Surrey KT8 0DQ. (081) 941 4234. Acoustic Energy, Conrad, Johnson, JAMichell, Proac, Croft, VPI, Thorens, Pink Triangle, Rotel, Luxman. Single speaker demo room. Home trial facilities. Free installation. Access, Visa. Interest Free Credit on some items, standard credit terms. 10-6 Mon-Sat. 10-8 Thurs. 10-4 Sun.

AUDIO SOUTH, 5 Mead Lane, Farnham, Surrey GU9 7DY. (0293) 619295. Audio Innovations, JPW, Luxman, Marantz, Ortofon, Rotel, Snell, Sugden, Teac, Voyd. Dem room and evening appointments available. Home trial facilities. Free installation. Access, Visa. 10.30-6 Mon-Sat. Closed Tuesdays.

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, Denon, Dual, JPW, Marantz, Monitor Audio, 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

SOUNDS EXCLUSIVE, 1 Kent House, High Street, Cranleigh, Surrey GU6 8AU. (0483) 268185. Marantz, Sumo, QED, Michell, Alphonson, SME, Ortofon, Finestra, Proac, Bose. Home trial. Dem's a pleasure. Appts. preferred. Service dept. Free install. Access, Barclaycard.

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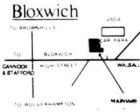
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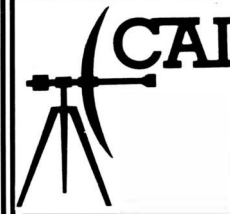
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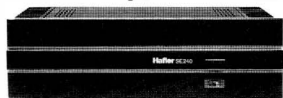
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The Directory

The *Hi-Fi Choice Directory* was conceived as a reference guide to all the audio products reviewed by *Choice* that are currently available. The products are split into suitable categories, each with its own introduction containing information about the product type and its applications. They are particularly relevant to the uninitiated first time buyer and help sort out the order of priorities when buying a piece of equipment.

Each product along with its retail price is placed in its respective category in alphabetical order. For instance, the Acoustic Research *EB101* is presently at the beginning of the Turntables and Tonearms section; however, the Ariston *Superior* heads the Motor Units section as it is solid and was reviewed as a separate component - requiring a separate arm. Where there are several products with the same name but different model numbers these are in price ascending order.

Then come the ratings for the standard achieved in laboratory and listening tests, with the exception of certain product groups where lab tests were not carried out. One important point to remember is

that they cannot be used to compare products from different categories - for example a cassette deck rated 'excellent' in sound quality will not usually offer the same standard of fidelity as a similarly rated turntable or CD player (unless you can get hold of first generation copies of the master tape!)

The Comments column contains a potted summary based on the original review, emphasising the salient points of a product's character and sonic performance. The space available doesn't allow for great detail but in the 20 or so words we have attempted to put across the essence of the review, in some cases using quotes from the review itself. Obviously, important information on compatibility or auxiliary equipment used in the test cannot be included, and we would advise you to refer to the original review for this, of which more later.

The next column varies from category to category but is usually either features or specifications, the former being facilities available on a cassette deck or amplifier or the type of drive system on a turntable.

Specifications vary with product type

but usually relate to suitability or capability, for instance in the case of arm matching, figures are given with the cartridges, which tie in with the mass figures for the tonearms themselves, making it easier to avoid compliance/mass mismatches.

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

(especially the electromagnetical elements - that is to say the cartridge and the speakers), system building is unfortunately not quite that simple. These ratings make a useful guideline for shortlisting components, but only experiencing the actual combination will tell you whether it works for you

The final column contains a reference to the issue of *Hi-Fi Choice* which featured the complete review. If you wish to get a better idea of a product by reading the complete review it is possible to order a copy (if still in print) through our back issues department. Every *Choice* issue contains a Back Issues page for this purpose.

The *Hi-Fi Choice Directory* is constantly updated with the latest reviews and price changes as well as having any discontinued products removed. If a listed product is updated to a 'mark two' form and the alterations are purely cosmetic or not too extensive, we sometimes leave the product in with its current model number, together with an asterisk in order to denote that it has changed since our original review was published.

SYSTEM BUILDING

Pre-packaged one-make systems have been commercially very successful, with advantages like cosmetic consistency, competitive pricing, and (assumed) technical compatibility. However, despite the mass market clout of the consumer electronics giants, the hi-fi tradition of specialised separate components seems to be as strong as ever, and certainly represents the route taken by those who place sound quality first.

Yet those who choose the separates route still have lingering doubts - usually completely unjustified - over the compatibility of components from different manufacturers. Gross incompatibilities are very rare nowadays, only likely to rear their heads amongst the most exotic components. Here the delicate art of 'supercompatibility' really takes over the major role and might be regarded as the key to 'real' hi-fi.

There are now three different prerecorded music media competing for the attention of the hi-fi user, and to go for all three will either cost a lot of money or involve substantial compromises in the sound quality of each. For this reason many separates purchasers may start with just one source, adding others or a tuner when funds permit.

There will always be controversy over the relative qualities of LP, CD and cassette. LP is still the choice for ultimate sound quality - particularly for those prepared to spend a substantial sum on a good quality turntable system.

Cassette has never really challenged vinyl's superior quality, but it is a multiple role format, offering 'go anywhere'

flexibility, a uniquely useful recording capability, plus a broad catalogue of prerecorded music cassette material. As a hi-fi medium cassette suffers from prerecorded material which has been improving but is still patchy in quality, and can usually be bettered by a home recording. There is also the worry that a tape made on a specific machine usually plays best on that machine, which may cause aggravation when upgrading a few years hence.

CD is the latest challenger to these two established media, using a digital instead of analogue storage format. The sound - quality remains controversial, hailed as near perfect by its fans but derided by vinyl freaks, so it is probably fairest to say that CD is fine for most listeners, but may not suit everyone; certainly the lack of background noise, defects and deterioration are major strengths.

While there will always be arguments about the different music storage and transmission formats available to the hi-fi listener, there is also controversy over the relative importance of the different components which make up the system chain - by which is meant the source, the amplification, and the loudspeakers (and for the pedantic the room itself, though there's often little that can be done here)

For many years the 'weakest link' theory proposed that the loudspeakers needed the most attention, that amplifiers merely had to have sufficient power, and that turntables were pretty well perfect. However, this perspective has become steadily discredited by an alternative 'theory of precedence', which stresses that

no subsequent component can make up for the inadequacies of its predecessors - all it can do is supply its own additional degradations. In such a context it is not uncommon to find more than half the system budget allocated to the record player, with scrimping and saving made on amplifiers and loudspeakers.

Choosing the components of a system is only part of the task of getting the system as a whole working as well as possible. Good turntables and loudspeakers both benefit to a surprising degree from proper support - from stands that enable them to give their best performance, whether floor-standing or wall mounted.

Siting of components within a room can play a significant role, as can the room itself. Some people may prefer an acoustically more 'live' room than others, but most will agree that the larger it is the better, because this tends to provide smoother and better extended bass reproduction. All rooms create reflections and standing waves, and the effects of these are more severe if all opposing walls are parallel, similar distances apart, and with hard reflective surfaces. Provided that the loudspeakers can be placed fairly symmetrically, slight asymmetry elsewhere in the room is usually helpful.

The loudspeakers are most critical of placement, because it is their job to create the stereo image, and it will be impossible to do this if the sound from each is not roughly similar at the listening position. Each loudspeaker should operate in a similar immediate acoustic environment, unencumbered by other furnishings and

structure, and a similar distance from each listener, nearby walls, and corners. Some loudspeakers are designed to operate close to a rear wall, others a metre or so out into the room, but all loudspeakers benefit from being closely mechanically coupled via proper stands to the floor.

Mixing and matching the components of a record player to get optimum results can be something of a black art, over and beyond the fairly simple business of choosing a cartridge of roughly the right compliance to suit the arm effective mass. Certainly the combining of turntables and tonearms is not a simple matter, and this is where a good specialist dealer will come into his own, both in terms of recommending good combinations from the models he holds in stock, and then in correctly carrying out the sometimes tricky set up procedures which are often required to get the best results.

The key to getting the best results from a separates system lies in finding an experienced and skilled dealer in the first place, one who takes the trouble to find out what you really want and then demonstrates some likely alternatives.

The *Directory* has been compiled so that it can be used by *Choice* readers as a buying guide. A guide in the sense that that you should use the information in it to make a shortlist of equipment suited to your needs and budget, and then audition it at a dealers' before taking the plunge. Because tastes inevitably differ it would be unwise to buy purely on the basis of our recommendation and dealers are the most experienced people around when it comes to making systems work as a whole.

The Directory

TURNABLES & TONEARMS

The schizophrenic split between consumer electronics and 'real hi-fi' is most obvious amongst turntables. The former are supplied simply as a means of playing vinyl in a system context. Cheaply manufactured in the Far East, these are complete players with a variety of automatic facilities, sometimes tied into system remote control. But engineering compromises severely limit sound quality, cartridge choice may be P-mount restricted, and such machines are rarely stocked by specialist hi-fi dealers these days

Specialist turntables offer big sound quality improvements, but lack so-called convenience features (that practised users often find irksome). Such turntables at the cheaper end of the market (sub-£350) tend to be supplied with matching tonearm, and often include a 'starter' cartridge. Still better quality is found at higher prices amongst the separate motor units and tonearms. Careful partnering and set-up is essential for these individual components, but 'naturally sympathetic' combinations do exist, and the good dealer can help.

Listed separately as integrated players and as turntable motor units and tonearms, our sound quality rating is based on results achieved using a high quality system – but in point of fact the turntable is usually the limiting factor soundwise in any system. Lab performance summarises the speed stability, vibration generation and environmental isolation of turntables, along with the friction, alignment and adjustment of tonearms. The tonearm's physical characteristics also define a range of compatible cartridges.

INTEGRATED TURNABLES

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 Solo/Xenon MCS £440/£320	Average Good	The deck is warm and euphonious with high levels of clarity. Wow artefacts occasionally just audible	Suspended motor unit, optional quartz PSU, 13g		67
Alphason Sonata/HR-100S MCS/Atlas £760/£500/£360	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
Alphason Super Nova £300	Good Good	Informative, easy to listen to and quite lively deck with good detail and occasionally uneven bass. Build quality of review sample not perfect	Subchassis, manual, belt drive, detachable arm, 12g	R	91
Ariston Forte £350	Average - Average	Heavy on engineering, short of soul? The Forte almost makes it, losing out only because of some residual pitch variations and a lack of bass power. The arm is modestly good	Manual 2-speed belt drive player and detachable arm, 10g		67
Ariston Icon £215	Good Good	A thoughtful and efficient design that offers good sound, excellent value and semi-automatic operation too! Good vibration isolation eases siting	Belt drive, suspended, semi-automatic, 10g	BB	79
Ariston Pro £180	Good Good	Remarkably clear and detailed for the price, very neutral. Benefits from cartridge upgrade	Manual, belt drive, 12g	BB	91
Ariston Q-Deck £165	Good Average +	Well engineered and good sounding low cost package which is both easy to set up and to use	Semi-auto, belt drive, solid	BB	67
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 CS503-2 £140	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
Dual CS505-4 £160	Good - Good -	The old-time favourite which never gives up. Sound is enjoyable if not perfectly clear, all-round value is excellent	Semi-auto, belt drive	BB	91
Goldmund ST4 £4589	Very Good Excellent	The Studio turntable takes on a cheaper tonearm than the T3F, yet provides a similar reference standard objective and subjective performance at £2,000 less, in a neatly integrated though bulky package	Solid subchassis, direct drive, parallel arm, detachable h/shell	R	60
Heybrook TT2 turntable & arm £424/£269	Average Good +	A gradual process of informed evolution and a sensibly designed arm combine to make this a good sounding middle of the road package. Well supported by dealers	Manual subchassis motor with arm, belt drive, 14g	R	67
JVC AL-FQ555 £170	Average - Poor	Clear midband sound but woolly bass and crude treble. Ease of use however ranks highly, and there's little to go out of adjustment	Auto, direct drive, 5.5g		67
Kenwood DP-990 £400	Average Average	Smart, slick and massive player suitable for low compliance cartridges only. A good but not inspired performer	Semi-auto 2 speed direct drive, 16g		67
Kuzma Stabi/Stogi Reference £900/£700	Very Good Very Good	Beautifully made in a solid oak plinth, the Stabi also sounds very clear, detailed and extended. Stogi Reference is also most capable.	Manual, belt drive, subchassis, 12g	R	91
Linn Axis/Akito £433	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 LP12-Lingo/Ekos/Troika £1128/£1097/£798	Good + Good +	The classic reference is improved (at a price) by the Lingo but character remains the same - not as detailed or neutral as the best. Ekos arm, though pricey, is well made and suited to many decks	Manual, subchassis, belt drive, 9g	-R/-	91
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
Marantz TT400 £150	Average - Poor	Everything one hopes a budget deck won't be; coarse, confused, muddled and woolly. Construction isn't wonderful, either	Manual, belt drive, 16g		91
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
Omega Point Silver/Black £895/£295	Good Good +	An avowedly stripped down turntable that lacks even an on/off switch, the Omega Point Silver offers fine midrange clarity and good stereo, but some HF compression and a lack of 'wellie'	Manual, solid, belt drive, unipivot, 11g		55
Opus 3 Continuo/Decca London International (Revised) £599/£99	Poor Good	Heavyweight motor unit with many fine properties, but which needs further development. The idiosyncratic arm is a suitable (though not ideal) platform for the Decca cartridge. For all its faults though, the whole transcends the sum of the parts	Belt-drive manual, damped unipivot arm, 12g		67
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 £155	Average + Good	A remarkable product at the price, surprisingly articulate and confident	Manual, 11.5g	BB	48
Rega Planar 3 £207	Good Good	A long time leader in its price category, the '3' (with its excellent RB300 arm) sounded nicely 'musical' in a balanced and coherent manner	Manual, 11.5g	BB	48
Revolver Rebel £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, prefitted cartridge		55
Rotel RP-855 £160	Good Good	Great sound for the money - detailed and clear with good bass and no irritating nasties	Belt drive, solid, speed adjust, 9g	BB	79
Systemdek IIX £248	Good Average +	Poised, clean sounding deck, forward and explicit in character. A good value deck under £250, and a relatively cheap and satisfactory suspended model	2 speed belt drive manual turntable and arm, 11g	R	67
Technics SL-DD33 £110	Average Average	As with the QD33 though better value	Automatic, direct drive, solid plinth, 7.5g, P-mount	BB	48
Technics SL-L20 £115	Poor Average -	A rather lightweight parallel tracker achieving a poor overall rating, with little to recommend it unless you dig facilities	Electronic, solid plinth, 5g, P-mount		48

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INTEGRATED TURNTABLES

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES ARM EFF. MASS	VALUE	ISSUE
Technics SL-QD33 £140	Average Average	The quartz speed controlled version of the DD is short on sound quality but not features. But it did have fair focus and some depth	Automatic, Quartz, direct drive, solid plinth, 7.5g, P-mount	R	48
Technics SLBD-22 £90	Average - Average -	Not bad for the price and a great improvement on the L20, it performs reasonably when not stretched	Semi automatic, solid plinth, electronic, 6g P-mount	R	48
Thorens TD 166 Mk V £200	Good Good	Classic suspended-subchassis deck with clear, stable sound of no particular character. Unlikely to make enemies	Belt drive, suspended, 12g	BB	79
Thorens TD 280 Mk II £180	Good - Good -	Legendary Thorens build quality on the cheap - slightly unsubtle sound but eminently liveable-with and very good value	Belt drive, solid, electronic PSU, 12g	BB	79
Thorens TD 316 Mk II £220	Good Good -	Very solid deck with neat split-chassis construction. Sound is a bit insecure in the bass, but it could suit classical music lovers well	Belt drive, suspended, electronic PSU, 12g	R	79
Thorens TD2001 £630	Good Good -	Similar to TD320 but much dearer - why? Sound is comfortable but not very detailed	Semi-auto, belt drive, subchassis 15g		91
Thorens TD320 Mk II £350	Good Good	Good, consistent sounding deck with much improved (but not ideal) arm. A little expensive for performance offered	Semi-auto two speed belt drive, 14g		67
Townshend Rock Reference/Excalibur £1995/£695	Excellent Excellent	Overall the closest reproduction to master tape we've yet heard, with stunning real bass and excellent neutrality. Front end damping trough improves LF detail significantly	Belt drive, suspended, electronic PSU, front-end damping, 12g	R	79
Voyd Reference/Helios Cyalene £5299/£1066	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
Ariston Superior £598	Good + Good	Good but slightly damped sound quality, with powerful and stable bass. The pro quo is a certain lack of pace, energy and resolution	Belt drive, subchassis, electronic		55
CEC ST930 £599	Good 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
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
NVA Senior £450	Good - Average	Very high sensitivity to low-frequency vibration, especially on NVA stand, gives strange subjective bass response and confused sound. Looks are unusual but pleasing	Belt drive, electronic PSU, two-part plinth		79
Oracle Alexandria Mk III £1195	Very Good Very Good	One of the most beautifully presented players made, and fully supported by superb separation, dynamics and a euphonious style of delivery.	Manual 2-speed belt drive	R	67
Oracle Paris £595	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 Excellent	Basically a PT TOO with built-in power supply. Retains features of great transparency and neutrality. Review sample had highish motor noise - presumed untypical	Suspended, belt drive, electronic	R	91
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 IIXE £248	Good Very Good	Fine, honestly specified and well built player which easily betters its closest stablemate, the IIX. Frankly, at the price it's a sonic bargain	Manual 2-speed, external PSU	R	67
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 "The Voyd Plus" £2777	n/a Excellent	Based on the standard 3-motor Voyd but with upgrade options (better bearing, platter, etc) which take it half way to a Voyd Reference, so we've dubbed it The Voyd Plus. Superb build and finish; colourful, dramatic performance. A thoroughbred	Belt drive, 3 motors, subchassis, outboard PSU	R	72
Voyd Valdi £699	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-19 £1317	Very Good Very Good	Built to accommodate parallel tracking arms, this large but elegant deck produced clean, smooth sound when fitted with an SME arm. Good bass	Belt drive, suspended subchassis	R	79

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 £190	Good Average +	A highly competent design from Alphason gives good sound quality but with slight blurring and treble fizz	16g	R	48
Alphason HR100S £440	Very Good Very Good	This S-shaped arm sounds smooth, but nevertheless reproduces transients with fine attack	10g	R	Coll. '86

The Directory

TONEARMS

MODEL PRICE	LAB SOUND	COMMENTS	ARM EFF, MAS	VALUE	ISSUE
Alphason Opal £130	Good Average	This is a straightforward adequate sounding low cost arm, priced just above where it rightly belongs	10g		55
Alphason Xenon £260	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
Ariston Enigma £99	Average Average +	Good but not the best in its class: mid-band sounds a little uneven; treble a trifle "brash"	11.5g		48
Audio Technica AT1130 £186	Good Good	Well suited to most cartridges including high compliance ones, the AT is smooth and tonally neutral, if slightly lacking in 'balls'	8.5g	R	67
Decca London International £49	Average + Average +	This uni-pivot design gives a rather rich tonal balance and some bass muddling. Could be good with Decca cartridges, but not well built	12g		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
Helius Orion 2 £490	Very Good Very Good	Excellent engineering with rigid bearings, free from slack. It remains expensive but the level of performance deserves Recommendation	12g	R	48
Kuzma Stogi Reference £699	Very Good Very Good	A large, solid and well-made arm that holds the cartridge firmly, giving exceptionally clear sound with just a hint of brightness	12g	R	79
Linn Ekos £1097	Very Good Very Good	Superb, state of the art design which builds significantly on Ittok's strengths	9g	R	67
Moth Arm £78	Good Good +	The ultimate budget arm? Refined, detailed, sweet and natural - performance improves in line with the rest of the system	12g	BB	60
Naim Aro £699	Good Good -	Designed for use on the Linn LP12, the Aro is a little bright and congested.	10.5g		91
Rega RB300 £115	Very Good Very Good	Despite its modest price this sets exceptional performance standards and could be used on a number of high-quality turntables	10-11g	BB	60
Roksan Artemiz £595	Average Good	Interesting design which works a treat on the Xerxes deck. Fits Rega cut-out.	8g		67
Roksan Tabriz £150	Good Good +	Though obviously targeted at Roksan's own Xerxes, it is also a good alternative to the Rega arms in many applications. A trifle bright.	9g	R	91
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 £495	Very Good Very Good	Beautifully made, finished and presented, this arm is fully and easily adjustable and a highly neutral performer	10g	R	79
SME Series IV £810	Excellent Very Good	Superb engineering and finish with a finely balanced sound giving impressive stereo focus and low coloration	10.5g	R	60
SME Series V £1247	Excellent Very Good	Excellent in terms of design engineering and sound quality, this arm arguably sets a new reference standard regardless of price	10.5g	R	60

CARTRIDGES

Very much the 'slave' of turntable and tonearm and to some extent undermined by the supply of free 'starter' cartridges on many turntable systems, the cartridge is still worth taking seriously. The quality of both the stylus itself and the cartridge's tracking performance are important in preserving that most important part of the hi-fi system — the record collection — and the cartridge also plays a significant role in determining the overall balance of a system.

Cartridges fall into two groups: high output models, capable of working directly into any amplifier, and more expensive low output models.

Stereotypically, low output cartridges use the moving coil principle of operation, have better mechanical integrity and tighter tolerances, and give better performance but at much higher cost. Most under-£150 amplifiers and many valve designs need either an extra head amp or

transformer to cope with the low output.

Cartridge/amplifier interfacing can be very subtle, but even basic high output moving magnet designs benefit in overall balance from optimised amplifier capacitance loading. Still more important, the mechanical cartridge characteristic of cantilever compliance ('springiness') needs to be considered in the light of the effective mass of the tonearm which will be used.

MODEL PRICE	LAB SOUND	COMMENTS	ARM OUTPUT/TYPE	VALUE	ISSUE
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
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-F3/OCC £74	Average + Good	Though the 'limited edition' badge is a trifle tongue-in-cheek, the 'F3 still offers excellent value	8-15g Low, MC	BB	67
Audio Technica AT-F5/OCC £106	Average Good +	This latest sample demonstrated some technical weaknesses but its spacious, fluid sound quality still represents a benchmark at this price	4-10g Low, MC	BB	67

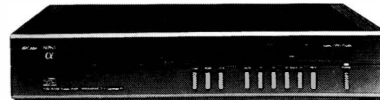
BILLY VEE SOUND SYSTEMS

ARCAM — A.R. — CYRUS — CREEK — DENON — DUAL — EPOS — EXPOSURE — HEYBROOK — JPW — KEF — LINN

MARANTZ — MISHORT — N.A.D. — NAIM — NAKAMICHI — QUAD — ROGERS — REGA — ROTEL — SPENDER — T.D.L.

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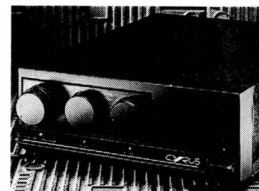
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CARTRIDGES

MODEL PRICE	LAB SOUND	COMMENTS	ARM OUTPUT/TYPE	VALUE	ISSUE
Audio Technica AT-OC7 £265	Good + Good +	The OC9 is better if you can afford the extra. But OC7 is at least a taste of the high-end at a sensible price	6-13g Low, MC	R	54
Audio Technica AT-OC9 £400	Average + Very Good	Tonal colours are reproduced faithfully and it rarely puts a foot wrong. Slightly less transparent than more costly MCs but it has got real wellie. Good value (really!)	6-14g Low, MC	R	60
Audio Technica AT95E £19	Average - Average	Clear, dynamic if richly balanced, the magnetic '95E is a definite Best Buy	8-14g Normal, MM	BB	48
Audionote I02VDH £895	Good Very Good	One of the best, giving 'an extraordinarily relaxing midrange clarity', needs a transformer	8-18g Very low, MC	R	43
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 DL 103 £99	Average Good	This classic spherical stylus model gives a lively sound with powerful bass, and is popular in broadcast studios	6-16g Low, MC	R	48
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
Dynavector 1702 £280	Very Good Very Good	Clear, detailed, neutral and generally very informative - excellent.	6-18g L ow, 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 OV10X IV £125	Average Average +	Fine sounding and realistically priced, damping is recommended to ensure successful tracking ability	8-18g N 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 800 Mk II £33	Good Average	This very high output MM appears to be based on the classic Ortofon VMS series. A trifle uninspiring overall	7-17g Normal, MM		67
Empire Benz Micro MC-2 £600	Average Good +	Similar to both the Empire MC1000 and vdH MC2 in design, the Benz offers a warmer and very transparent account of the music. Its tracking prowess is slightly limited	5-12g Low, MC	R	72
Empire MC-5M £110	Average + Good	A very low compliance renders this MC best suited to heavy tonearms while its sweet, non-aggressive sound quality earns it a recommendation	13-20g L ow, MC	R	67
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 L 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 £40	Good + Good	Slightly harsh sound but plenty of life and quite good detail. Some very high frequency coloration apparent	6-12g Normal, MM	R	85
Goldring 1022 £60	Good + Good	As with 1012, a touch harsh; detail and transient purity improved, though, and it goes well with electric guitar!	5-11g Normal, MM	R	85
Goldring 1042 £85	Good + Good	Not terribly subtle, and not such good value alongside 1012 and 1022. Quite lively, though	7-12g Normal, MM		91
Goldring Elan £16	Average + Average	A lightweight and frisky-sounding MM that appears to be based upon the same body as the Nagaoka mm4	7-15g Normal, MM	R	67
Goldring Epic II £26	Average Average +	An excellent budget choice though the limitations of the stylus are rather obvious at higher frequencies	5-12g Normal, MM	R	67
Goldring Eroica £100	Good Good -	More confused and coloured than its low-output sibling - high output less of an issue in these days of cheap MC-compatible amplifiers	8-15g Normal, MC		84
Goldring Eroica LX £115	Good + Good	Not the most subtle cartridge in the world; can sound edgy at times, but lively and informative	8-14g Low, MC	R	84
Goldring Excel £500	Average + Good	Goldring's most expensive cartridge to date errs on the warm and heavy side of neutral. Strong bass lines are its forte though its ability to resolve subtle treble details is weaker	6-13g Low, MC		72
Grado ZF3E + * £47.50	Average - Average	Down-tilting 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
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

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MODEL PRICE	LAB SOUND	COMMENTS	ARM OUTPUT/TYPE	VALUE	ISSUE
Linn Asaka £365	Good + Good +	Disciples of Linn who are trying to realise their true "Karma" may find that saving money is not a short cut to heaven	9-18g Low, MC	R	Coll. '86
Linn K5 £37	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 £552	Very Good Very Good	A specialist which is strongly recommended for Linn-based systems; results may be less predictable in more general application	9-18g Low, MC	R	Coll. '86
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 (damp) 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, damp Normal, fixed stylus MM		84
Miltek 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
Miltek 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 MM4 £9	Average - Average -	Clear punchy sound that delivers the rudiments of a good performance	6-16g Normal, MM	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
Nagaoka Stilton TS10 £50	Good - Good	Stilton-designed solid body (with three-point mounting) certainly gives remarkably resonance-free sound, but tip and generator are less good - a little rough at times.	5-10g Normal, MM	R	85
Nagaoka Stilton TS11 £70	Good - Good	Differs from TS10 in having Vital stylus with better tracing but still some high frequency harshness.	5-10g Normal, MM		85
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 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 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
RATA RP20 £22	Average - Average	Good integration, a clear dynamic midrange and the beginnings of fine stereo imagery merits clear recommendation	6-14g Normal, MM	R	48
RATA RP40 £44	Average Average +	The '40 did a good job of sorting out the layers and complexity of the mix, with good focus, excellent stereo spread and fine scale	6-15g Normal, MM	R	48
RATA RP70 £77*	Average Average +	Clearer and sweeter than the '40 this also seemed heavier and less lively. For £99 you can have a van den Hul stylus	6-14g Normal, MM		43
RATA RP70vdH £99	Average + Good	Able to retrieve bags of musical detail (thanks to the vdH stylus), RATA's top cartridge ranks as one of the most articulate MM's available	11-18g Normal, MM	R	67
Rega Bias £34	Average Average +	Difficult to mount in some arms due to its shallow build, the bias offers a 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 £100	Good + Good	Recognisably related to Corus Blue, but distinctly more civilised and smoother.	7-12g Normal, MM	R	91
Roksan Corus Blue £60	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
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

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MODEL PRICE	LAB SOUND	COMMENTS	ARM OUTPUT/TYPE	VALUE	ISSUE
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
Stifton/AT-F3 £110	Good + Good +	At a premium of some £40 this modified AT-F3 offers a startlingly refined performance and is strongly recommended	8-18g Low, MC	R	67
van den Hul 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 £800	Very Good Very Good	Slight softening effect on transients was the only real flaw, but it didn't quite seem to have that special touch one expects for the money	8-15g Low, MC		84
van den Hul MC10 £499	Good Good +	A neutral balanced performer giving transparent midrange, fine depth and focus with firm extended bass. Gosh!	5-10g Low, MC	R	60

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
Acoustic Research A03 £170	Average + Average	New slimmed down version of the A04 with less power and facilities but also a slightly 'fuzzy' sound	38W, MM disc, CD direct and 3 aux inputs		74
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-005 £130	Good + Average -	A technically competent amp with big, friendly but not overly engrossing sound quality	61W, MM 5 line inputs, source-direct		80
Aiwa XA-006 £130	Good Average	Competent enough performer with plenty of facilities. A gutsy sound though one that's rougher via CD than MM.	67W, MM and 5 line i/p's plus independent rec out.		92
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 converters were less successful than its conventional analogue CD input.	112W, coax and optical dig inputs, MM/MC		68
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
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 2 £190	Good Good +	Very confident, convincingly musical and punchy sound that sets the standard for other budget amps	41W, 4 line and MM inputs	BB	68
Arcam Delta 110/120 £700/£500	Good+ Good	Overall performance is limited by the power amp - in isolation the PDM-preamp offers a remarkably open and detailed sound, particularly in 'digital' mode.	112W power amp, MM/MC + four line inputs + coax/opt digital input.	R/-	92
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 £400	Average + Average +	Dark but slightly dead or conservative sounding version of the original Delta 90. Improved disc stage	73W, MM/MC, 4 line inputs, tone bypass, bi-wire	R	74
Ariston Amp £219	Average Average +	Slightly veiled and thin sound but proved suitably attractive in the listening tests	32W, full logic control, MM and 4 line inputs	R	68
Audio Innovations Series 1000/2nd Audio Amplifier £1499/2950	Poor Excellent	This valve combination offers awesome dynamic range with superb transparency and power to match. Compatibility with other brands is unpredictable	15W, MM, 6 inputs, monoblocks	R	63

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AMPLIFIERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Audio Innovations Series 200 £449	Poor Very Good	Like most 'Innovations valve power amps, compatibility with other brands is unpredictable. Hardly a powerhouse, but nicely 'open', transparent and dynamic sound in small(ish) systems	12W	R	77
Audio Innovations Series 300 £499	Poor Very Good	Something of an anomaly, the 300 is an integrated valve amp that looks awful in the lab but sounds remarkable in a system - now in mk II guise	10W, MM, 6 inputs	BB	63
Audio Innovations Series 400 £669	Poor Very Good	Superior styling and better build quality than the Series 300 make for a very attractive integrated valve amp. Capable of fine results in the right system, but can sound too 'thin' and lacking in welly with inefficient speakers	12W, MM and 4 line inputs	R	77
Audio ... Ongaku £29,950	n/a Excellent	An out and out audiophile product, a single ended, zero negative feedback, triode, line level integrated amp. Probably the best amplifier in the world!	6 line inputs, 27W	R	Coll '90
Audiolab 8000A £350	Very Good Good +	Exceptionally detailed, tactile and transparent via CD but slightly more clouded via disc. A stalwart design	72W, MM/MC, 4 line and full record out selection	R	74
Audiolab 8000C £325	Excellent Good	A well established preamp with a highly controlled sound, though it could do with more life and depth	MM/MC, 5 inputs, hdph, tone controls	R	62
Audiolab 8000P £495	Excellent Good +	A dynamic powerhouse, load tolerant and sonically reliable	100W	R	62
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-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
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
Cambridge P25 £180	Good+ Average	Despite clocking-up a solid set of measurements the sound of the P25 proved to be as grey as its appearance.	37W, 4 line and MM/MC inputs + tone defeat.		92
Cambridge P50 £200	Good Average +	A pleasant enough sound with full bass yet with a slightly mechanical quality that reduced its sense of 'naturalness'	56W, 4 line inputs + MM/MC + tone		85
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 £1725	Average + Good +	Technically very interesting, this mini-powerhouse uses a switched-mode supply to deliver a crisp and refined sound	236W with protection into lower loads	R	85
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
Conrad Johnson Motif MC-8 £1995	Very Good Very Good	A cheaper alternative to the '7, this preamp is an undoubted success in maintaining the Motif sound but does not compare on sound quality	MM/MC	R	50
Conrad Johnson MV50 £1995	Good + Good +	Coupled with the PV5, this CJ power amp performed well on audition	50W		Coll. '87
Conrad-Johnson Premier Seven £8995	n/a Excellent	Price has increased since we tested it - but at this price who cares? The 'Seven is designed without compromise, and it's clearly one of the finest (valve) preamplifiers money can buy. Absolutely gorgeous!	MM, 4 line inputs, sep. Rec Out, versatile cartridge matching	R	72
Conrad-Johnson PV10 £1395	Excellent Excellent	Pricey, yes, but a fabulous preamplifier which confirms C-J's high reputation in the States. Beautiful imaging, superb detail, plenty of gain on the phono stage - classy build quality too.	MM plus 4 line inputs	R	78
Creek CAS 4140S2 £220	Average Good	Disc headroom still poor but the open and detailed, if slightly bright, sound wins through	40W, MM/MC, 3 line inputs, mono R and mute	R	80
Creek CAS-4040 S3 £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
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
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		80
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 £130	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 £160	Average+ Good	Bold claims were made at its launch but the sweet and inoffensive sound, though very pleasant, is not mould-breaking at the price.	88W, 5 line and MM disc inputs + source direct.	R	92
Denon POA-6600 £1000 pr.	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
DNM 3A From £1000	Good + Very Good	The DNM3 in its acrylic case is a remarkably revealing and neutral state of the art preamp	5 inputs MM/MC twin vol controls	R	44
Dual CV5600 £150	Good+ Very Good	Made by Rotel and possessing the highly articulate vocal/string quality of their best budget amps. Very communicative, especially with a good CD player.	57W, 3 line, 2 tape and one MM input. CD direct	BB	92
E.A.R. 549 £3628 pr	Very Good Very Good	A valve monoblok that measures like a solid state amp is itself an achievement, but exceptional power delivery and bass 'slam' is not fully matched by delicacy and transparency elsewhere	200W monoblok, bias setting		60
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
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

The Directory

AMPLIFIERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Exposure VI/VII*/VIII £320/£500	Good Very Good	An established company like Exposure could do more to improve the 'look' of these amps which, nevertheless, sounded confident, dry and musical. Dual version no longer available	63W, Super mod. 4 line and 2 disc R inputs with full rec-out switching	R	68
Exposure VII/VIII £430/£470	Very Good Good	Supplied as a combination without the separate preamp power supply, this pre power combination performed satisfactorily especially on the moving coil input	50W, MM/MC, 3 inputs, straight line	R	62
Exposure XI/XII/VIII Super £1600	Good Very Good	New preamp and improved power amp led to a smooth and refined sound, MM/MC less transparent than CD	61W, MM/MC, 5 line inputs	R	80
Grant G60AMS £948 pr.	Good Very Good	This neat and compact 60W valve monoblok gave good sound on the 8ohm tap, better still on 4ohms. The midrange was particularly natural	60W monobloks 8ohms	R	57
Hafler DH120 assembled £360	Very Good Average	Sound quality results were decent enough, but this power amp won't set the world on fire at this price	60W	R	44
Hafler DH120 kit form £295	n/a Average	Er, we didn't build one; see assembled version below	60W	R	44
Hafler XL-600 £1145	Very Good Very Good	Sounds remarkably open, transparent and inherently 'musical'. XL-600 is tremendously powerful and very compatible	426W in stereo mode, 1.5kW in bridge	R	74
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	R	74
Harman Kardon HK6100 £170	Good Good	Re-packaged version of the popular PM635. Still offers very up-beat and exciting sound	47W, MM, 5 line inputs, tone controls	R	80
Harman Kardon HK6500 £380	Good+ Good+	The best of HK's current range. A firm sound that enjoys an impressive grip on the most complex music. Great bass!	74W, 3 line, 2 tape and MM/MC. Tone controls + loudness	R	92
Harman Kardon HK6800 £700	Good + Good	Smoother and more evenly paced than previous H/K superamps, this model sounded both confident and nimble. A fine result	115W, 4 line + 2 tape i/p's + MM/MC	R	85
Heybrook C3/P3 £400/£500	Average + Average -	There's a chance our power amp was a dud for the combo sounded very disappointing on the whole - glassy and uncouth	138W with plenty of current. Passive line inputs	R	85
Jadis JP30/JA30 £4145/£4200	Average Excellent	Two-box preamp plus monoblok power amps, classic valve design gives stereotype valve sound. Beautiful build, nostalgic styling and delightful sounding midrange transcend limitations at frequency extremes, in lab, and re cartridge matching	30W 2-box pre-, monoblok power, MM-only, 4 line inputs	R	60
Jeff Rowland Coherence One/Model 7 £3950/£9900	Very Good Very Good	The technical design of these amps is very elaborate but ensures they achieve an extraordinarily transparent and potent sound. However, the CD i/p is clearly superior to the disc inputs	448W monoblok MM/MC with variable loading options. Balanced topology	R	72
JVC AX-A3TN £140	Very 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/p's CD DiRt and 'Bass Compensator' controls.	R	92
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.	R	92
Kelvin Labs Absolute Zero/M30 £395 + £295/£595pr.	Good + Average +	Latest versions of the M30 offers a true 30W Class A and a slightly muddled but very comfortable sound. MC preamp is a very linear design	33W monoblok MC only + 4 line inputs. Separate L/R balance	R	74
Kenwood KA-4010 £170	Good Average +	A flexible design at moderate cost. Smooth and cultured sound if slightly lean in balance	81W, MM/MC, 4 line inputs, source-direct	R	80
Kenwood KA-5020 £210	Very Good Good+	Something of a powerhouse on the cheap this amp can keep pace with the most challenging of dynamics. Its sound is vibrant but some fine detail is lost.	115W, 3 line, 3 tape and MM/MC. Source direct.	R	92
Kenwood KA-550D £130	Very Good Average	Having dropped its moving coil input, this latest version has British style dynamics and rhythm but is not first grade yet	35W, MM, 4 inputs, hdph, tone controls	R	62
Kenwood KA-7010 £300	Average + Average +	More powerful version of the 5010 but less successful in the listening tests. RF IMD is the likely cause.	123W, as above plus -20dB mute facility	R	74
Klyne SK5a £2590	Very Good Very Good	Beautifully made and presented, this American thoroughbred has a good lab performance, but although versatile, is rather expensive for the quality of sound offered	Balanced output, versatile cartridge loading	R	72
Lecson 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
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	R	78
Linn LK1/LK280 £585/£747	Good Good -	A very modern, logic-controlled amp with distinctive and inoffensive sound quality. Its restrained sound could do with extra insight and zip	84W, compact amp CMOS sw. for 2 tape, 2 line and MM/MC. xlr sockets.	R	68
Linx Nebula £500	Average + Average +	Ambitious both in style and design this amp was less impressive in the sonic arena — positive but two-dimensional	88W, logic-controlled i/p switching	R	85
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-30SE £180	Very Good Good+	The breathed-on version of Marantz' PM-30 offers an engagingly detailed and spacious sound though one that's warmer via MM disc than CD.	50W, 3 line, 2 tape and MM disc. Source direct	R	92
Marantz PM-50 £250	Good + Average +	One of Marantz's new breed, the PM-50 has a big and beefy sound yet one that lacks refinement	92W, MM/MC, 4 line inputs, source-direct	R	80
Marantz PM-75 £500	Good Average	More successful than most amps with on-board DACs but still not as balanced as other Marantz products	136W, opt/coax dig inputs, 6 line + MM/MC	R	68
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
Marantz PM-95 £2000	Very Good Average +	Beautifully constructed, this amp was less convincing via its digital input than via line. Class A option best suited to sensitive speakers. Costly	151W with 30W available in Class A. Opt + coax inputs	R	74
Meridian 201/205 £695/£500 each	Very Good Good +	A fine preamp with additional luxury option of full system remote, plus competent and attractive monoblok power amplifiers with generally good performance	100W MM/MC 6 line inputs remoteR/-capable straight line	R	62
Mission Cyrus One II £200	Very Good Very Good	Crisp, meaty and exquisitely detailed, this latest Cyrus amp had us enthralled via CD. MM/MC enjoyed a lesser clarity	34W, 4 line + MM/MC i/p's with dual-conc vol.	R	85
Mission Cyrus PSX £230	Very Good Very Good	The PSX does make the Cyrus Two sound better; and also improves the PCM II CD player giving more wallop and clarity	Auxiliary power supply	R	62
Mission Cyrus Two II £330	Very Good Very Good	Recently updated this popular favourite captured our attention, once again, with its robust and very convincing sound.	60W, 4 line and both MM/MC disc. No tone controls	R	92
Musical Fidelity A1 £299	Average + Average +	Just scraping a recommendation, this current A1 sounded lush but sleepy — lacking the bite and sparkle of old	26W with 9W of Class A. 4 line + MM/MC inputs	R	85
Musical Fidelity A100 £499	Good + Very Good	This is another one recommended for fine sound with which you could keep your Chinese carry-outs warm	50W MM/mc 5 inputs straight line	R	62
Musical Fidelity B1 £200	Average + Good +	The subject of much controversy, this 50W wonder offers a very deep, solid and powerful sound	50W, MM/MC, 5 line inputs, tape monitor	R	80
Musical Fidelity B200 £349	Very Good Good +	Running cooler than other MFs, the B200 delivered fine musical and dynamic sounds with plenty of power	80W MM/mc 4 line inputs straight line	BB	62

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The Directory

AMPLIFIERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Musical Fidelity MA50 £875 pair	Good Excellent	An audiophile bargain. One of the best sounding power amplifiers made	50W, monoblok	R	62
NAD 3020i £140	Very Good Good +	The most balanced and communicative of NAD's 3020 series. Great at revealing subtle musical clues without aggression	31W with tone controls, 3 line + MM inputs	BB	85
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
Naim Separates £750 plus	Very Good Good	A consistent and coherent series of 'building blocks'. Sound quality ignores conventional audiophile standards of presentation, but achieves fine musical communication	40-70W, MM/MC etc	R	60
Nikko Beta 400/Alpha 800 £225/£800	Very Good Good	Big, bold and gutsy, these are indestructible amps with a sound quality to satisfy all but the most demanding users	358W(!) with every feature necessary	R	85
NVA P70MC/A60 £830	Average Average +	NVA's speaker cables are a must, the amp offering well-integrated but not particularly crisp sound	68W, MC, 3 passive line inputs		80
Oakley S £499	Good Very Good	Much improved version of the original Image preamp from Yugoslavia. This one won't disgrace itself even in top-notch systems. Image Six model (£150 more) is really fabulous	MM plus 3 line inputs	R	78
Onkyo A-8000 £140	Good + Good +	A rare combination of style, features and very acceptable sound quality. Free of compression and 'grain' - undemanding	64W, 5 line + MM disc i/p's + full tone cont.	R	85
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. Tweaky components.		71
Philips DFA-888 £300	Good Average	As above but including a modified disc input and onboard DAC. Sounds tight but also slightly thin	107W, as above + opt and coax digital inputs		74
Philips FA-880 £200	Good Average	A new and cheaper design from Philips that sounds best via MM disc. Can appear soft and unbalanced via CD	108W, MM/MC source-direct tone		74
Philips FA960 MkII £300	Good + Average	The MkII '960 still failed to grasp our listeners' attention, but it remains a competent amp nonetheless	122W, 6 line & 2 disc inputs + tone controls		68
Pioneer A-300 £180	Very Good Good	The cheapest of Pioneer's dynamic duo gives off its best with CD rather than MM disc which failed to shine quite so brightly.	55W, 3 line, 2 tape and MM. Independent rec out facility.	R	92
Pioneer A-400 £230	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
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 £199	Good + Good	Latest 240CD is fine value for CD and has competent MM disc input as well	45W MM 5 line inputs straight line	BB	62
QED A240 SA II £259	Very Good Good +	Redesigned 240SA has significant improvements over its predecessor, and provides a good moving-coil disc input in a competitive price	45W MM/MC 5 line inputs straight line	BB	62
QED A270 £299	Good - Good +	Building on the strengths of the '240, the '270 sounds weighty, fast and dynamic. A bit 'lumpy' via MC	51W, 5 line and 2 disc inputs, pre-out	R	68
QED C300/P300 £300/£300	Good Good	A cost-effective combo, limited in its resolution but no less beguiling as a result. Disc stage is sweeter but samey	58W, 2 tape, 3 line, MM/MC + mono/biamp opt.	R	85
Quad 34 £299	Very Good Average	This well-built durable preamp has useful filtering and above average tone controls but was found lacking in sound quality (viz: detail/dynamics)	4 inputs MM/MC tone controls		44
Quad 405 £389	Very Good Average	Not an impressive power amp but easy on the ear if not pushed and very reliable	100W		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 pr	Average Good +	Monstrous valve monobloks which represent good value. What they lack in musical subtlety they make up for in sheer muscle. And these are Lumley's small monobloks!	75W monoblok		78
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 the Rose given the competitive price	MM plus 3 line inputs	R	77
Rotel RA-810A £120	Very Good Average	As a cut price RA820AII this is a very successful little amp that loses little in sound quality to its predecessor. Excellent value	20W, MM, 5 inputs, hdph, tone controls	BB	62
Rotel RA-820AX £150	Very Good Very Good	The spacious, detailed and very musical performance of this budget amp is almost too good!	47W, MM, 4 line inputs	BB	80
Rotel RA-820BX4 £190	Good + Good +	Very authoritative but creamy-smooth and delightfully musical. Spatially convincing too, yet not as open as RA-820AX	39W, 4 line + MM/MC, dual-conc. R volume.	R	85
Rotel RA-840BX4 £250	Good Good +	Very sedate and controlled in presentation but check phasing for optimum stereo effect	63W, MM/MC, 4 line inputs, tone controls		80
Rotel RA-870BX £300	Very Good Good +	A powerful blockbuster with solid and well focused sound, good versatility and fine load tolerance	85W MM/mc 7 line inputs tone controls	R	56
Rotel RC/RB-850 £140/£160	Very Good Good +	Quality separate pre and power amplifiers at near budget integrated amplifier prices. A notable achievement	60W MM/mc 4 line inputs tone controls	BB	62
Rotel RC/RB-870BX £220/£230	Excellent Good +	Reduced price makes the 870 combo better value but, despite mods to the preamp, it is the power amp that must take the lion's share of credit	128W or 208W bridged CD direct, 4line, 2 tape and MM/MC	R	68
SAE P102/A202 £499/£599	Average + Average +	Microprocessor-controlled pre and power amp that sounds much better at low rather than high volume levels. Pro-oriented aesthetics	151W, MM/MC + CD tuner and 2 tape tone memory, spk switching		74
Sansui AU-X111 £110	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-F630ESD £350	Good Average	Based on the '530 but equipped with PDM D/A convertor. Amp is competent but DAC sounds truly magnificent!	130W, as above + opt. and coax digital inputs	R	74
Sony TA-F730ES £450	Very Good Good	A very stable and coherent amp but one that lacks a crucial sense of involvement	133W, MM/MC, 3 tape, 2 line, full rec-out		80
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 in Pure Class A.		92
Sumo Athena/Polaris £695/£695	Very Good Very Good	Very good value US pre/power combo with transparent, detailed and gutsy sound via all inputs	128W, MM/mc, 2 tape and 3 line inputs	R	80

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AMPLIFIERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Teac A-X400 £115	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
Technics SE-M100 £550	Very Good	An unusual disc-less poweramp with volume control. Standard line input sounds very open and clean. Digital input is harsher and less convincing	123W, coax and opt digital inputs, var and direct CD no disc input	R	74
Technics SU-810 £130	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-V660 £250	Good	Chunky build but integrated output stage infers a weak, insubstantial and rather monophonic sound	107W, MM/MC, cd aux, tape + tuner + power amp-direct		74
Technics SU-V900 £500	Very Good	Massively built but with a light, fresh and essentially very neutral sound. Bulk notwithstanding it's not particularly suited to life with a difficult speaker.	125W, 5 line and both MM/MC inputs. Tone controls + power amp.		92
Threshold FET 10e system/Stasis SA-4 £5700/£5900	n/a	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. '90
Yamaha AX-330e £100	Average +	An improvement on earlier efforts but still a little bland or lack-lustre. Very compatible though	48W, MM, 3 line inputs, source-direct option		80
YBA 1 power amp £2995	Good	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	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	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	Suited to highish sens. loudspeakers this duo produced see-through, ethereal stereo images that were more convincing towards the centre of the soundstage than at the edges	56W stereo amp MM only with 3 line i/p's.		72

LOUDSPEAKERS

Last item in the hi-fi chain, to some extent the loudspeaker is merely the slave of what has gone before, capable only of reproducing a signal as good as it is fed. Nevertheless the distortions (colorations and stereo effects) introduced by loudspeakers (and rooms) tend to be more immediately obvious than those anywhere else in the chain, so careful choosing according to taste is very important.

The average loudspeaker consists of a smallish enclosure, much of which may have begun life as part of a tree, plus a couple of drive

units hidden behind a removable grille. Inside the box lurks a simple electrical circuit known as a crossover, which divides the incoming (full range) signal into the right bits for the drivers to handle. Variations on the above formula are specifically identified in the entries. The designer's primary task is to balance the sensitivity of the loudspeaker (how loud it goes for a given electrical input) against the bass extension (how low does it go) for the given box size. After that such subtleties as coloration and dispersion come into the equation.

Careful placement of the loudspeakers within the room is as important as the initial choice of model.

For good stereo they need to be more or less the same distance from nearby walls, and preferably on rigid stands. The listener should be about the same distance from and listening angle to each loudspeaker. The ideal placement depends on the way a particular model has been balanced (not to mention a number of other factors), and our recommendation is given in the entries.

MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY	VALUE	ISSUE
Acoustic Energy AE1 £748	Good	To the author's knowledge, the most awesomely dynamic and articulate miniature ever made	29.5 x 18 x 25cm semi-open space	88dB/w 60Hz	R	59
Acoustic Energy AE2 £897	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 space	88.5dB/w 45Hz	R	66
Acoustic Energy AE3 £1650	Very Good	Solid, authoritative and impressively accurate – if a shade ponderous and slow – AE's latest 'big one' is a much better bet than the earlier '4, combining traditional monitoring virtues with the latest metal diaphragm technology	63 x 26.5 x 37cm low stands in free space	85dB/w 23Hz (in room)	R	86
Acoustic Research AR-112 £125	Average	Nicely presented and engineered, but sounds a bit small and boxy without true coherence	36 x 19 x 18.5cm stands near rear wall	87dB/w 75Hz		66
Acoustic Research AR-122 £150	Average	Despite a promising enough list of ingredients, the 122 failed to excite real enthusiasm amongst the listening panel	38.5 x 19 x 22cm stands near rear wall	87dB/w 68Hz		68
Acoustic Research AR-132 £200	Average +	Good presentation and detail engineering was not sufficient to counter bass heavy balance problems on auditioning	44.5 x 23 x 25.5cm stands 1ft from rear wall	87dB/w 50Hz		66
Acoustic Research Red Box £100	Average	Lively and balanced if a bit crude and uneven, this econobox succeeds partly because of its simplicity, and works well with some rear wall assistance	32 x 19.5 x 17cm close to rear wall	87dB/w 85Hz	R	74
Alexander SE11 £299 (stands £69)	Good	Clearly better than its cheaper stablemates, the metal jacket delivers a different – and in some respects superior – sound than the wood-based competition	52 x 14 x 17.5cm stands close to wall	86dB/w 25Hz (in room)	R	82
Alexander SE5 £199	Average	Particularly well suited to surround sound A/V applications, the SE5 can give any miniature a run for its money on bass performance; hardness and coloration mar good detail and clarity, and price is a little high	40.5 x 12 x 15cm ALS stands near wall	82dB/w 50Hz (in room)		78
Allison AL100 £109	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/W 30Hz (in room)	BB	94
Allison AL105 £150	Average	Pretty enough in appearance, sonically the AL105 doesn't really make the grade at the £150 asking price	37 x 24 x 21cm high stands against wall	87dB/w 45Hz (in room)		78
Allison CD6 £290	Average	An unusual cube-shaped model designed for wall mounting gives exceptional bass extension from a small box, though it's also a bit heavy, coloured and slow	28.5 x 28.5 x 28.5cm stands against rear wall	88dB/w 45Hz	R	71
Alphason Amphion £680	Good	This fine-sounding, nicely finished compact wall-mount is just a little too expensive for formal Recommendation, but is a good performer for all that	44 x 23 x 27.5cm high stands against wall	88dB/w 47Hz (in room)		78
Alphason Artemis £299	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/W 50Hz (in room)		94
Alphason Orpheus £1000	Good	Large hi-tech two-way features unusual, sweet-sounding isodynamic tweeter; well engineered and balanced if a shade odd in appearance	65.5 x 28 x 34cm stands near rear wall	87dB/w 43Hz	R	71
Apogee Caliper Signature £3350	Good +	Pretty but power hungry full range panels have remarkable transparency and delicacy, though loudness and bass 'grunt' are both a bit lacking	122 x 59-70 x 6.5-28cm floor, free space	81dB/w 30Hz (in room)	R	81
Arcam Alpha £200	Good	It has its own colorations to be sure, but delivers a fine room balance with unusually good dynamics, timing and 'life', and is fine material value	46 x 26.5 x 26cm stands close to wall	89dB/W 30Hz (in room)	BB	82
Arcam Delta Two £340	Average+	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 wall	87dB/W 40Hz (in room)	R	94
Ariston Image £180	Average -	Despite a sweet treble character, the Image fails to impress with a 'lumpy' over-rich balance that has room integration problems	42 x 22 x 27.5cm stands in free space	89dB/w 28Hz (in room)		82

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MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY	VALUE	ISSUE
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 space	85dB/w 30Hz (in room)		86
ATC SCM20 £1320	Very Good Good +	Massively built to no-compromise Pro monitoring standards, the SCM20 is invariably informative but the rather forward presentation can be uncomfortable	44 x 24 x 31cm stands close to rear wall	82dB/w 28Hz (in room)		86
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	87.5dB/w 40Hz	R	68
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 stands	83dB/w 48Hz (in room)	R	86
B&W 620 £299	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 and firmer bass.	74 x 23.5 x 30cm floor, free space	89dB/W 25Hz (in room)	BB	94
B&W CM1 £400	Good Average	Cleverly thought out luxury design package is also fundamentally well engineered, if a shade pricey on 'sound for pound' basis	24.5 x 16 x 22cm close to rear wall	84dB/w 90Hz		74
B&W DM550 £149	Good + Average -	Beautifully presented, well engineered near-miniature with precise sound but a distinct lack of 'wellie'. Ideal for considerate flat dwellers	35 x 20.5 x 22.5cm stands in free space	86dB/w 70Hz		71
B&W DM560 £199	Average + Average -	Fine cosmetic presentation and good engineering for the price; overload protection may be handy but listening panel was underwhelmed	49 x 23.5 x 30cm stands in free space	88dB/w 55Hz		66
B&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 stereo imaging	77/99 x 56 x 43cm floor or stands, free space	86dB/w <20Hz (in room)	R	81
B&W Vision DS1 £120	Average Average -	Although significantly hampered by upper bass cabinet coloration, the DS1 cleverly combines high sensitivity with a rich and generous soundstage	36 x 21 x 19cm stands quite close to wall	91dB/w 40Hz (in room)	R	82
B&W Vision DS2 £180	Average Average -	Although the box is generous for the price, the DS2 is a rather uneven performer, both on the measurement and listening. Careful stand selection and placement is needed to control the enthusiastic mid bass	50 x 24 x 25cm stands in free space	89dB/w 43Hz (in room)		86
Bose 305 £350	Average Good -	A bit of an oddball, fine dynamic liveliness and a good room match more than make up for the strange stereo imaging and treble	28 x 45 x 23cm high stands near wall	88dB/w 40Hz (in room)	R	78
Bose 901 MK6 £1600	Good Average	Still controversial after all these years, the pre-equalised multi-driver 901 is cleverly engineered to deliver exceptional loudness with a modest amplifier, but mid bass tends to dominate the sound and transparency is notably lacking	33 x 54 x 32cm rigid stands in free space	(92dB/w midband) 28Hz (in ro		86
Bose Interaudio 3000XL £150	Average Average -	Lots of perceived value and well enough balanced, but low cost cabinet and driver engineering results in a crude and unsuitable sound	46.5 x 29 x 23cm stands in free space	89dB/w 45Hz		71
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 genuine bass extension and a few rough edges	62.5 x 31.5 x 25cm stands in free space	89dB/w 48Hz	R	86
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	88.5dB/w 63Hz		41
Boston Acoustics T830 £399	Good Good	A lot of speaker for the money, the T830 is a smooth and accomplished performer with a big and easy - or alternatively a lazy and laid back - sound	82.5 x 25.5 x 24cm floor, away from walls	87dB/w 30Hz (in room)	R	82
Cambridge SoundWorks Ambiance £179 (mail order only)	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/W 45Hz (in room)		94
Castle Clyde £159	Average + Average	A tidy little performer packing punch, but beginning to show its age in the light of new competition	37 x 21.5 x 22cm open space on stands	89.5dB/w 64Hz	R	46
Castle Durham £209	Average + Average	Listening results were encouraging, well engineered and finished, but lean on treble and a bit weak on bass; still recommended	41 x 21.5 x 25cm near rear wall	89dB/w	R	46
Castle Pembroke £229	Good Average +	Comfortably recommended, a sweet smooth sound with good overall balance of engineering-based performance	55 x 37.5 x 30.5cm open space on stands	88dB/w 46Hz	R	31
Castle Warwick £179	Good Average -	Excellent presentation and fine engineering with overload protection, but a sonic disappointment in bass and dynamic qualities	46.5 x 25 x 23cm stands 1ft from rear wall	88dB/w 50Hz		66
Castle Winchester £1250	Very Good Very Good	This unconventional and beautifully crafted model is physically large for its bass extension but is engagingly agile and sounds attractively open and airy	114 x 24 x 47cm in free space	87dB/w 25Hz	R	90
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/w 55Hz		71
Celef Cirrus £180	Average Good	It's nice to see Celef back in the UK, with this decent sounding small reflex box that seems unusually tolerant of siting	39 x 20.5 x 23cm stands in free space	84dB/w 60Hz	R	66
Celestion 3 £109	Average + Average	This attractive little wall-mount gives good balance and stereo imagery, with a character which leans more towards indolence than excitement	31 x 18.5 x 21cm high stands against wall	86dB/w 55Hz (in room)	R	78
Celestion 5 £149	Good Average	Cunningly conceived and balanced, the 5 may be a little slow for some tastes, but is well suited to CD-oriented budget systems	35 x 20.5 x 26cm heavy stands close to wall	89dB/w 30Hz		90
Celestion 6000 £1470	Very Good Very Good	A genuine fullrange audiophile quality speaker system - with Star Wars styling to suit a high tech environment	Complex, on floor in free space	82.5dB/w	R	60
Celestion DL6 Series II £179	Good Average	Good tonal colouring and plenty of bass for the enclosure size; the metal dome tweeter is excellent, but bass and mid lack clarity and 'bite'	45.4 x 24.5 x 26.2cm near wall, on stands	87dB/w 65Hz		59
Celestion DL8 Series II £199	Very Good Good	A refined middle market speaker has a smooth but slightly dull quality, with good definition and deep, if slightly boxy bass	50 x 27.5 x 27.8cm open, stands	87.5dB/w 60Hz	R	59
Celestion SL12Si £599	Average Average	Careful setting up does reveal elements of fine sound quality, but this 'grown up' SL6 variation has a lumpy response alongside its improved power handling	53 x 20 x 27cm matching stands clear of walls	85dB/w 50Hz		66
Celestion SL600Si £799	Good + Good	This Aerolam high tech miniature has certain remarkable qualities that some will find irresistible, but needs careful system and room matching	27 x 20 x 23cm free air on tall stands	82dB/w 52Hz		68
Celestion SL6Si £399	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 wall	86dB/W 30Hz (in room)		94
Creek CLS20 £200	Good Average -	Looks good material value, but sound is distinctly over-rich and thick in the mid-bass region; maybe the box is a little too large.	49 x 24.5 x 24cm open frame stands, free space	88dB/W 30Hz		90
Dahlquist DQ8 £850	Good Good	Large floorstander uses out-of-box tweeter to give delightfully out-of-box presence and treble; bass is much less impressive	100.5 x 36 x 28cm floor, free space	88dB/W 30Hz (in room)	R	94
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/w 20Hz		90
DCM 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/w 45Hz		90
Doxa 5 - 2 £900	Average Good	The high sensitivity and seductive midband makes an obvious partner for valve amplifiers, though obtaining a good room match may prove a little tricky	98 x 21 x 28cm floor well away from walls	91dB/w 30Hz (in room)	R	82
Duntech PCL1000 Crown Price £6120	n/a Excellent	Immensely 'listenable', refined sounding speaker capable of creating lifesize musical images. Not overly transparent to source, but very civilised nonetheless	180 x 30.5 x 43.5 free standing away from walls	90dB/w 42Hz	R	72

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Duntech PCL500 Marquis £3998	n/a Very Good	Better value for money than the Crown Prince - and arguably more dynamic, with real bass 'slam' but a little less refined in the higher registers	147.5 x 27 x 40cm free standing away from walls	92dB/w 48Hz	R	65
Epos ES11 £300	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/W 45Hz (in room)	BB	94
Equation O £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 wall	85dB/w 45Hz	R	90
Faraday Siren £330 (direct sale)	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/W 48Hz (in room)		94
Goodmans B-Max/Maxim 2 £100/£90	Poor Average -	Stick with the Maxims on their own until you can afford some real grown up loudspeakers	60 x 21 x 26 see above, suck and see	89dB/w 55Hz (in room)		78
Goodmans HIM 440 £350	Good Average -	Amazing perceived value, sensitivity and good bass extension, marred by serious cabinet coloration, a nasty tweeter and a difficult amplifier load	87 x 38 x 40cm low stands clear of walls	94dB/w 24Hz		90
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/w 50Hz (in room)	R	86
Goodmans M300 £100	Average Average -	Conveying much of the charm and life which has made the Maxim 2 so popular, the M300 is sensitive, but hampered by upper bass cabinet coloration	38.5 x 21.5 x 17cm stands close to rear wall	89dB/w 50Hz (in room)	R	82
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/W 50Hz (in room)		94
Goodmans Maxim 2 £90	Average + Average	More wham-bam-thank-you-mam sound that imitates much bigger speakers when you let these babies yell. (A well-controlled yell)	26 x 17 x 19cm near wall on shelf or stand	86dB/w 85Hz	BB	59
Harbeth HL Compact From £539	Very Good Average	The clean and neutral sound lacks resolution and gives rather unobtrusive though well differentiated stereo. Can be bi-wired to advantage	52 x 27.2 x 28.1cm open space, on high stands	87.5dB/w 65Hz		59
Harbeth LS3/5A £343	Good Average	Still a classic miniature, though not to every taste, and none the better for the recent update under our listening conditions. Limited dynamic range	30.5 x 19 x 16cm stands in free space	81dB/w 60Hz		66
Heco Interior 120 £169	Good Average	Drab appearance belies a lively enough character, though the balance is altogether a bit bright for UK tastes	32 x 23 x 23cm high stands against wall	88dB/w 50Hz (in room)		78
Heco Interior 430 £429	Good Good -	This tall floorstanding enclosure delivers an impressively even sound balance with good bass extension, if not the lively dynamics to satisfy enthusiasts	85 x 24 x 27.5cm free space	88dB/w 43Hz	R	71
Heco Interior 90 £159	Good Average -	Neatly finished and engineered miniature, but the disappointingly 'lifeless' sound left the listening panel decidedly underwhelmed	27 x 18 x 16cm on high stands	87.5dB/w 90Hz		74
Heco Interior Plus 404 £400	Average+ Average+	Odd shape and size; twin main driver arrangement creates a slight 'boom'n'tizz' effect, but mid focuses well and bass extension is impressive	58 x 26 x 31cm low stands free space	88dB/W 25Hz (in room)		94
Heco Superior 740 £599	Good Good -	A similar sonic package to the cheaper Interior 530, these Superior clothes are very pretty indeed, though spikes are still awaited	84.5 x 22 x 25cm on floor in free space	88dB/w 30Hz (in room)		78
Heco Superior 940 £999	Good Good	This large and beautifully finished floorstander has an impressively smooth and attractively transparent midband. Bass is well extended but follows rather than drives the music along.	110 x 26 x 31.5cm free space	88dB/w 20Hz		86
Heybrook HB1 £199	Good Average +	No longer an over-bright character, a strikingly clear sound and fine transient performance now merits recommendation	47 x 29 x 23cm on stands near wall	88dB/w 61Hz	R	46
Heybrook HB100 £279	Average + Good	Well matched for wall siting, the HB100 is a lively and informative performer in the tradition of the popular HB1	47 x 26 x 28cm stands near rear wall	86dB/w 50Hz	BB	66
Heybrook HB150 £369	Average Good	Convincingly communicative but a bit coloured and congested, this lively compact wall-mount is nicely finished but a little costly for the content	40.5 x 23 x 22cm stands close to rear wall	89dB/w 42Hz (in room)		82
Heybrook HB200 £429	Average Average	This luxury successor to the HB2 is lively and informative, but sounded insufficiently balanced to convince our listening panel	46 x 23 x 26cm stands against rear wall	87dB/w 55Hz		66
Heybrook Point 5 S2 £179	Good Good	Lively, revealing and enjoyable wall-mount can sound unruly with multi-strand but comes dramatically into focus with solid core cable.	37.5 x 23 x 24.5cm HBS1s against wall	85dB/W 30Hz (in room)	BB	94
Heybrook Point 7 £185	Average Average	Physically an attractive package, but not entirely convincing in lab or listening panel test; interesting for all that	40.5 x 23 x 23cm stands against rear wall	85dB/w 60Hz		68
Heybrook 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/w 28Hz	R	90
Infinity Kappa 6 £795	Good Good	Interestingly styled US loudspeaker has unusual high tech drivers and good neutrality, but the sound seriously lacks excitement	63 x 38 x 24cm stands, free space	85dB/w 35Hz		66
Infinity Kappa 8 £1850	n/a Very Good	Very nicely made and unobtrusive but large four-way speakers which have a tendency to sound bass heavy unless used with solid core cables	118 x 51.5 x 17.5cm floor standing, open space	89dB/w 33Hz		72
Infinity Modulus £695	Good Average +	Luxury high-tech miniature is carefully conceived and beautifully executed. Undeniably attractive in the midrange and treble, the Modulus failed to handle the bass end of the spectrum as successfully	30 x 18 x 26cm high stands 1ft from wall	84dB/w 45Hz (in room)		86
Infinity RS2001 £180	Average Average +	A little coloured and unruly in the treble, the 2001 nevertheless retains the lively dynamic bounce of its predecessor; pity the price has gone up	36.5 x 22.5 x 20cm lightweight stands	87dB/w 50Hz (in room)	R	78
Jamo Concert II £250	Good Average -	A thoroughly respectable 'bookshelf' performer that needs free space siting but includes attractive cabinetwork and a neat grille	41 x 24 x 25cm stands in free space	85dB/w 48Hz		66
Jamo Concert VII £650	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/W 25Hz (in room)		94
Jamo Cornet 40 £100	Good Average	Prettily styled Danish miniature is good perceived value and delivers solid bass and midrange performance but is let down by an indifferent tweeter	31.5 x 19.5 x 21.5cm about 1ft from wall	87dB/w 48Hz		90
JBL Control 1 Plus £229	Average Average	Sub-miniature with forward midrange and no real bass; highish price partly justified by cute, near-indestructible Pro styling and build	23 x 15.5 x 14cm close to rear wall	89dB/w 50Hz		90
JBL L20T3 £249	Average- Average-	Compact bookshelf model delivers bouncy miniature-type sound when free space mounted; pleasant enough but uneven and undistinguished	39 x 23 x 20.5cm stands free space	87dB/W 48Hz (in room)		94
JBL LX33 £259	Average + Good	A bit of a cheat, but a lot of speaker for the money, which manages a better room balance than many 'large bookshelf' rivals, and delivers a fine acoustic performance	80 x 25 x 21cm floor, 1ft from wall	89dB/w 48Hz	R	82
JBL LX44 £339	Good - Average	This generously built model offers good power handling, bass extension and dynamic range, but suffers from the 'three-way syndrome', with middle muddle	58.5 x 30 x 29cm stands in free space	89dB/w 40Hz		71
JBL TLX12 £149	Good - Average	This smart near-miniature has a 'boppy', lively bottom end, but beware of the fizz in its top	37 x 23 x 23cm stands 0.5m from rear wall	87dB/w 55Hz	R	71
JBL XPL 90 £699	Good Average +	Though undoubtedly pretty and very expensively engineered, this elaborate near-miniature didn't really convince our listeners that it could deliver a sound quality to match its elevated price	39.5 x 24 x 24cm stands in free space	85dB/w 45Hz (in room)		86
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 stands	89dB/w 65Hz	R	53
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/w 57Hz	R	46

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MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY	VALUE	ISSUE
JPW Minim £85	Average + Average -	Very civilised but dynamically limited, the Minim is well suited to the smaller room and where limited loudness is acceptable	27.5 x 18 x 19.5cm stands against wall	85dB/w 28Hz (in room)	R	82
JPW P1 £145	Good Average +	Honest and basically articulate if not very sophisticated, resolution is good but it can sound a little wearing in bright systems or with rough sounding material	44 x 25.9 x 26.1cm free space on stands	89dB/w 60Hz	R	59
JPW 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/w 55Hz	BB	71
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/w 30Hz		90
JRT AD1 £500 (stands £100)	Average + Good +	A most auspicious Choice debut for relative newcomers JRT. A fair share of cosmetic deficiencies do little to spoil the impressive coherence and timing that makes this beautifully finished and generously proportioned model so enjoyable.	59.5 x 28 x 36cm own stands close to rear	86dB/w 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 transparent to system tuning.	28 x 17 x 21cm stands against wall	87dB/W 50Hz (in room)	R	94
Kammerzell Reference Mini Monitor £545	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	stands 1-2ft from wall 85dB/W	50Hz (in room)		94
KEF 103/3 £750	Good + Good	Technically impressive, excellent bass/power handling for size, but not for the audiophile system. Better among cheaper components, and good in a large room	56 x 27 x 30cm supplied stands free space	90-95dB/w 35Hz		53
KEF 104/2 £1,150	Very Good Very Good	A reference point for dynamics, preferred without KUBE, suited to many rooms. Good stereo, high sound level	90 x 28 x 41.5cm floor standing in free space	92dB/w 50Hz	R	60
KEF C15 £119	Good Average	One of the tiniest around delivers a surprisingly 'big' and well balanced sound, with excellent stereo from free space siting	26.5 x 18 x 14cm stands in free space	85dB/w 60Hz	R	71
KEF C25 £149	Average + Average -	Very safe and competent, but rather short on inspiration, the '25 lacks the brio and flair of its smaller C15 brother	34 x 20.5 x 17cm high stands near wall	87dB/w 60Hz (in room)		78
KEF C45 £219	Good Average -	Conventional and competitively priced, C45 delivers an impressively consistent and competent sound. As one listener commented: "Offensively inoffensive whether it be love or loathing, give me some emotion"	47.5 x 28 x 24cm uncritical	87dB/w 30Hz (in room)		86
KEF C55 £249	Good Average +	Similar to but less good value than C75, the '55 provides Uni-Q stereo stability but not real wood veneer or good low frequency room match	48 x 24.5 x 25cm stands, free space	91dB/w 30Hz (in room)		82
KEF C75 £339	Good Good	Compact floorstanding model's Uni-Q driver provides fine crossover integration, giving stable stereo and fine dynamic range within a slightly 'rich' balance	72 x 24.5 x 25.5cm floor in free space	90dB/w 45Hz	R	71
KEF C85 £549	Good Good	Essentially a simplified vinyl finish version of C95, the 85 delivers a similarly coherent, neutral, rich and slightly lazy sound	88 x 25 x 22cm well clear of walls	89dB/w 27Hz	R	90
KEF C95 £649	Good Good	Rich and lazy, but nonetheless very endearing in a cosy sort of a way, the '95 is a lot of speaker for the money, and delivers a big sound with grace and subtlety	88.5 x 24.5 x 31cm floor in free space	90dB/w 28Hz (in room)	R	78
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/w 25Hz		90
Linn Index II/KuStone £235/£109	Good Good	Combination of stand and speaker looks and sounds very good for the price, with good bass extension and control, and dynamic range. Clean, clear, if a shade slow	44 x 21 x 23.5cm (box only) close to rear wall	86dB/w 28Hz	BB	90
Linn Kaber LS500 £989	Average Good +	Discreet wall-mount package trades sensitivity for fine bass extension and midbass performance; can be a little relentless but has prodigious dynamic capabilities	93 x 19 x 28cm floor against rear wall	86dB/w 28Hz (in room)	R	82
Linn Kan II £417	Average + Average +	A niche product for those prepared to tolerate its strong character for the sake of its fine bass performance and near invisibility	30.5 x 18.5 x 16.5cm Kan stands against wall	82dB/w 35Hz (in room)		78
Linn Nexus LS250 £449	Good Average	Good features include a solid, meaty bass plus good imagery and tonal balance. The catch is that Nexus lacks resolution and timing	49 x 23.5 x 30.4cm near rear wall supplied stands	89dB/w 60Hz		59
Magneplanar MG1.4 £1190	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/w 40Hz	R	72
Magneplanar MG2.5R £1998	Good Good	Offers the low coloration and profound musical insight of better electrostatic loudspeakers but without loss of low frequency extension	183 x 56 x 4.5cm Open space	83-85dB/w 35Hz	R	60
Magneplanar MG11la £2700	Good Very Good	Another excellent true-audiophile loudspeaker this American panel speaker helps to convey much of the original character of the music	180 x 62 x 38cm well clear of walls	84-86dB/w 35Hz	R	46
Magneplanar SM6a £675	Average - Average	Tonally 'rich', in the right room it proved a satisfactory musical experience	122 x 48 x 4.5cm on floor clear of wall	85dB/w 56Hz		46
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/w 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/w 45Hz	R	72
Meridian Argent 2 £995	Good + Good	This beautiful but pricey high-tech 'large compact' delivers an 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/W 23Hz (in room)		94
Meridian M30 £895	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	Active 40Hz		46
Mission 760 £100	Good Average +	Smart presentation and an engaging sound, this sensitive budget miniature sounds notably more lively and less boxy than most of its peers	29 x 18 x 20cm stands close to wall	88dB/w 50Hz	BB	90
Mission 761 £130	Average Good	One helluva speaker for the price, if a shade small and short of subtlety and refinement - should prove a worthy successor to the 70 and 700	38 x 21 x 21cm stands near rear wall	87dB/w 60Hz	BB	66
Mission 762 £200	Average Average -	Mission's 'bookshelf middleweight' offers high sensitivity and loudness capability, but at the expense of a somewhat untidy and rather 'heavy' sound	50 x 25 x 27cm stand, experiment advised	91dB/w 55Hz		66
Mission 763 £300	Average + Average +	A very artful combination of generous volume and good bass extension at a modest price. Works well in the listening room despite a few rough edges	77 x 25 x 32cm near rear wall	86dB/w 40Hz	BB	68
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	1ft from wall, freestanding 87dB/W	below 20Hz (in room)		94
Mission 767 £2300	Very Good Very Good	Magnificent and massive part-active monoliths have fine acoustic subtlety and impressive loudness capability, ultimately limited by partnering (Cyrus) electronics	138 x 29 x 43cm floor, flexible	91dB/w <20Hz (in room)	R	81
Mission Cyrus 780 £170	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/w 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. Take care to adjust placement to suit room and system	43 x 22.5 x 28cm matching stands 1ft from wall	88dB/w 28Hz (in room)	R	86
Mission Cyrus 782 £350 (stands £80)	Good - Good -	Lively, articulate and beautifully finished, this compact wall-mount model with twin main drivers has good integration but a rather rich, 'Loudness' balance	50 x 25 x 32.5cm Cyrus stands near wall	90dB/w 50Hz		71
Monitor Audio MA1200 £900	Average Average +	This smooth and civilised slimline floorstanding loudspeaker is well built and nicely presented. But it is also expensive	94 x 20 x 26cm in free space	85dB/w 48Hz		68
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/w 30Hz (in room)		81

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■ MODEL ■ PRICE	■ LAB ■ SOUND	■ COMMENTS	■ SIZE ■ PLACEMENT	■ SENSITIVITY	■ VALUE	■ ISSUE
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	stands free space 87dB/W	48Hz (in room) R	94	94
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/w 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/w 30Hz		78
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 walls	87dB/w 45Hz		90
Mordaunt-Short MS 3.10 £110	Average Average +	Probably the liveliest and most communicative miniature around, this beautifully presented design is probably better suited to budget 'real hi-fi' than the blandness of the midi system	28.5 x 17.5 x 20cm	88.5dB/w 48Hz	BB	78
Mordaunt-Short MS 3.20 £140	Average Average +	All the charm of its BB-rated £99 baby 3.10 brother, plus a smidgeon more bass for those in a suggestible frame of mind	35.5 x 18 x 20cm open stands against wall	85dB/w 50Hz (in room)	R	82
Mordaunt-Short MS 3.30 £200	Average Average +	A little too mid-forward for neutrality or formal recommendation, this attractive, good-sized model nevertheless has more than enough appealing qualities to merit serious consideration	46 x 23.5 x 27cm high stands 1-2ft from wall	87dB/w 38Hz (in room)		78
Mordaunt-Short MS 3.40 £260	Average + Average	It looks pretty and sounds civilised, but the 3.40 failed to ignite any degree of enthusiasm amongst our listeners. Low frequency stand matching is a bit tricky	57 x 23.5 x 27.5cm stands in free space	87dB/w 30Hz (in room)		86
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. The whole turns out to be worth more than the sum of its parts.	34 x 20 x 18cm stands close to wall	87dB/w 45Hz (in room)	R	86
Naim NA IBL £798	Average+ Good	This tiny and elaborately engineered floorstanding wall mount delivers outstanding dynamics, speed and detail, marred by pronounced upper mid forwardness.	wall, freestanding 84dB/W	30Hz (in room)	94	
NVA Cube 1 £600 (stands £200)	Good - Good +	Attractive, cube-shaped semi-omni is very sturdily built, and gives an idiosyncratic but unusually open, spacious and informative sound	33 x 32 x 32cm own stands c0.5m from wall	85dB/w 52Hz	R	71
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/w 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 and has aggressive tendencies	60 x 32.5 x 32.5cm	84dB/w 28Hz (in room)		78
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 bookcase	86.5dB/w 45Hz		66
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/w 65Hz		74
Pearl & Dakley 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 and mechanical development	93 x 33 x 33cm on floor in free space	87dB/w 30Hz (in room)		78
Philips FB815 £250	Average Average	An impressively – indeed imposing – physical package for the price, clever engineering gives a very competent if slightly hard and brittle sound quality that somehow lacks genuine authority	63 x 27 x 27cm low stands in free space	85dB/w 30Hz		86
Philips FB825 £650	Good Good	Generous sounding and impressively uncongested for the type, loudness and bass extension don't quite match the large and rather plasticky box	110 x 29 x 41cm on cones clear of walls	88dB/w 25Hz	R	90
QLN Model One £700	Good Average	Similar to Signature at two thirds the price, Model One exaggerates the latter's rich and heavy midbass and lacks its velvet smoothness	35 x (16-25) x (21-27)cm pillar stands, free space	85dB/w 28Hz (in room)		82
QLN Signature £1100	Good Good	Beautiful but expensive luxury compact has a rather laid back and 'heavy' sound, but coloration is low and stereo imaging very good	37 x 18 x 36cm heavy stands in free space	83dB/w 30Hz (in room)		78
Quad ESL-63 £1860	Good + Very Good	With its unusual but subtle characteristics this classic electrostatic may not be punchy in the bass, but has strengths that some cannot live without	92 x 66 x 27cm open stand well clear of wall	84dB/w 34Hz	R	60
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/W 45Hz (in room)		94
Richard Allan CD5 £184	Average - Average -	This neatly presented small reflex design can sound engagingly communicative, but is flawed sonically and technically and quite expensive too	38 x 19 x 23cm on rigid stands	88dB/w 80Hz		68
Rogers LS2a £193	Average Average	Provides very good engineering and stereo performance for the price, alongside some 'boxiness' and certain dynamic constraints	36 x 23 x 21cm low stands 1ft from wall	88dB/w 50Hz (in room)		82
Rogers LS4a £255	Good Good -	This artfully voiced and well balanced compact gives a fair flavour of the classical 'BBC sound' at a very reasonable price	43 x 25.5 x 24.5cm stands 1ft from wall	87dB/w 32Hz (in room)	R	78
Rogers LS6a £316	Good Good	Stereotypically a Rogers model with impressively even balance, prospective purchasers will have to weigh the fine midband naturalness against slightly lazy dynamics and timing.	51 x 27.5 x 28cm stands in free space	86dB/w 25Hz (in room)	R	86
Rogers LS7t £449	Good + Good +	A fine combination of classic qualities at reasonable price produces the "R" tag, but try to get a pair home on approval to check for bass 'heaviness'	56 x 27 x 28cm free space on 40cm stands	88.5dB/w 48Hz	R	59
Rogers Studio 1a £612	Very Good Good -	The classic BBC monitor style sound sensitively updated – transparent and natural with fine stereo, but a touch 'heavy' in balance	63.5 x 30.5 x 30.5cm stands in free space	87dB/w 36Hz	R	66
Roksan Darius £1395 (£345 integral stand)	Good Very Good	Now totally realigned, the current Darius provides an exceptionally impressive combination of transparency and delicacy with fine information retrieval and speed. The problem is affording the amplification to do it justice.	47 x 27 x 40cm own stands angled in space	82dB/w 20Hz	R	86
Royd A14 II £199	Average Good	Not the smoothest or prettiest around, this is still an informative if sometimes aggressive large bookshelf model, with plenty of welly for the price	40 x 26 x 23cm stands 1ft from wall	87dB/W 30Hz (in room)	R	94
Royd A7 Series 11 £115	Average + Average	Lively clear sound; good upper bass and dynamics, but treble "ramp" made vocals sound shut in. Try before you buy	31 x 20 x 17cm shelf or 50cm stands near wall	86dB/w 75Hz	R	53
Royd Apex £485	Average + Good	Not the smoothest sound around, it more than compensates with an impressively communicative and informative musical presentation	85.5 x 20 x 30cm on floor close to wall	87dB/w 33Hz (in room)	R	78
Royd Eden £235	Average Average +	Delightful mid/treble speed and transparency but determinedly bass light, this oddball miniature threatens cult status but could use a sweeter tweeter	31 x 20.5 x 18.5cm stands close to wall	87dB/w 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/w 50Hz	R	90
Ruark Swordsman £219	Good Average	Very attractively styled and finished, the Swordsman is a well built 'small bookshelf' model that delivered better test than listening results	38.5 x 20 x 27.5cm stands 0.5m from wall	84dB/w 50Hz		71
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/w 30Hz	R	90
SD Acoustics OBS £845	Average Good	Recent changes have added some refinement to a seductive midrange, good timing and fine sensitivity, though bass extension is limited and coloration obvious	102 x 35 x 25cm floor, angled, away from walls	92dB/w 30Hz (in room)	R	82
SD Acoustics Ribbon £2150	Average Good +	Entertaining but a little underdeveloped and rather amplifier sensitive, the Ribbon is a lively and loud hybrid marred by some colorations; some like it, others don't	152 x 30 x (15-30)cm floor, angled, away from walls	91dB/w 30Hz (in room)		81
SD Acoustics SD1 £1350	Average Very Good	A large scale, airy and unusually detailed system with excellent dynamics. Current model has more civilised top-end and warmer balance than original model	123.5 x 38.2 x 31.9cm free space	90dB/w 50Hz	R	60

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MODEL PRICE	LAB SOUND	COMMENTS	SIZE PLACEMENT	SENSITIVITY	VALUE	ISSUE
SD Acoustics SD3 £379	Average Good	Neither cheap nor perfect, this near miniature (using OBS' mid driver down into the bass) sounds unusually lively and dynamic within inevitable physical constraints, and is ultimately both engaging and entertaining	38 x 19 x 29cm stands 10cm from wall	83dB/w	R	86
Seventh Veil System IV £1290 (£340 integral stand)	Average Good +	Lacks welly and loudness but delivers astonishing results with female vocals in particular. Antithesis of the 'good allrounder', this oddball design has considerable charm that the committed enthusiast might find irresistible	72 x 44 x 21 x 29cm own-stands close to wall	84dB/w 28Hz (in room)	R	86
Shan Shimna £280 (stands £75)	Average + Good	Pretty little miniature in cast mineral/plastics has limited dynamic range and could sound smoother, but integration is good and box effects slight	31 x 16 x 17cm stands near rear wall	84dB/w 65Hz	R	71
Snell Type C £2350	n/a Very Good	Pricy, yes, but an extremely capable loudspeaker. Musical and transparent; excellent bass extension which improves with the addition of a Pirate plinth	112 x 38 x 33cm free standing, free space	90dB/w 35Hz	R	65
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/w 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/w 25Hz (in room)	R	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 free space	88dB/w 30Hz (in room)	R	78
Sony APM-181ES £300	Very Good Average	Big and beefy but equally fat and bass heavy, this well engineered 3-way has notable strengths but lacks transparency and sounds better at lower levels	57.5 x 29 x 36cm low stands, free space	87dB/w 40Hz	R	71
Sony APM-66ES £700	Average + Average +	Powerful heavyweight sound with a brilliant midband - clear articulate and transparent. But bass is on the boomy side and the treble can sound grainy	66 x 38 x 36.5cm low stands, free space	89dB/w 60Hz	R	59
Spendor SP1 £800	Very Good Good	A very subtle and musical performer that works particularly well with digital material. An exceptional allrounder	63.5 x 29.5 x 30.5cm stands, free space	87dB/w 41Hz	R	60
Spendor SP2/2* £500	Very Good Good +	Conceding little to the SP1, this 30 litre model displayed good tonal balance with a highly articulate midrange, only slightly marred at frequency extremes	50 x 25 x 30cm stands, free space	87dB/w 45Hz	R	59
Spica Angelus £1295	Good Average	A little bass shy and soft in the bass and lower mid, the free standing Angelus is otherwise tidy, extremely lively and fluid, if uneven overall	116.8 x 53.3 x 26cm away from walls	86.5dB/w 50Hz	R	60
Spica TC50 £599	Good - Good	This triangular-profile 'grown up' miniature is a shade boxy and laid back but has good rhythmic and musical integrity	40.5 x 33 x 29cm stands in open space	88dB/w 55Hz	R	71
Spica TC50SE £799	Good - Good	A heavily UK-modified TC50, the SE sounds less boxy and more spacious, but lacks some of the urgency of the standard model	40.5 x 33 x 29cm stands in open space	88dB/w 55Hz	R	71
Studio Power DMS100 £249	Average + Average +	Close to a BB rating, and in many respects remarkable value for money. Delivers an impressively smooth and large sound, but sheer ugliness will limit its appeal	51 x 26 x 32cm open stands 1ft from wall	86dB/w 25Hz (in room)	R	82
Tannoy DC1000 £210	Average Average -	The smaller of two DC models with dual concentric drivers, the '1000 is much less well balanced than the larger, floorstanding '2000	50 x 24 x 25cm	91dB/w 53Hz	R	71
Tannoy DC2000 £340	Good Good	Remarkably high sensitivity from unique dual concentric driver that has an involving but characteristic sound. Bass could be better	68.5 x 26 x 27cm floor in free space	93dB/w 55Hz	R	66
Tannoy DC3000 £670	Good Good	Giving new meaning to terms like dynamic range and headroom, the magnificent '3000 is a must for those who enjoy high-level monitoring.	94 x 26 x 31cm Floor 1ft+ from wall	94dB/w 30Hz (in room)	R	78
Tannoy E11 £140	Average Average -	Fundamentally turgid and slow, thanks to leaden upper bass and 'shut in' treble, though stereo images are convincing, as are the reasonably uncoloured vocals	39 x 21 x 22cm stands, free space	87dB/w 45Hz (in room)	R	82
Tannoy J95 £520	Good Good	Substantial cabinet engineering explains the unusually authoritative bass delivered by this big, good value floorstander, though the upper range is a bit dull and shut in	93 x 26 x 32cm floor, freestanding	90dB/w 30Hz (in room)	R	94
Tannoy M15 £190	Good Average +	Somehow lacking the magic of its predecessors, the M15 remains a fine value compact that needs careful set-up to give optimum results	50 x 25 x 21cm Blu-tack to stands 1-2ft from wall	88dB/w 40Hz (in room)	R	78
Tannoy M20 £260	Good Good	Alongside fine build and presentation, the M20 provides an unusually clever combination of the 'traditional' virtues of transparency and low coloration with more trendy strengths of speed and pace	50 x 25 x 22cm stands in free space	87dB/w 25Hz (in room)	R	86
Tannoy Westminster £3600	n/a Good +	These awesome horn loaded speakers are remarkably controlled and impressive, if only suited to a few pockets and rooms	Huge, flat against rear wall, away from corners	96dB/w (manuf.)	R	Coll '87
TDL Monitor £1799	Very Good Very Good	Fine solidity and good accuracy, with enough bass extension to satisfy even organ freaks. Needs a big room and can sound a bit lazy and a shade tinkly	118.5 x 30 x 47cm 0.5m from walls	85dB/w 28Hz	R	66
TDL Studio 0.5 £399	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/w 40Hz (in room)	R	94
TDL Studio 1 £599	Average + Good	Delivering genuinely extended bass from a compact floorstanding enclosure, the Studio is very detailed but a shade clinical and detached in presentation	76 x 23 x 33cm	84dB/w 25Hz (in room)	R	78
Technics SB-CS5 £70	Average Average	Clearly fine material value for money, the CS5 nevertheless betrays its midi system heritage, the quest for size for its own sake compromising the performance of both enclosure and main driver	42.5 x 25 x 24cm Stands in free space	86dB/w 48Hz	R	86
Technics SB-RX50 £500	Very Good Average +	With its unique coaxial drive unit the RX50 proved a smooth and well balanced loudspeaker, its minor weakness being a mildly excessive low bass	48 x 30 x 26cm free space on 40cm stands	86dB/w 40Hz	R	46
Technics SBC 250 £140	Average + Average -	Despite a fairly even tonal balance, the 250EK sounded muddled in the midrange and dull in character	36.5 x 23.5 x 20.5cm free space, stands	86dB/w 60Hz	R	46
Toshiba SS33-M £100	Average Average	Providing a benchmark for budget loudspeakers, this Toshiba-inspired but UK designed and manufactured model is a lot of loudspeaker for the money.	40 x 26 x 21.5cm stands in free space	86dB/w 55Hz	BB	68
Townshend Glastonbury IIS* £1700	n/a Very Good	What? No bass? Actually, like the KEF 107, Glastonbury II goes down so low you might not notice how good it is. A truly remarkable performer. Superb soundstaging	91.5 x 28 x 4.6 free. standing in room	88dB 27Hz	R	65
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/w 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 in view of the additional mid forwardness and bass imprecision.	100 x 30.7 x 25.6cm floor clear of walls	87dB/w 23Hz (in room)	R	86
Videotone Minimax 2 £80	Poor Average -	Cheap in build and QC as well as price, but cheerful (if coarse) with it - if a little too cheerful after extended listening	27.5 x 17 x 20cm near rear wall	84dB/w 90Hz	R	74
Visonik David 6001 £173	Average - Poor	Sharp styling a classy looking miniature makes, but the complex grillework worsens a sound which starts off with too much top and not enough bottom	20 x 12 x 13cm against rear wall	87dB/w 130Hz	R	74
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/w 45Hz (in room)	R	94
Wharfedale 505/2 £190	Average Good	This lively Wharfedale provides plenty of speaker with unusual refinement for the money, and should be fairly tolerant of room siting	44 x 25.5 x 24cm stands 1ft from wall	86dB/w 55Hz	BB	66
Wharfedale Coleridge £499	Average Good	Compact, beautifully finished and extravagantly engineered box sacrifices bass extension in the cause of high midband sensitivity; communicative.	48 x 26 x 26.5cm stands 1ft from wall	91dB/w 48Hz (in room)	R	82
Wharfedale Diamond IV £109	Good Average +	Thanks to a new metal dome tweeter, the new Diamond is much more civilised than its predecessors, with an attractive lively bounce but some boxiness	27 x 18 x 18.5cm stands close to wall	86dB/w 48Hz	R	90
Yamaha NS 1000M £900	Good Good +	Living up to its monitor label, and tonally well suited to digital material, the NS 1000M is superbly crafted and capable of high levels	67.5 x 37.5 x 32.5cm 30cm from wall, stands	90dB/w 40Hz	R	46

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CASSETTE DECKS

The bad odour of copyright theft hangs around the compact cassette, but there is no doubt it is the world's most versatile and ubiquitous music storage medium. Hi-fi buffs may wrinkle their noses pointedly, but are still happy to use cassette decks to make up tapes for the car or personal – at the same time complaining loudly about the quality of pre-recorded material. (In fact the very best decks can do a surprisingly good job with musicassettes.)

There is no problem in connecting a cassette deck to any normal amplifier, but some care needs to be taken in choosing the best tapes for a

specific machine. (Trial and error is one effective technique, but many decks have manual bias adjustment and some match up to the tape automatically.)

Lab performance and sound quality often go hand in hand, and are frequently somewhat dependent upon factory alignment. The mechanical integrity of the mechanism itself is another crucial factor, that is often reflected in the asking price.

All modern hi-fi decks have Dolby B and the majority have Dolby C besides; the very worthwhile HX Pro system is becoming steadily

more widespread. Remote control remains rare, though sometimes it is available as a system option.

Three-head recorders allow simultaneous checking of the recording being made. Auto-reverse is a useful convenience feature, but usually with some mechanical compromise, while double-mechanism 'dubbing' decks of dubious quality are fashionable at the bottom end of the market. The welter of different 'music search' systems available is some indication of their frequent ineffectiveness

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Acoustic Research RD-06 £280	Average Average	Acceptable middle market player with very simple facilities and cramped control section, but unusually good looks	Dolby B/C/HX Pro, fine bias, counter memory, repeat		69
Aiwa AD-F270 £90	Average Average	An excellent budget machine, adequately equipped and satisfactorily built. Sound quality is in severe danger of transcending the price category	Dolby B/C, fine bias adjust	BB	75
Aiwa AD-F370 £130	Average Average	Adequate but uninspiring recorder with detail shortcomings but good control layout and successful sounding with recorded musicassettes	Dolby B, C, HX Pro, bias adjust		63
Aiwa AD-F500 £150	Average Good	Noise levels are a little higher than usual, but sound quality is otherwise very good - open, explicit and very neutral tonally.	Dolby B/C/HX Pro, cue/review, fine bias, record sensitivity adjust	R	93
Aiwa AD-F700 £199	Good Average	Somewhat less than the sum of the (most fine) individual parts, this deck has an artificial quality which spoiled the efforts of a fine transport	Dolby B/C/HX Pro, fine bias, CD Direct input		75
Aiwa AD-F800 £249	Good Very Good	Close to first class performance – and superb value. The Aiwa is purposeful and finely engineered. It provides a near irresistible blend of good mechanics and electronics	3 head, dual capstan, Dolby B/C/HX Pro, tape calibration	BB	75
Aiwa AD-R470 £150	Average Good	For once, an auto-reverse deck with the performance of a decent uni-directional one at a similar price. The Aiwa is modern in concept, and has good, transparent electronics	Dolby B/C/HX Pro, auto reverse, cue & review, bias adjust	BB	69
Aiwa AD-WX616 £150	Poor Poor	Sonically sub-standard twin transport deck which has sensible range of well implemented features, yet which sounds compressed and uneven.	Twin full logic, 1 records, Dolby B/C track search		93
Aiwa AD-WX777 £179	Very Good Very Good	Excellent, middle price dual deck with quick side change and a living, breathing sound – though prerecorded tapes sound bright	Twin: auto-reverse, one records. Dolby B/C, fine bias	BB	75
Aiwa AD-WX888 £249	Good Good	Inaccurate set-up spoils metal tape operation, but with other tapes the deck works well. This deck offers fine engineering, facilities and sound	Dual auto-reverse twin deck, Dolby B, C and HX Pro	R	75
Aiwa AD-WX909 £400	Good Good	Convenience meets sound quality, and both win. An essentially clean, positive recorder which works alongside an auto-reverse player of lower standard – a sensible compromise	Dual deck, auto-reverse, track search, Dolby B/C/HX Pro, bias adjust, 3 Head	R	57
Aiwa XK-007 Excelia £400	Good Good	Downmarket version of XK-009 with simplified bias/equalisation adjustment section and more forgiving but less informative sound. Still good, but less exciting than XK-009	Dolby B, C, dbx, HX Pro, 3 Head, tape alignment		63
Aiwa XK-009 Excelia £550	Very Good Very Good	Excellent detail, stable articulate midband and slightly obvious treble. The most interesting Aiwa for yonks	Dolby B, C, dbx, HX Pro, 3 Head, tape alignment, CD direct	R	63
Akai GX-32 £170	Average Poor	Constrained and smeared sum 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 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 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 Very Good	Well designed and finished cassette deck with features well judged to please the audiophile – especially switchable Dolby HX Pro and switchable panel display. The calibration system is simple and effective, and the deck sounds great	Dolby B/C/HX Pro, 3 head, manual tape set-up	R	69
Denon DRM 700A £150	Very Good Very Good	Simple but adequate features, lacks only timer standby. Musically this deck equals the best at this price level despite some clouding of transients with Dolby B.	Dolby B/C/HX Pro, fine bias, 3 heads, record return	BB	93
Denon DRM-400 £140	Poor Poor	Messy, confused sound terminally lacking in detail and space under all conditions of use due to high mechanical flutter levels	Dolby B/C, memory stop, track search		81
Denon DRM-500 £180	Good Very Good	Powerful, refined and detailed sound, and an excellent transport are keys to the success of this cleanly styled addition to the range – but why no timer standby?	Dolby B/C/HX Pro, variable bias	BB	75
Denon DRM-700 £250	Good Very Good	Sloppily executed (though attractive) user interface contrasts with a high standard of music making belying its modest price	3 head, Dolby B/C/HX Pro, record return	R	81
Denon DRM-800 £330	Good Very Good	There are some niggling faults and limitations (no timer standby is particularly annoying), but as a means of recording music it sets a very high standard	Dolby B/C/HX Pro, off tape monitoring, dual capstan	R	75
Denon DRW-650 £200	Average Average	This simply equipped model is a little fiddly to operate at time, partly because of the way the single set of transport keys is assigned. But sound quality is generally workmanlike - good value	Twin transport, Dolby B/C/HX Pro	R	93
Denon DRW-750 £250	Good Good	Polished and articulate, the only significant shortcoming is poor performance with prerecorded material	Dolby B/C/HX Pro, twin unidirectional, one records	R	69
Dual 5850RC £269	Poor Average	Average-to-middling deck which does most things well and skates over the more subtle things. Control system is uninspired but easy to master. Overpriced	Dolby C/HX Pro, bias adjust		87
Goodmans GSW-5200 £90	Poor Poor	Musically unimpressive but at least it's cheap!	Dolby B, twin, one records		69
JVC TD-V621 £300	Very Good Good +	Sharp, stable sound with rock solid transport. Features count is extensive and useful. Only raw sounding electronics detract from the scoring.	3 head. Dolby B/C/HX Pro, 3 inputs, fine bias	R	93
JVC TD-X321 £130	Average Average	Typical modern budget deck with acceptable sound quality, especially when making and playing it's own tapes. The transport is a little rough, but recommended on the basis of good value for money.	Dolby B, C & HX Pro	R	93
Marantz CP230 £330	Average 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 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 SD-40 £170	Average Very poor	Obstructive aesthetics are offset by apparently good build and sensible features, but sound quality is uneven or worse.	Dolby B/C/HX Pro, fine bias	R	93
Marantz SD-50 £220	Good Very Good	Fine, exacting all-rounder offering good stereo, precision and focus. Good with prerecorded tapes too.	Dolby B/C/HX Pro, track & intro search, variable bias etc	R	81
Marantz SD-60 £350	Good Very Good	A first rate, highly capable deck offering energetic yet refined sound largely due to good electronic design	3-head, Dolby B/C/HX Pro, variable bias & sensitivity	R	81

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CASSETTE DECKS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Marantz SD315 £180	Average Average	Sound quality is promising, but somewhat offset by 'shut in' top end. Pitch integrity suspect Dolby C sound quality and dubbing performance poor	Dolby B/C/HX Pro, twin transports, one rec/play, one play only. Mic input		93
Marantz SD515 £350	Poor Poor +	Good electronic design is let down by mediocre alignment and poor transport stability. Disappointing at the price.	Twin auto-reverse, both transports record, Dolby HX Pro, parallel record capable	R	93
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
Memorex SCT-84 £200	Average Average	The playback only transport is a little disappointing, but the record one is a quality item and the deck works well. Ergonomics are good, but styling and control feel are decidedly tacky.	Dolby B/C, fine bias, twin deck with auto-reverse record, unidirectional play	R	69
NAD 6300 £550	Very Good Very Good	Solid and homogeneous sound quality and very good replay compatibility thanks to 'play trim'. Distinctive, musical – and costly	Dolby B, C, HX Pro, 3 Head, bias adjust	R	63
Nakamichi Cassette Deck Two £300	Very Good Very Good	Not completely neutral, this deck is assured, dynamic and quick, with abundant detail and some coarseness. Stable transport but only rudimentary features accompany fine engineering	Dolby B/C, manual tape type selection, bias adjust	R	93
Nakamichi RX-202E £545	Good Very Good	Fine, clear and articulate sounding player. Excellent with prerecorded material, but idiosyncratic and sometimes obstructive control	Auto reverse, Dolby B, C, 2 head	R	63
Philips FC566 £179	Average Average	Mostly well equipped, though some tape search facilities fail to exploit the auto-reverse capability. Sounds clean and stable – with prerecorded tapes too	Auto reverse, track search, Dolby B & C		57
Philips FC567 £279	Average Poor	Well equipped but ergonomically substandard; sound quality is messy and lacking in clarity and dynamics	Dual deck, auto reverse, track search, Dolby B & C		57
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-225 £99	Poor Poor +	Budget deck with a strictly budget sound - but surprisingly strong range of features. An opportunity lost.	Dolby B/C, logic controls, track search		93
Pioneer CT-337 £130	Average Average +	Simple but well made machine with a slightly soft but consistent standard of reproduction	Dolby C/HX Pro, CD synchro, mic inputs	R	87
Pioneer CT-447 £170	Good Good	An excellent and affordable package, decidedly OTT in the display area but capable of genuinely fine musical reproduction	Dolby C/HX Pro, auto tape alignment, track search	BB	87
Pioneer CT-656 Mk II £250	Average + Average +	Reworking of original 656 has led perhaps unintentionally to a somewhat ill-conceived set of compromises. Excellent with prerecorded material, the deck is otherwise unbalanced.	Dolby B/C/HX Pro, 3 heads, track search, fine bias		93
Pioneer CT-757 £350	Very Good Poor	Ostensibly fine deck is let down by inability to drive tape hard without loss of focus and consistency. Even prerecorded material, which didn't suffer these shortcomings, lacked detail.	Dolby B/C/HX Pro, 3 head, assisted tape calibration		93
Pioneer CT-91a £500	Very Good Very Good	Superb, near state of the art recorder with an excellent dual capstan transport and very capable electronics. At the price, this one is a mould breaker	3-head, tape calibration, Dolby B/C/HX Pro	R	75
Pioneer CT-959 £450	Very Good Very Good	Near state of the art for £450. Engineering is of a high order. An open window sound quality, but playback response is very bright (being corrected by manufacturer)	3-head, var bias & eq, multi-mode meters. Dolby HX Pro	R	87
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
Rotel RD-845 £130	Average - Average +	Extremely fine transport and clean sounding electronics for the price. Bass lacks weight, but deck works remarkably effectively with chrome tapes.	Dolby B/C, manual tape selector	R	81
Rotel RD-855 £180	Average Good	The transport is OK and the various frequency responses are erratic, but good basic electronics help the Rotel deliver. Coherent, enjoyable and informative	Dolby C memory stop & repeat, track search	R	87
Rotel RD-865 £200	Good Very Good	Fine, architecturally solid sound quality in a package with a low gimmick count and strong audiophile appeal	Dolby B/C/HX Pro, fine bias	BB	75
SAE K102 £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-X211HX £170	Good Good+	Clean, stable and open sounding recording quality distinguishes this player, - and auto-reverse too. A great improvement on earlier mid price Sansui models, and excellent value.	Auto reverse, Dolby B/C/HX Pro, bias adjust	R	93
Sansui D-X301i £180	Average Good	Lively, informative and well equipped basic deck, if rather obscure operationally	Dolby B/C/HX Pro, variable bias, track search	R	69
Sansui D-X501 £230	Poor Poor	Unhappy mixture of good looks, excellent ergonomics and mediocre, sometimes poor sound	Dolby B/C, random track search		81
Sansui D-X701 £340	Average Average	A little flat and smeared under some conditions, this design is at its best with metal and prerecorded tapes	Dolby B/C, 3-head, variable bias & output, track search		81
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 TC-FX120 £90	Poor Poor	Neat and very simply equipped model has decent electronics but poor, unstable transport with predictable consequences.	Dolby B & C, variable bias		93
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-K650ES £250	Average Average	Facilities are utilitarian but nicely presented, but sound quality, which is basically good, is slightly marred by some coarseness of tone.	3 head, Dolby B/C/HX Pro, fine bias	R	93
Sony TC-K730ES £500	Very Good Very Good	First rate cassette deck that scarcely betrays it is a cassette deck on audition. Features and control wise, it feels a little dated	Dolby B, C, bias and equalisation adjust	R	81
Sony TC-K850ES £400	Very Good Very Good	Near state of the art recorder with excellent recording quality, and even better playback performance. Sounds — and looks — best with the display turned off	3-head, Dolby HX Pro, bias/level adjust, dual capstans	R	87
Sony TC-RX110B £90	Poor Poor	Woolly bass and scrappy treble combine to make a meal of many music types, despite accurate response shapes with most types of tape. Prerecorded material sounds dull	Dolby B/C		75
Sony TC-TX55 £150	Average Average	The sound quality ranking is a good one for an auto reverse machine at this price level. Clean, sharp sound, only slightly let down in the deep bass.	Auto reverse, Dolby B, C & HX Pro	R	75
Teac V-270C £89	Average Average	Not quite cheap enough to compete solely on price, the V-270C is a rather messy and unstable sounding deck	Dolby B & C, bias adjust		63
Technics RS-B905 £350	Good Good	Good, well set up cassette deck with a clean, accurate sound but some compression. dbx circuit sounds poor	Dolby B, C, HX Pro, dbx, bias adjust, 3 Head		57
Technics RS-B965 £350	Very Good Very Good	Messy control layout, but ultra capable deck with clear electronics and excellent headroom, low noise, an ultra-stable transport - and first rate sound quality.	3 head, dual capstan, Dolby B/C/HX Pro, dbx, assisted tape alignment.	R	93

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CASSETTE DECKS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Technics RS-TR355 £200	Average	Serviceable middle market dual deck without serious fault but with some annoying inadequacies, notably an inability to play side A and B and then stop	Twin auto-reverse, one records, Dolby B/C/HX Pro		75
Yamaha KX-1200 £500	Excellent Average	A veritable rats' nest of buttons and dials, albeit well laid-out. This is nearly a great recorder, but lacks simplicity of sound	Real-time counter, track search, Dolby B, C, dbx, HX Pro, bias adjust, remote control		52
Yamaha KX-250 £150	Good Good	Excellent if somewhat fiddly deck with all mod cons. Play trim helps bring recalcitrant tapes back into line. Refined, expressive sound quality and stable transport	Dolby B/C/HX Pro, Intro Scan, Play Trim	BB	93
Yamaha KX-330 £170	Average Good	Cramped control panel but a strong, dynamic and comparatively stable performance distinguish this strong middle-price deck	Dolby C/HX Pro, optional remote control	R	87
Yamaha KX-530 £230	Good Good	Excellent all-rounder that does most things at least competently and many things well. One of the best middle price decks	Dolby C/HX Pro, 3 motors, optional remote control	BB	87
Yamaha KX-930 £400	Good Average	Worthy but ultimately slightly disappointing mixture of fussy ergonomics and tidy but cluttered sonics	3 heads, dual capstans, Dolby C/HX Pro, remote control		87

DAT RECORDERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Aiwa Excelia XD-001 £1300	Very Good Very Good	Clear and very listenable recorder, roughly comparable to, but slightly sweeter sounding than Sony DCT-1000ES - but with an inferior front panel design	Track ID and search, remote	R	63
Aiwa HD-S1 £600	n/a Average	The first portable DAT recorder, and already looking expensive and a little under endowed. Nevertheless, good build, controls and display help, and sound quality is adequate.	DAT recorder with separate A/D converter/battery unit. SP only, mic/line i/p		94 Supp.
Denon DTR-2000 £800	Good Very Good	Not cheap, but first rate DAT recorder, good to excellent fidelity in all modes, with a slightly cool detached quality when differences are detectable.	Digital LP/digital & analogue SP record/play, LP analogue play only, digital fade, fine cueing, remote	R	93
Grundig Fine Arts DAT-9000 N/a	Good Good	Conventional DAT recorder offering standard facilities. The deck is well made and equipped, and is engineered to a satisfactory quality standard. It performs to an acceptable standard, though it is not state of the art.	2/4 hour recording, mic inputs, digital in/out		69
Kenwood DX-7 £450/£150	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	AC powered recorder, no analogue LP mode. Optional accessory packs adds battery/ADC & case		94 Supp.
Luxman KD-117 £1499	Good Good	Slightly soggy, earth-bound sound quality, this model trails the other DAT decks tested so far	Two analogue inputs, remote twin address		63
Sony DTC-1000ES £1299	Very Good Very Good	Only available from professional outlets. Fine, consistent performer with accomplished tape handling and good build quality	Standard track ID and search, remote	R	63
Sony DTC-55ES £550	Very Good Good	Broadly comparable to a middle ranking CD player sonically, the Sony is particularly well equipped and well priced.	DAT with all record modes, inc LP (analogue) record	R	93
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	Midi-width, alpha-numeric display, remote, optical interfaces	R	63
Sony TCD-D3 £500	n/a Very Good	Compact, well equipped, easy to use and excellent sound, it undercuts rivals by a clear £100 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 record modes	BB	94 Supp.

CD PLAYERS

Now entering its second decade, this all digital music source is well established despite high disc prices and the opposition of many hi-fi enthusiasts. Compact Disc's strengths over conventional vinyl are complete freedom from surface noise, ease of use, and more robust software. Remote control is just about standard on all new players.

However, many vinyl enthusiasts find CDs

sound less involving than top quality vinyl.

Prices average out at a little over £200, although entry level models are now available for little more than £100. Even the most basic models can sound very good indeed and employ state of the art decoding chips and the most useful play features. Extra money can buy remote volume control, audio 'tweaks', plus improved build and component quality control.

Digital outputs facilitate an easy upgrade path.

Machines can be split into bitstream and multi-bit with each school having its adherents. Bitstream is the newer technology and will probably win in the end, although the development time spent on multi-bit systems means that excellent results can still be obtained.

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
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
Aiwa XC-333 £149	Average - Average	Looks costly, well featured, well balanced technical performance and sound for money	multi bit, keypad remote, hdph (fixed)	R	88
Aiwa XC-700 £170	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
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-62 £330	Average Very Good	Looks, build quality and the technical specification are right up to date. As it stands it sounds good but if the indifferent lab performance could be 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.	Track entry remote, menu display etc		58
Arcam Alpha £420	Very Good Very Good	Arcam's new star, its best CD player yet and great value	Remote, etc, coax dig. out	BB	83
Arcam Black Box 1 £210	n/a Very Good	This rich, powerful and articulate sounding DAC transforms the majority of medium price CD players	Needs D-out CD players	R	60
Arcam Black Box 2 £260	Very Good Very Good	An addition to the BB 1, it also offers improved sound and more inputs	Optical and wired input digital decoder	BB	76

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CD PLAYERS

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, optical & coax	R	88
Arcam Delta 170.2 transport £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
Arcam Delta 70.2 £600	Very Good Good	Now in Mk II form a further improvement is seen in features, performance and sound quality. Solidly built and British	Now adds simple remote vol + std features; also display off	R	76
Arcam Delta 70.3 £699	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 digital outputs.		95
Ariston CD1 £345	Good Good	Easy on the ear compact disc for those who like their music Radio 2 flavoured. And it looks good	digital output, remote control	R	87
Ariston Maxim £500	Good+ Good+	Yet another re-worked Philips player with chunky alloy casework and sophisticated analogue stage. Narrowly escaped a recommendation with its dynamic and purposeful sound. Still a hint of graininess through the treble	Remote control, coax digital output. 16bit 4x chipset.		95
Cambridge Audio CD3 £649	Poor Good +	Unique internal configuration gives the CD3 a fluid and detailed sound falling off at the frequency extremes. The controls and displays are primitive	Optical/electrical digital out, remote control		87
Carver TL-3100 £340	Average Average -	The sound quality did not live up to the excellent fascia. Carver's DTL did not aid the indifferent sound	DTL sound shaping, usual facilities, remote, memory		76
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 £695	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
Conrad-Johnson DFI £1995	Average - Good +	Setting a decent standard and including an FET line preamplifier, the unusual DFI is worth investigating	Line preamp built-in, simple remote facilities		76
Deltec PDM-One £500	Average Very Good	A no frills audiophile bitstream converter at an affordable price	Coax-in, special cable and mains filter options	R	83
Denon DCD 960 £300	Good + Average	A fine feature package with good lab results, but unfortunately an unexceptional sound quality	Remote inc vol, hdph, keypad, well featured		88
Denon DCD-2560 £550	Very Good Good	Beautifully built and, once again, generously equipped yet with a sound that's decidedly sluggish or reserved, particularly through the bass. Vocals are more forward but can sound a little glassy	Remote, pitch and tape edit features, opt/coax digital output, 20bit 16x.		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
Dual CD5150 £300	Very Good Good +	In a real sense cloned from the rave Rotel RCD-855, this is also a great value all rounder: multi bit rules OK!	keypad remote, hdph (fixed), Philips based	BB	88
Ferguson CD007 £130	Good Average	The cheapest recommendation in the test group; don't expect the earth but the value is good	Manual, digital output, headphone socket	R	64
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
Grundig CD9000 £1000	Good Good	Aimed at a market which puts external styling above sound quality. Although this player is of slightly above average competence, in most departments it is expensive	Remote, programme, hdph socket, calendar display etc		70
Harman Kardon HD7450 £300	Good Average	A very stylish machine but one that is let down by its aggressive and dirty treble quality which pierces through most types of music. Weak bass resolution undermines the 'roots' of the player	Remote control but no headphone socket. MASH/PWM bitstream DAC.		95
Harman Kardon HD7500II £350	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 youthful enthusiasm.	Remote, variable, digital and R headphone outputs. MASH/PWM DAC	R	95
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
Harman Kardon HK7500 £330	Average + Average	Decided improvement over 7300 in all respects. Still fairly unimpressive sound	Remote, hdph + vol, good programming		83
JVC XL-V231 £149	Excellent Average -	Text book lab result but below par sound, nice and boring. Must be some potential here	Remote, hdph (fixed), JVC 1-bit PFM		88
JVC XL-Z1010 £499	Good Average -	Despite some high tech design and a good lab result, this model did not deliver good sound quality	32 track prog., disp. off, auto fade, 2 digital op		76
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.	Remote operation, motorised volume + tape edit. PEM bitstream		95
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-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	R	95
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		88
Marantz CD-40 £200	Very Good Good +	Like the Philips CD620 equivalent, this is the Philips/Marantz performance/value equation at its best	Multi bit, remote, hdph (fixed)	BB	88
Marantz CD-41 £230	Good Average	Based on Philips' CD624/634 but stashed in the older CD-40 case, this player suffered from a loose, boomy bass quality together with an impure treble. Not a good advert for PDM	Remote, index scan but no digital output. SAA7321 PDM DAC		95
Marantz CD-50SE £330	Very Good Very Good	Souped up CD50 delivers reference performance in its class. Worthy successor to the '65SE legend	Full remote, power volume. Hdph, (fixed), FTS. Good programming	BB	83
Marantz CD-60 £330	Very Good Very Good	Lacking the SE flair, the 0 remains a fine player by market standards. Second best is more than good enough	Multi bit, remote inc. vol., hdph, FTS etc	BB	88
Marantz CD-60SE £380	Very Good Very Good	Luxury '50SE with superior remote volume and variable headphone socket; a fine performance all round	Optical digital output, full remote, power vol. FTS, hdph	BB	83
Marantz CD-80 £550	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.		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		88
Meridian 203 £495	Very Good Excellent	Exceptionally lucid, transparent and solid sound 'bitstream' converter. Always tidy and easy on the ear, but doesn't bulldoze the craggy bits	Stand alone converter, 32-48kHz, optical/electrical i/p	BB	87
Meridian 206B £950	Excellent Excellent	What a stunner! Audiophile quality from the reference one box CD player, and at a most realistic price	Differential bitstream, keypad remote, prgming	R	88
Meridian 208 £1575	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 CDM100 £3850	Very Good Good	One of the hernia inducing bricks of hi-fi, the Micro is extravagantly styled, finished and built. The good lab performance led to an 'only good' sonic display when the price demanded excellent	Balanced output, remote, display blanking		72

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CD PLAYERS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Micromega Duo BS £499	Good Excellent	With a good transport it delivers a sweet musical sound at a high quality level	Bitsream D/A convertor, auto input switching	R	88
Micromega Optic BS £695	Average Good +	A bitstream rebuild of a Philips chassis, this player shows promise for the future	Bitstream, remote, hdph (fixed)		88
Mission Cyrus PCM II £400	Very Good Good +	Improvements in price and performance keep this classic remote player in the running	Remote vol, phase inv, dig op. PSX option	R	83
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 £290	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 you perch on the edge of your seat	Remote with direct track access, variable output, MASH/PWM DAC	R	95
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 tracks rather than complex classical works which seem to lack focus and secure soundstaging	Remote with track access, headphone, coax dig. output. 18bit 8x		95
Nakamichi OMS-5EII £1500	Good + Very Good	"... delivers near state of the art performance and build quality in a deliberately starkly functional package, but at a very high price ..."	Skip and scan, simple track programming, I		51
Nakamichi OMS-7EII £2000	Good + Good	The only serious criticism here is of the price. And in our opinion you can get better sound quality for less elsewhere in Nakamichi's range	10 digit track entry programming, hdph		51
Philips CD 850 £400	Very Good Very Good	An upgrade of the 840, Philips has got bitstream to work well here. A fine allrounder	Bitstream, keypad remote, FTS etc, etc	BB	88
Philips CD624 £200	Good Good-	Philips' cheapest Bit Stream machine is still equipped with a vast array of features. Sounds pretty civilised too but lacks the crispness and freedom necessary to set it apart.	Remote, FTS programming, digital output. SAA7321 Bit Stream DAC		95
Philips CD634 £250	Good Good-	The all-singing all-dancing version of Philips' budget Bit Stream player and one that seems better able to cope with the pizzaz and dynamics of a decent recording. Nevertheless it still lacks the lucidity and conviction of the best at this price	Remote, FTS + Title + personal programming SAA7321 Bit Stream		95
Philips CDV185 £350	Average + Average	Hard to value with the video singles facility but it all works well enough for a recommendation	Video singles + CD scart + digital out etc	R	76
Pioneer PD-7500 £280	Very Good Average	Has potential but has not brought it off on sound. Good aspects of earlier models have been lost with the new technology	Low bit dual DAC, full remote, hdph		88
Pioneer PD-8500 £400	Very Good Good+	One of a number of genuine 20bit CD players now available, the PD-8500 enjoys a thoroughly unrestrained and full-bodied sound. It rarely sounds hard or abrupt but prefers civilised classical CD's over pop, it has to be said.	Remote with tape edit and fader controls. Variable o/p. 20bit-8x	R	95
Pioneer PD-91 £899	Excellent Excellent	Close to state of the art in nearly all areas - soundstaging, clarity and simple lack of artificiality. A well made and sophisticated player	Track entry remote, calendar display	R	64
Pioneer PD-93 £1400	Very Good Good+	The extremely civil, understated feel of its music contrasts markedly with the over-engineered construction of this player. It will not offend anyone but neither will it spark much excitement	Remote with fader and index facilities. Two dig o/p's. 20bit		95
Pioneer PD-9300 £499	Excellent Average	A mid price flagship of excellent build and lab performance but only average sound - interesting though	Remote, 24 track programming, 2 dig. op		76
Proton AC-120 £180	Average Average -	Fine styling, low price but barely average performance	15 track memory, simple design, remote, hdph		76
Radford DAC1 £895	Good Good	Fine but slightly dated and costly package in performance terms — but flexible, musical and well built	DAC with 2 electrical + optical i/p, tape out		87
Radford 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 4x chipset.		95
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-855 £250	Good Good +	Stripped for action, this well built Philips technology player delivers fine performance and sound. First rate value	Remote, 20 track prog, 1 audio op, 1 digital op	BB	76
Rotel RCD-865 £300	Average Good	Curious mixture of bold musical presentation and foreshortened imagery. Grows on you though. One to audition with care	"bitstream", remote control	R	87
SAE D102 £700	Good Good	Considering the high price of this player, most of the innards seem fairly prosaic. Sound quality and lab performance are both respectable enough, but hardly justify the price premium involved, though styling is unusual	Remote (inc volume), skip, scan etc.		58
Sansui CD-X211 £200	Good+ Good+	A new cheapie based on Philips' successful CD582 technology with a bold orange display and an equally bold, invigorating sound that is mercifully free of brightness or grittiness	Simple remote, programming and shuffle play. 16bit 4x	BB	95
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
Sonographe SD1 (by CJ) £799	Good Very Good	Distinctive with oak end-cheeks, using Philips based 14 bit x 4 oversampling, Conrad Johnson electronics make this a musically rewarding player	Full search programme and timing	R	Coll. '87
Sony CDP-228ES £400	Very Good Average +	Good value, this is Sony's best mid price design and comes superbly equipped	Hdph, remote, rem vol, custom file	R	76
Sony CDP-338ESD £600	Excellent Good	Only a bit better than the 228, the 338 is a good machine, but not quite good enough for formal recommendation at the price	Custom file, remote, rem vol, hdph, shuffle etc		76
Sony CDP-790 £200	Good Average	Great on the test bench but new tech sounds worse than its predecessor. Who does the listening?	Low bit, full remote, comprehensive facilities		88
Sony CDP-990 £300	Very Good Good+	Every feature under the sun is available on this busy-looking machine though its sense of pace and drive at bass frequencies is less hectic. Treble detail is crisp and sparkling by contrast.	Remote, Custom File program on scrolling display. PLM bitstream.	R	95
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, this sample was well-used from demonstration stock...	Remote, everything but Custom File titling. Complementary PLM DAC		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-P3000 £169	Good+ Average	A new budget bitstreamer though one that fails to match the success of recent NAD and Kenwood players. Pleasantly open and airy sounding but lacks guts and solidity.	Most facilities moved to remote. Midship drive. MASH/PWM DAC		95
Teac CD-P4000 £299	Good+ Average-	An updated version of the CD-P400 but one that seems less successful with its rather thin and scratchy sound. Very poor bass resolution dilutes the impact of all recordings. MASH/PWM	Most features on remote, two parallel outputs on player.		95
Teac CDP-400 £249	Good Average	Fine in the lab, but good build quality is not reflected in the rather average sound	Low bit, keypad remote, hdph, versatile prgm'ing		88
Technics SL-P277A £160	Very Good Average +	High value, budget priced, yet well equipped and finished, a strong example in its group	Remote, programming, hdph + level. No d. op	BB	83

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MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Technics SL-P550 £220	Very Good Average	Superb, slick presentation, well equipped, average sound, fine build	Hdph, rem. prog., edit/fade, dig, optical		83
Technics SL-PA10 £450	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 WT-2000/Digimaster 2000 £5495/£6500	n/a Very Good	Very high grade player which provides state of the art in believable music making from CD, and promises a degree of upgradeability	Transport/multi bit DAC - 32, 44.1, 48kHz o/s		Coll. '90
Yamaha CDX-1030 £500	Good + Average	New tech but Yamaha hasn't managed to get this one sounding right. Otherwise its fine	Low bit, remote with vol, very versatile		88
Yamaha CDX-530E £180	Average + Average	A well balanced example using established DAC technology - worthy of consideration if not recommendation	Multi bit, keypad remote, hdph (fixed)		88

CD MIDI SYSTEMS

So you want a hi-fi, but you don't want to make a fuss about it. A pre-packaged system with everything matching up and no aggravation may not rank with carefully chosen separates on sound quality, but there's no denying the attractiveness or popularity of this approach - the market for pre-packaged component hi-fi systems is considerably bigger than that for separate items, even ignoring the vast numbers of low-cost single unit stacker systems.

The arrival of compact disc led to a new

fashion for shelf-standing compact systems, or 'midis' as they are known in the trade, as a replacement for earlier floor-standing rack systems (themselves the upmarket development from music centres). Only some 330mm wide, midis can more or less match full-size (430mm) rack components for performance, and are certainly cheaper to make, ship, sell and buy.

Whereas specialist hi-fi is moving steadily towards ultra-simple 'no frills' components, midi systems tend to be sold on a feature count at a

price point, usually with little opportunity for demonstration and comparison. Our test programme includes extensive auditioning and lab testing, while making allowance for the different aspirations of designers and expectations of users. Key features valued highly by customers include system remote control, automatic switching, and double 'dubbing' cassette decks. The top end of the market is developing with surround sound audio/video-ready packages.

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Aiwa NSX-800 £550	Average Poor	Undetailed, undynamic and largely unmusical system which throws it all away for an excessive range of tape related features	One box miniature plus remote and speakers dual auto reverse tape etc		89
Aiwa X-D100 £1000	Average - Average	Very fully equipped with wide ranging in and outputs but poor upgradeability. Sound quality is reasonable on the whole	Digital & optical in/outputs, dual auto reverse, disc file CD		77
Aiwa X-D80K £550	Poor Poor	Congested and harsh sound quality, the cassette deck, amp and loudspeakers being well below par. The built-in timer adds some operational flexibility	Auto-reverse, CD synchro record, remote, timer		77
Akai FX-800CD £700	Very Good Very Good	Well thought through as a functioning system. Lacks the usual surfeit of controls, and sound quality is of an unusually high order. An excellent buy even at this price	Twin record & auto reverse cassette etc with 'intelligent' remote	BB	89
Ferguson HF028 £300	Poor Poor	Similar to Goodmans 5000 system but with greater power and marginally superior sound	One-piece, semi-remote		77
Grundig Studio Line 1 £330	Poor Average +	Intriguing package with warm, woolly but attractive sound let down by poor attention to detail and suspect cassette deck. Amplifier appears to be inadequately protected	CD/cassette tuner plus preset equaliser		77
Hinari DK200 Disc Deck £300	Poor Poor	Confused user interface is matched to inadequate electronics. Poor - and poor value	Single unit, two cassettes, CD, tuner, remote		77
JVC Midi-W53 £500	Average Average	A potentially excellent middle price system spoiled by the loudspeakers and - to a lesser extent - the record player	Midi system with SEA equaliser		89
Kenwood M-54CD/CDS £600	Average + Average +	The M-54CD is the version without speakers and is the one to buy. The control system is A1 and the range of facilities offered is dazzling, but the amp and CD player are crude	Dual auto-reverse cassette, tuner/timer, CD, turntable with or without speakers	R	89
Memorex System-550 £500	Average Average +	Above average electronics let down by very poor loudspeakers. Worth considering if the latter are replaced	Dual CD & cassette deck, tuner/timer, semi-auto turntable		89
Pioneer S-11 £510	Average - Average -	Fine lower middle market system, with one useful extra - the built in timer. Only the record deck is disappointing	Twin auto reverse cassette, built in timers, one piece amp/cassette		77
Pioneer S-330D £1080	Very Good Very Good	High standard of reproduction on all sources, though mistracking with Dolby C was a limitation. There are few gimmicks and plenty of fine engineering	Dolby C/hx pro, multi-disc, amp with DAC etc	R	77
Pioneer S-555 £800	Good Good	Confusingly well equipped, in some respects rather gimmicky system, weak on record performance (surprise!) but quite or very good elsewhere	Full feature midi system with graphic, dual disc CD player	R	89
Pioneer XR-P500 £400	Good Very Good	Costly but high grade compact with excellent consistency between sources and plenty of presence	Compact system, remote control, dual auto-reverse cassette	BB	89
Proton AI-3000II £650 w/o spkrs	Average Very Good	Simple facilities and good, no-nonsense engineering combine to produce a system with genuine class. It's as easy to listen to as it is on the eye	Single box amp/tuner/CD/cassette with remote control; no loudspeakers	R	89
Sanyo 39CD £260	Poor Average -	Acceptably compromised basic low end system, offers broadly respectable if unambitious music making for those on a tight budget	One piece + CD, non-remote, manual tuner		77
Sanyo 49CD £300	Poor Average -	Similar to 39CD, but with Dolby B, preset tuning, remote control and more power. Audio wise, it's more of the same, but there's greater stature when loud and cassettes are helped by	One piece + CD, partial remote control, digital tuner Dolby B	R	77
Sanyo 59CD £380	Average - Average -	Adequate performance overall, though endemic lack of pitch integrity takes edge from tape and records. Some inconsistencies in control system too	As 49CD, + full remote, auto source select, separate turntable		89
Sanyo SYS-801CD £360	Poor Poor	Typical low end midi system: simple controls, adequate CD and tuner, poor turntable and cassette, awful loudspeakers	Remote control midi system		89
Sharp 320E £500	Poor Poor	Poor quality system featuring tacky styling, a lack of sophistication - and overpriced	One box midi & turntable with surround matrix		89
Sony Compact 302CD £400	Average Average +	Fine low to middle price system whose only significant weaknesses are the poor tuner behaviour with weak signals and the turntable	Auto-reverse record, unidirectional play cassette, graphic equaliser etc.	R	89
Sony Compact 702CD £700	Average + Good	Creditable up-market system with reasonable speakers and excellent cassette deck, amplifier, and a relative absence of superfluous gadgetry	Twin auto-reverse cassette deck, tuner/timer, video in/out circuitry	R	89
Technics CDC30 £600	Good Good	A fine record player-less system whose electronics are well made and of moderately good performance, it's rescued from anonymity by excellent loudspeakers	5 disc multiplay top loading CD player, twin auto-reverse cassette, tuner	R	89
Technics CDX50 £750	Very Good Very Good	Conventional, well built but button bound sound system with a nearly adequate turntable and excellent loudspeakers etc.	Dual auto-reverse cassette system (tested with optional equaliser)	R	89
Yamaha AST-C10 £530	Average + Very Good	Brilliant if flawed luggable with weighty, powerful bass, and a rare combination of expressiveness and clarity unprecedented from such a small package. Good features.	Mains portable twin cassette/CD/radio system detachable speakers, remote	R	77
Yamaha YST-C11 £600	Average + Good	The cassette deck is a little wobbly in tone, but CD and FM are excellent, and bass depth is unusually prodigious from such small loudspeakers, though paid by with some loss of subtlety	'Astarte', dual auto reverse cassette, luggable, with remote control		89

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TUNERS

The radio medium operates at a much lower profile than TV, but in areas outside pop music the BBC service is the envy of the world. Live Prom concerts can rival all other sources from a hi-fi perspective. Only the FM (VHF) bands give stereo hi-fi sound, though AM (MW & LW) are useful for certain transmissions in the UK.

Something of a hi-fi afterthought, tuners are often selected merely to match a chosen amplifier

cosmetically. However, the task they carry out is far from simple (or cheap), combining the skills of RF (reception) and audio (signal processing) engineering. The importance of the former will depend on local reception conditions, but money invested in a high quality outside aerial system is well spent.

Tuners come in two basic types. Analogue models tune gradually (and usually manually)

across the bands, and can have analogue or digital displays; they are often preferred for sound quality, and are certainly best for AM bands. Digital tuners offer convenient automatic tune facilities and hold many station positions in pre-set memories. (The Lab and Sound results for models tested in issue No. 65 refer to FM only. For AM results see under Comments.)

■ MODEL ■ PRICE	■ LAB ■ SOUND	■ COMMENTS	■ FEATURES	■ VALUE	■ ISSUE
Aiwa XT-003 £100	Average	Economically designed and built in the UK, but trade-offs have a marked influence on FM and AM sound quality.	FM/AM digital, 30 presets, no signal strength meters.		93 Supp.
Akai AT-52L £150	Very Good	Holds its own on FM against many much more expensive tuners, but AM is very poor	All bands	BB	65
Akai AT-93L £250	Good + Good +	By AM standards presentable (good) while FM delivers the goods	All bands, aerial switch	R	65
Arcam Alpha 2 £180	Good Average+	Re-styled to blend in with the Alpha system, Arcam's cheapest tuner makes up for its lack of features with a sensitive front-end and mellow sound.	FM/AM analogue, no presets, manual tuning + AFC	R	93 Supp.
Arcam Delta 80 £330	Very Good Very Good	Hi-fi sound on FM, good on AM, a dependable British all-rounder	6AM, 6FM presets. FM/MW/LW display, manual tune	BB	55
Creek T40 Series 3 £220	Average+ Average	Creek's FM-only analogue tuner is now in series 3 form, though the aesthetics remain unchanged. Our sample was hampered by an obvious bass 'hump' though production units are said to be cured.	FM-only analogue, no presets, manual tuning + AFC		93 Supp.
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.
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 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 + hi-blend + signal strength meter.	R	93 Supp.
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 £130	Average + Good	A little slow to tune but once accomplished it provides a meaty and dynamic sound on FM. AM too has a little extra bite to its performance	FM/AM digital, 30 presets, manual/auto tuning	R	93 Supp.
Meridian 204 £595	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 £1294	Very Good Very Good	There may be better sounding tuners in the world, but we have yet to hear one	No presets. Two box, flywheel tuning FM only, Analogue	R	50
Nakamichi ST-7E £750	Good + Good +	Exceptionally good for weak-signal areas, and good all round	16 AM/FM presets, auto time digital		55
Onkyo T9090 II £590	Very Good Very Good	It has most of the facilities you could possibly want and more besides. Lab performance and sound quality are both good enough to ensure recommendation even at this price	FM only, digital, 20 presets, auto scan etc.	R	72
Pioneer F-447L £130	Average+ Average+	Equipped with a various IC-controlled servo and tuning aids, great fun to play with but of little practical benefit. Sounds OK but, on past form, we would expect more from Pioneer.	FM/AM digital, 36 presets, CCTS +SS + manual/auto seek tuning.	R	93 Supp.
Pioneer F91 £350	Excellent Good +	Easy to use, this model has excellent RF performance and scored very high ratings on the listening tests	FM/AM 24 presets	R	60
Proton AT-300 £199	Good Good	The AT-300 is pretty on the outside, orthodox on the inside and rather dear. AM - poor	FM/MW only	R	65
Quad FM4 £329	Very Good Good +	Fine sound, excellent ease of use, good build and finish and a more than satisfactory technical performance	7 presets. Digital	R	50
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-830AL £110	Good + Good	Fine sounding budget audiophile material, no frills, no fuss	Manual dial analogue, FM, MW, LW	BB	55
Rotel RT-850AL £180	Good + Good +	Scoring well on listening tests and one of the best sounding tuners at its price level, it was a bit let down on AM but RF performance was good	FM/AM, digital	BB	50
Rotel RT-870L £230	Very Good Very Good	Rotel's top tuner is ruggedly built and includes plenty of sophisticated electronics. It's a very slick machine to use with a sound that's equally confident and refined.	FM/AM digital, 16 presets, selectable IF/RF + RF attenuation + signal readout.	R	93 Supp.
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.
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 facility, decent signal strength meter.	R	93 Supp.

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HEADPHONES

There are a variety of different approaches to headphone design, and examples of each turn up in this group. Amongst the more expensive esoteric models, electrostatic drivers are used in square open-backed phones such as the Jecklin and Stax models.

The majority of these come with some form of transformer which takes the signal initially from the speaker terminals on the amplifier. The actual speaker cables then travel from this unit

bypass switch to the loudspeakers.

The more down to earth models feature dynamic drivers in circular open-backed designs. The advantage of open backs seems to be a correspondingly open sound and a less claustrophobic feel to the music.

One can also of course hear external noises, as well as irritating the hell out of people on public transport.

The third category are closed-back designs,

which are useful in situations where it is necessary to block out background noise. Another means of distinguishing different types is the way they sit on your head.

There are three styles: circumaural models enclose the ear and rest on the side of the head; supra-aural designs press on the outer ear (pinna); and intra-aural types rest inside the ear and are popular amongst users of personal stereos.

MODEL PRICE	LAB SOUND	COMMENTS	TYPE	VALUE	ISSUE
Aiwa HP-V99 £50	Good - Average +	Horn loaded in-ear miniatures with plenty of guts but not enough transparency or bass to compete with the headbanded competition	Intra-aural, closed-back, dynamic		75
Aiwa HP-X30 £30	Good Good -	A flashy personal stereo phone which alternatively could be used at home. A slight LF tonal preference slightly colours the response, but it ain't a bad can	Supra-aural, closed-back, dynamic		75
Aiwa HP-X80 £50	Good Good	A headphone that's highly suited to non acoustic music and portable sources, nicely made and slickly finished. Sound quality doesn't quite match the price	Supra-aural, closed-back, dynamic		75
Aiwa HPEX-200 £90	Good Good	Modern looking and well finished, the Excelias, as they are dubbed, had meaty bass and sounded reasonably open for the type	Circumaural, closed-back, dynamic		63
AKG K135 £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
Audio Technica ATH909 £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 ATH910 £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 ATH911 £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 £30	Very Good Average	Lightweight in more ways than one, the 325s may be a little bright for some systems and tastes but will suit duller sources	Supra-aural, open-back, dynamic	R	63
Beyer DT330 Mk II £45	Good Poor	Not the most revealing 'phones encountered, the 330s were nevertheless enjoyable and rarely offended	Circumaural, semi-open, dynamic		55
Beyer DT550 £69	Good Good	On their own the 550s sound articulate with a slightly 'gritty' treble and 'keen' midrange; not suitable for headbangers!	Circumaural, semi-open, dynamic		55
Beyer DT880 £90	Good Good	Well made cans with a warmish sound but fairly solid midrange, though they're not that informative for the price	Circumaural, semi-open, dynamic		63
Beyer DT990 £100	Very Good Very Good	The 990s are definitely a significant pair of dynamic headphones; they have a smooth and yet revealing neutral sound that is hard to criticise	Circumaural, open-back, dynamic	R	55
Beyer IRS690 £200	Good + Very Good	High quality infra-red headphones with soft comfy earpads and mellow but informative sound quality which is hard to dislike	Circumaural, open-back, dynamic	R	75
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
JVC HA-D990 £65	Good + Good +	Good looking well made cans that offer good sound quality for the money. Sonic nature is of the easy-going, laid-back variety	Supra-aural, closed-back, dynamic	R	75
Koss K/6X Plus £30	Average Poor	'Sixties-style 'phones from the good ole US of A, their sonic style is unique and can make a system sound quite different	Supra-aural, closed-backed, dynamic		63
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 £40	Good Average	Whilst not as seductive as their PMB25 predecessor, the 30s are reasonably neutral and do improve on some of the competition - though not stunning	Circumaural, semi-open, dynamic		63
Quart Phone 70 £70	Good Good	Competent performers that were hard to criticise but lacked the life and sparkle of which some of the competition are capable	Circumaural, closed-back, dynamic		63
Quart PMB 25II £40	Good Good	Despite a somewhat unconventional suspension system, the 25s put in a convincing and enjoyable performance with warm yet lively balance	Circumaural, open-back, dynamic	BB	55
Quart PMB 65 £70	Good Good	Quite revealing and neutral albeit with the usual closed back sound, this competes well with more established models	Circumaural, closed-back, dynamic	R	55
Quart PMB 85 £90	Average Very Good	These more expensive Quarts bear a striking resemblance to the Jecklin Float models and use two drivers per ear. Sound is a bit bass heavy but not bad overall	Circumaural, open-backed, dynamic		63
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 RE-2760 £35	Poor Average	Stylish white cans from the only British firm in the business. Unfortunately sound quality is not up to par in this price range	Supra-aural, closed-back, dynamic		63
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

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HEADPHONES

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
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 HD40 £20	Very Good Good -	Very light and comfortable headphones with an even sonic balance that will suit most sources, but jack is 6.3mm and not suited to personals	Supra-aural, semi-open, dynamic	BB	75
Sennheiser HD450 £35	Good Average	Modern, simple and lightweight phones that are remarkably robust and which turned in a relaxed if weighty performance that was at worst pleasant	Supra-aural, semi-open, dynamic	R	63
Sennheiser HD480 £45	Good Average	Using the same shell as the 450s, the 480s were a little softened and unrevealing by comparison with their competitors	Supra-aural, semi-open, dynamic		63
Sennheiser HD520 £65	Good + Good +	A very comfortable and musically capable headphone. If you've got this sort of bread to blow on cans, give 'em a blast	Circumaural, semi-open, dynamic	R	75
Sennheiser HD530 £75	Very Good Good +	One of the better dynamics in its group, the 530s create a sense of space that eludes most sub £100 cans, and they're dead comfy to boot	Circumaural, semi-open, dynamic	R	75
Sennheiser HD540 Ref Gold £160	Good Very Good	The 540 Golds prove that dynamic headphones can be subtle, informative and capable of creating a remarkable sense of space	Circumaural, open-back, dynamic	R	55
Sony 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 V3 £30	Average Good	Portable stereo oriented phones that are very nicely made and combine clarity with a pleasant lack of distortion	Supra-aural, closed-back, dynamic	BB	63
Sony MDR V7 £70	Very Good Very Good	Classy sounding cans that are very slick and work well with all types of music, setting the standard in their price range	Circumaural, closed-back, dynamic	R	63
Sony MDR-CD999 £120	Good + Very Good	A very nice headphone in all respects, the 999s are worthy of the best headphone outputs and high quality sources	Supra-aural, semi-open, dynamic	R	75
Sony MDR-R10 £2500	Excellent 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/£230	Very Good Excellent	The Gamma pros are like a stethoscope for your hi-fi, revealing subtleties that many loudspeakers fail to resolve	Circumaural, open-backed, electrostatic	R	63
Stax Lambda Signature/SRM-T1 £470/£895	Very Good Excellent	The Signature when combined with the SRM-T1 valve driver must be the most transparent headphone available	Circumaural, open-backed, electrostatic	R	72
Stax SR Gamma £299 (inc. SRD-6 Adaptor £100)	Very Good Very Good	The next model down the Stax range from the Lambda, the Gamma is an excellent headphone with little to criticise but the price	Circumaural, open back, electrostatic	R	55
Stax SR Lambda Pro/SRD-75B Mk2 Adaptor £360/£185	Very Good Very Good	A bit of an industry reference, the Pros are frighteningly revealing, bringing across more information than loudspeakers costing twice as much	Circumaural, open-back, electrostatic	R	55
Stax SR Lambda Pro/SRM-1 Energiser £360/£635	Very Good Excellent	This combination extracts layers of information that other headphones only hint at. The SRM-1 has more edge than the SRM-T1, but it's good	Circumaural, open-back, electrostatic	R	75
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
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

PERSONAL STEREO

Whilst not exactly hi-fi components, personal stereos probably play more music to more ears than all manner of domestic systems and as such demand some attention.

Now that personal CD players have joined the ubiquitous Walkman in the market, the variety and standard of sound quality is huge, with obscurely named cassette players practically falling out of your cornflakes packet and the top Discmen going for £300 or more.

Despite their diminutive size personals attempt to incorporate as many gimmicks and features as possible, cassette players often incorporating tuners, Dolby noise reduction or even graphic equalisers.

CD players are still relatively expensive, although prices have come down a lot, and don't tend to vary that much on the features front, rather the amount and quality of accessories differs. Rechargeable batteries are extremely useful and increasingly popular, some can now be recharged within the unit and charge capacities are also being increased.

Most models come with a mains adaptor, which in some cases doubles as a battery charger and some include a wired remote control. A few are now appearing with infra-red remote control although this is more applicable to CD players.

Sound quality on the cassette front seems to

have a proportional relationship to price and integrity of construction – wow and flutter being quite obvious on the cheaper models.

CD players become less noisy as they get dearer and also reduce in size; one drawback of the latter seems to be that immunity to shock suffers as a consequence, although newer models are starting to buck this trend. Cassette players do, on the whole, seem better suited to the outdoor life than their digital counterparts, as does the software.

Bear in mind that the sound and lab ratings given below cannot realistically be compared to those in other categories or between cassette and CD personals

PERSONAL CASSETTES

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Aiwa HS-PL300 £110	n/a Average	Good looking, simply laid out player with a sensible selection of features and reasonable sound quality for a small player of this price	Dolby NR, chrome/metal eq, remote		78
Aiwa HS-PX303 £150	n/a Good	Chunky and macho styling combines with comprehensive features and a half decent transport to make a powerful personal	Dolby BC, chrome/metal EQ, remote	R	78
Panasonic RQ-P505 £100	n/a Poor	Very attractive and neat little player with nicely designed controls and XBS bass boost, but sonically it's limited by distinct wow and flutter	Dolby, chrome/metal eq, remote		78
Panasonic RQ-P525 £120	n/a Average +	Fitted with what is effectively a bass only tone control and harbouring all the necessary features, the 525 also has a knack with tape replay	Dolby B & C, chrome/metal eq, remote	R	78
Saisho PS90R £40	Poor Poor	A bit of a jumble of features and gadgets, the PS90R has on-board speakers, an extending aerial and even records, but sound quality is dubious	Graphic EQ, types I, II & IV, AM/FM, recorder		56
Sharp JC-270E £130	n/a Average -	Slightly old fashioned design combines with a basic feature count and mediocre sound quality to make an apparently uncompetitive player	Dolby, chrome/metal eq, remote		78

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PERSONAL CASSETTES

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Sony Walkman Pro £249	Good + Very Good	One of the finest sounding cassette decks on the market today. A mandatory Best Buy, it takes other personals to the cleaners (except on weight and power consumption)	Dolby B, C, types I, II & IV, record, line in/out, varispeed	BB	52/56
Sony WM-701C £200	n/a Good -	Beautiful little machine with all the necessary buttons'n'switches and a fundamentally exceptional sound quality, marred unfortunately by wow and flutter	Dolby B & C, chrome/metal eq, remote, folding phones		78
Sony WM-BF65 £90	n/a Average +	Regular size radio/clock/cassette player with a bright even open balance and Sony's forward facing phones. Not as glamorous as slightly more expensive models but sonically not bad	Dolby, chrome/metal eq, radio, alarm clock	R	78
Toshiba KT-4549 £80	n/a Poor	Fully equipped with 10 preset radio and alarm clock, the KT-4549 is a bit aggressive on the sonic side and the bass boost system lacks balls	Dolby, chrome/metal eq, radio, alarm clock		78

PERSONAL CDS

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Aiwa DX-P50 £150	n/a Average -	A tad aggressive both through earphones and domestic systems, not very walkable but it has got two stage bass enhancement	Digital output, mains adaptor, remote		94 Supp.
Denon DCP-100 £250	n/a Good	Solidly constructed and nicely finished in the slightly impractical Velvex, almost walkable, competent if uninspiring sound quality	Remote, mains adaptor, no earphones, rechargeable batts		94 Supp.
Denon DCP-50 £180	n/a Average +	Not very walkable, but lightweight and nicely finished in a nextel like grey. Sound through a system is a tad unexciting but not too bad	No headphones, remote, mains adaptor		94 Supp.
Goodmans GCD-10 £120	Average - Poor	Cheap, flashy and not short on accessories, the GCD-10 is a rather noisy player that left a lot to be desired on the sound quality front	13.5 x 3.7 x 18cm, 478g, mains adaptor		66
Kenwood DPC-41 £150	n/a 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		94 Supp.
Kenwood DPC-77 £270	Good + Very Good	Very chunky and well made, the DPC-77 is the only player to include a digital output and sounds very good through its analogue output - a suitable domestic alternative adaptors	12.8 x 3.5 x 14.5cm, 750g, digital output, mains & in-car	R	66
Kenwood DPC-81 £200	n/a 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 adaptor/charger and batts, digital output		94 Supp.
Philips AZ6897 £150	n/a 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	BB	94 Supp.
Sanyo CP-12 £260	Average Good +	Sonically amongst the more enjoyable personal CD players and capable of revealing the musical aspects of a disc in an interesting and entertaining fashion	12.5 x 2 x 12.7cm, 380g, wired remote, mains adaptor	R	66
Sony D-350 £300	n/a Good	More buttons and widgets than any of the others but not the sound quality or walkability to go with it	Mains adaptor, clock, comprehensive facilities		94 Supp.
Sony D-66 £180	n/a Average +	One of the few walkable CD players on the market, sound quality is a little muddled but not offensive	Mains adaptor, rechargeable battery pack	R	94 Supp.
Technics SL-XP1 £130	n/a 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	BB	94 Supp.

CABLES AND CONNECTIONS

Although cables and connections are sometimes thought to be the least important items in an audio system there has been a growing awareness in recent years that they have a significant effect on sound quality. To this end there is now a vast array of exotic cables and interconnects available to those interested in experimentation. The key observation on cables is that they are much more than mere accessories. Carrying the audio signal, just as any amplifier does, it's really not too surprising that they can influence sound quality.

The characteristics of any cable are determined by the materials and topologies utilised in its construction. The purity of the conductor, nature of the insulator dielectric, mechanical construction, physical geometry, RF characteristics, efficiency of screening and finally the connectors themselves, all play vital roles in the sonic character. These factors tend to vary more with interconnect cables which are used to carry the signal between active components like pre and power amplifiers. The interconnects summarised here were tested in 1m terminated

lengths and therefore the results and prices relate to that length - some cables may well perform differently when used in longer lengths. What's more, most cables are significantly cheaper if you are prepared to fit the plugs yourself.

The features column contains information on the material makeup of the different cables with the following abbreviations: OFC - oxygen free copper, OFHC - oxygen free high conductivity (Audionote defines HC as high crystal), PC-OCC - pure copper by ohno continuous casting, LC-OFC - linear crystal oxygen free copper.

INTERCONNECT CABLES

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Audio Technica AT6115 £40	Very Good Average	This cable sounds somewhat 'quieter' than the original LC-OFC interconnect, but is also less transparent and three dimensional	PC-OCC copper coaxial		59
Audionote Copper ANA £44	Average Good	ANC sounded punchy with a faintly lean but tightly-focused bass character. This crystalline precision waned slightly at higher frequencies	OFHC copper twin-axial	R	59
Audionote Flexible Silver ANS £99	Average Very Good	ANS scored a hit with its transparent midband and revealing but quite unforced treble quality. Bass transients were slightly softened	Silver signal & Copper screen	R	59
Audionote Silver ANV £154	Poor Excellent	Far weightier-sounding than the flexible ANS, ANV interconnect also possesses a fair degree of treble clarity and sparkle	21 strand silver Litz		59
Audioquest Livewire Ruby £49	Average Good	Smoother sounding than the Topaz, the extended crystal Ruby is less grainy and coarse, better able to resolve complex passages	FCL copper twin axial	R	59
Audioquest Livewire Topaz £35	Good Average	Sounding 'bigger' and faintly richer than Reference 2, Topaz was also slightly grainy at the top end	Gold-plated plugs, OFHC copper		59
Budget OFC Circa £7	Average Average	Subjectively, this cable did lift much of the aural fog experienced with scrawny standard hook-up leads.	OFC		59
Budget Patch Cords (see text)	Average Poor	As thrown in gratis with cassette decks and the like - frequency extremes were restricted and performances were veiled	Thin coaxial		59
Chord Mono-t £27/1.2m	Average + Average +	Offers a slightly rolled-off treble but its rich sound is an upgrade from patch-cords	Unsymmetrical 4-conductor cable	R	83 Supp.

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INTERCONNECT CABLES

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Deltec Black Slink £152	Excellent Excellent	Inherently neutral, the cable faithfully reproduced broad and deep stereo soundstages with precise focus and a sense of tactility	8 silver plated OFC strands PTFE dielectric	R	59
Deltec Gortex Black Slink £152	Very Good Excellent	A true reference quality cable providing an exceptionally detailed and transparent sound	Symmetrical, 8-conductors, Gore-tex ins.	R	83 Supp.
Deltec Slink £32	Good Very Good	Ideally used in lengths of under 4 metres, it errs on the lean side of neutral but has an uncommon transparency in the midrange	4 silver plated OFC strands PTFE dielectric	BB	59
Denon LC-OFC N/A separately	Very Good Average	Supplied with Denon's dearer CD players, this cable introduced a peculiar 'twangy' coloration at high frequencies, and a slightly soft bass	LC-OFC, non-magnetic gold plated plugs		59
DNM Solid-core £23	Average Good	Transparent in the midband and full of sparkling detail in the treble, low bass was slightly curtailed (unterminated price £2.30 per m.)	Single strand nickel-plated copper. Unshielded	R	59
Isoda Electric HC-05-PSR £54	Good Good	A pleasantly lively and fluid sounding cable though softens some subtle, midband detail	Aluminium + brass multistrand cable	R	83 Supp.
Kimber Kable KC-1 £65.55	Very Good Average	Tonally faintly leaner and brighter than the more open-weave PSB, KC-1's treble detail was just too sharp and grainy	Multi-gauge PTFE dielectric		59
Kimber Kable PSB £41.40	Very Good Very Good	An exceedingly transparent midband but slightly 'clanky' treble. It always managed to sound remarkably uncluttered and open	OFC, PTFE dielectric	BB	59
Monster Interlink 300 £24	Average + Average	A big, larger-than-life sound but with some emphasis of midband detail and loss of bass	Screened, symmetrical cable		83 Supp.
Monster Interlink 400 £34	Good Good	Bass is solid and punchy, counterpointed by a slightly overblown midband which tends to make vocalists sound larger-than-life	Multi-gauge	R	59
Origin Live Soli-Core Super £60	Good Average	Improves over previous Soli-core samples in stereo depth and bass weight, but a 'loud' treble presentation remains	Solid-core gold-plated AT plugs		59
QED Incon Graphite GP1 Gold £18.95	Average Average	A shielded version of Incon P1, it sounded thicker at the frequency extremes, the top end being coarser and more out of focus. Good for long runs though	OFHC Graphite shielding	R	59
QED Incon P1-Gold £15.95	Good Good	A lively open presentation that just borders on the lean side of neutral, the quick and lucid delivery affording considerable musical insight	OFHC, gold plated Deltron plugs	BB	59
Sterling £250	Average Good	Possessing a neutral if faintly rich overall balance, it supplies a pleasantly open and transparent perspective. (Reviewed in pre-production form.)	2 silver strands per conductor		59
Supra EFF-1 £60/0.75m	Average Average	A new, costly and mildly disappointing addition to the range. Edgy, smeared sound	Screened, symmetrical dir. cable		83 Supp.
Thorens SAC 100 £50	Good Average	Performance is undermined by a slightly coarse and splashy treble, not necessarily bright, simply rather confused - and fine detail lacks resolution	Silver-plated OFC, coaxial		59
van den Hul MC-D300II £45	Poor Good	It tended to highlight some upper mid detail, but a generally open and spacious acoustic proved its saving grace. Slightly soft at LF	Silver plated single strand VdH plugs	R	59
van den Hul MC-Gold £250	Average Good	It possesses a rich and beguiling treble balance that matches a weighty, slightly warm bass character. Seductive balance may prove worthwhile in some circumstances	Silver & gold plated copper		59
van den Hul MC-Silver £750	Good Good	Although remarkably transparent for an asymmetric design this costly cable was not considered to be of 'state-of-the-art' standard, and is bettered by cheaper models	19 silver plated copper strands		59
van den Hul MCD-1021II £69	Good Good	Possessing the same endearing qualities as the D300, it presented open and transparent soundstages and improved timbral resolution	Twin axial silver plated copper	R	59
van den Hul Thunderline £150	Good Average	Thunderline essentially parallels the sonic performance of the cheaper D102. HF is occasionally tainted by a 'tizzy' 'coarseness', bass is tight and dry	Silver plated 'matched copper'		59
Ytere LC-OFC Quad £85	Very Good Very Good	New cable with a very refined sound. Very transparent with good sense of focus and space	Symmetrical, star-quad with screening	R	83 Supp.

LOUDSPEAKER CABLES

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
Absolute Wire Force 4 £4.75 per metre	Good Average +	By current standards there was a loss of fine, sharp detail at the frequency extremes, but it has a big, friendly sound	744 OFC strands, PVC dielectric		64
Audio Innovations OR-200 £16 per metre	Average + Average +	Open and detailed throughout the midband but a grainy coloration tended to corrupt subtle timbral information at very high frequencies	200 LC strands, polyurethane and cotton dielectric		64
Audio Technica AT6120 £10 per metre	Average + Average	Compared to earlier LC-OFC cables, this PC-OCC derivative sounded smoother and less aggressive	PC-OCC, PVC dielectric		64
Audionote AN-SP £100 per metre	Average - Excellent	A clean and open sounding cable that offered a deep and pleasantly detailed perspective. Bass was slightly restricted, but seemed tight and coherent	15 silver strands, polyethylene dielectric		64
Audioquest Livewire Black £15 per metre	Good Good	It proved clear and punchy but with some grain across the treble. Nevertheless Black remains an interesting concept and proved better than Livewire Green	OFHC, surface only - foam core construction	R	64
Audiospec Latitude L4 £3 per metre	Average + Average +	Warm, ruddy but also mildly muddy sound with some slight emphasis of bass notes	Fig.-of-eight multi-strand, PVC diel.	R	83 Supp.
Bellwire 12p per metre	Poor Average -	Broadly speaking it delivered a bright and tizzy sounding treble with a fairly open and detailed mid with little or no bass resolution	0.5mm single strand, PVC dielectric		64
Deltec 8S £144 - 5m pair	Good Good +	The unerring transparency and detail resolution of 8S throughout the midband makes it a cleaner and more spacious sounding cable than others at the price	4 silver plated OF copper strands, PTFE	R	64
Deltec Gortex Black 16 £528 - 4.5m pair	Very Good Excellent	Improvements in bass resolution, transparency and treble poise maintains status of this cable	Silver-plated OF copper with Gore-tex ins.	R	83 Supp.
DNM Solid core £3 per metre	Average Average	A good general-purpose solid-core, though too bandwidth limited for high-end applications. Sounds great in some systems	0.65mm single strand, webbed PVC dielectric	R	64
Exposure £2.50 per metre	Good Good	It could sound a trifle matter of fact but this emotive flattening was also somewhat dependent on the music program. It is also highly suited to long runs	56 OFC strands, webbed PVC dielectric	R	64
Furukawa FS-2F09 £3.50 per metre	Good Average +	Some loss of bass weight but otherwise offers a fresh and open sound. Good value	Multi PC-OCC stranding, PVC dielectric	R	83 Supp.
Furukawa FS-2T15S £50 per metre	Good + Very Good	An advanced solid-core cable with a highly fluid, detailed and inherently musical sound	Single 1.5mm Super PC-OCC	R	83 Supp.
Kimber 4VS £7.15 per metre	Average + Average	Similar construction to 4TC but dissimilar materials infer a slightly tizzy sound	Open-weave, multistrand, PVC ins.		83 Supp.
Kimber Kable 4PR £54 - 5m pair	Average Average +	This directionally marked cable benefited from an open and airy treble quality but seemed notably leaner than 4TC. Bass was well round and satisfyingly taut	4 x 7 copper strands per conductor, PVC diel.		64
Kimber Kable 4TC £17.65 per metre	Good Good +	4TC made a great impression in the listening tests with an open midband, a smooth and unfatiguing treble with slightly rich but suitably weighty bass	OF copper, PTFE dielectric	R	64
Linn K20	Good	Subjectively, it erred on the forward and bright side of neutral but enjoyed an essentially	56 OFC strands, webbed PVC		64

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LOUDSPEAKER CABLES

MODEL PRICE	LAB SOUND	COMMENTS	FEATURES	VALUE	ISSUE
£2.88 per metre	Average	clar and punchy delivery	dielectric		
Marantz ML-55S £30 - 10m	Average	Subjectively, this cable offered a loose and splashy treble which, though not overtly bright, did compromise both tonal and timbral accuracy	30 OFC strands, 3 conductors PVC diel.	64	
Mission Cyrus £2.50 per metre	Average + Good	Because of its impedance characteristic this cable will deliver a smooth and unfatiguing treble balance with loudspeakers offering an easy load	0.8mm single strand, PVC dielectric	BB	64
Monitor PC Silverline PC4 £5.75 per metre	Good	Sonically, it laboured under a heavy and claustrophobic balance, lacking the see through transparency and lucidity of the better solid core cables	2072 x 0.07mm silver plated copper strands		64
Monster Original £4.50 per metre	Good	Original sounded relatively congested and murky at higher frequencies but possessed weight and conviction in the bass	Multistrand		64
Monster SCI 16-4 £3 per metre	Average + Average	Not as thick-sounding as early Monster cables but still slightly unbalanced. Versatile construction	4 x 16-gauge conductors, OFC strands	83 Supp.	
NVA LS1 £6 per metre	Average + Good	A light and breezy sounding cable best suited to short lengths, NVA benefited from a clear and transparent outlook	7 x 0.25mm silver alloy strands, PTFE	R	64
Origin Live Soli-Core Ordinary £1.80 per metre	Good	Subjectively it bettered the performance of the costlier Super version, affording a pleasantly detailed and spacious soundstage with firm bass but slightly coarse treble	1.8mm and 0.5mm single strands	R	64
QED 79-Strand £1 per metre	Average + Average	For much of the last decade QED 79-Strand has been the first port of call for enthusiasts on the upgrading ladder, a tradition that should still hold true today	79 strand, PVC dielectric	R	64
QED Flat 200 £2.20 per metre	Good	I detected a degree of confusion at low frequencies but this did not stifle the acoustic atmosphere which remained open and positive	200 strands, flat webbed PVC dielectric	R	64
QED Incon Graphite £2 per metre	Average + Average +	This graphite version of Incon sounded cruder and generally more heavy handed than the cheaper unshielded type. Overall presentation was mildly restricted and cloaked in a faint aural fog	OFHC, polymeric screen		64
Rotel Supra 10 £8.95 per metre	Good + Good	Supra 10 provided a very free and open sound that was unhindered by any excess at low frequencies. Worth its weight in scrap copper!	2,562 OFC strands, webbed PVC dielectric	R	64
Rotel Supra 4 £3 per metre	Good + Good	Ideal for both long and short runs, it furnishes a big sound that benefits further from a smooth, unfatiguing treble	1,036 OFC strands, webbed PVC dielectric	R	64
Solid core lighting cable 36p per metre	Average + Good	It enjoys much of the smooth treble and articulate midrange usually associated with the better solid core derivatives. Lean but taut and rhythmically coherent	1.5mm square, 3 cores, PVC dielectric	BB	64
Sterling £99 per metre	Average	This pre-production sample possessed a strangely muddled and reserved sound quality. It suffered from a progressive instrument modulation	Pure Silver, PTFE dielectric		64
Townshend Isolda £400 - 5m pair	Average + Good	Isolda possessed a truly dark background out of which rose a very solid and extended bass together with an excellent sense of transparency through the upper octaves	8 coax cables per conductor - very thick	R	64
van den Hul CS-122 £5.95 per metre	Average + Good - treble	Characterised by a driving and powerful bass, CS-122 is a heavy sounding cable. Mid treble detail was refreshingly clear but there was a slightly muted air about the extreme treble	19 x 0.45mm silver plated strands, webbed rubberised	R	64
van den Hul CS-352 £12.95 per metre	Good	Subjectively it sounded like CS-122 only more so, the deep rumbling bass tending to overwhelm subtle musical details. It also appeared a trifle peaky in the treble	7 x 0.76mm + 168 x 0.125mm silver plated strands, rubberised diel.		64
van den Hul SCS-12 £29.95 per linear metre	Good + Good +	SCS-12 set a high standard with a tight and well focused soundstage populated with tactile stereo images. Bass wasn't as extended or resolved as some other cables	19 silver plated strands of 12 different gauges, PTFE dielectric	R	64
van den Hul SCS-2 £99.95 per linear metre	Good + Good +	Overall it was commendably neutral and transparent but nothing less would be acceptable bearing in mind the tremendous cost of a stereo pair	665 silver plated matched crystal copper strands, PTFE dielectric	R	64
Vecteur R-CV30 £5.40 per metre	Average	Subjectively the better of Vecteur's cable line-up offering a neutral overall perspective but slight loss of detail resolution at both frequency extremes	4 x 0.8mm LC-OFPC PTFE insulated strands	BB	64

STANDS AND SUPPORTS

It's becoming more and more apparent that all the components in a hi-fi system benefit from being placed on the right kind of support. It is already acknowledged that performance of electro-mechanical transducers, such as turntables and loudspeakers, can be greatly improved by using highly rigid supports. This notion has been expanded to include electronics such as amplifiers and compact disc players, and inevitably a broad range of stands and supports have been produced to cater for this requirement.

With loudspeaker stands there seems to be two broad schools of design. The most common

is the open frame type which uses square section steel tubing (usually less than an inch square) made up to form a tripod or quadropod stand usually fitted with spikes top and bottom to ensure good coupling to both floor and cabinet. However, for reasons of domestic harmony this latter option is often not pursued as eagerly as perhaps it should be.

The alternative approach is to use mass. Larger section (approximately 3 inch x 2 inch) tubing is welded between square top and bottom plates and filled with sand and/or lead shot. Again, this type uses spikes at the base but Blu-

tack or the like for coupling with the cabinet.

Equipment supports generally place isolation quite high on the list of priorities and usually use a lightweight steel frame to support an MDF platform. Once again spikes are used to minimise contact with the platform and ensure good coupling to the floor. Minimising weight without compromising rigidity seems to be the aim with turntable supports but those designed for electronics often employ some form of damping to kill vibration, sometimes in the form of mass.

LOUDSPEAKER STANDS

MODEL PRICE	LAB SOUND	COMMENTS	TOP PLATE SIZE, HEIGHT	VALUE	ISSUE
Appolo A10 £52.50	4 leg Average	A robust and lightweight model, it would make an ideal upgrade for those still happy with the big boxes of old.	19 x 19cm 44cm	R	58
Appolo A820 £44	4 leg Average	A light open-framed budget design slightly lacking in rigidity and subjectively superceded by other stands costing £10 more.	19 x 19cm 53cm		58
Audio Dimensions Classic 2 £110	4 leg Average	Built in the heavyweight tradition and damped with chalk. Solid, stable, tactile sound	20.3 x 20.3 x 52cm	R	83 Supp.
Foundation Fred £70	2 leg Average	With sand filling the Freds made speakers sound tight and coherent with a more even balance.	19 x 19cm 36/43/59cm		58
Foundation Maggi £159 to order	Plinth Very Good	Made for Magneplanar and other similar panel speakers they seem to have a healthy effect on the sound quality thereof.	50 x 2cm 2cm	R	58
Foundation Pi £269 to order	2 leg Very Good	Overpriced in material terms the Pi nevertheless has a very positive effect on the low frequency performance of conventional speakers.	20 x 20cm 25/38/46/5	R	58

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LOUDSPEAKER STANDS

MODEL PRICE	LAB SOUND	COMMENTS	TOP PLATE SIZE, HEIGHT	VALUE	ISSUE
Foundation Sir Fred £80	2 leg Good	Upgraded 'Fred' with special in-fills. Sweet sound but one that also lacks bite and edge	19 x 19 x 46.5cm		83 Supp
Golding Black Satin £65	1 leg Very Good	Screw together stand tastefully hewn from medite. Some loss of bass but still pleasantly rhythmic	18 x 20 46cm	R	83 Supp.
Heybrook HBS1 £99	4 leg Very Good	With its new aluminium base frame the HBS1 fared very well in the listening tests. It allowed much of the speakers own 'sound' to remain intact.	23 x 21cm 47cm	R	58
Heybrook Point 5 £55	3 leg Very Good	An unusual triangulated open frame stand that can help certain speakers sound more transparent and fluent - a good value stand	23 x 21.5cm 47cm	BB	58
Linn Kan II £99	4 leg Very Good	Built to support Linn's Kan speaker this stand is well suited to the task, but is less successful with other loudspeakers.	19 x 16cm 59cm		58
Linn Sara £110	4 leg Very Good	The Sara exhibits some odd properties so its use other than with the Sara loudspeaker should be viewed with caution.	25 x 21cm 53cm		58
Monotrak Engineering M1 £58	1 leg Good	The M1 gave the mid and treble a commendably smooth and detailed presentation but bass sounded rather lacklustre and muddy.	19 x 18.5cm 48cm		58
Monotrak Engineering M4 £58	4 leg Very Good	Begging comparison with Heybrook's HBS1 the M4 maintained much of the openness and forthright detail of that model.	23 x 21.5cm 53cm	R	58
Monotrak Engineering M4S £58	4 leg Very Good	Its stature and stability would seem to mark it out as most suitable for smaller, lighter cabinets. The M4S possessed an open midband and clear treble.	20 x 17.5cm 53cm		58
Origin Live Advanced £145	3 leg Good	One of three related tripod-like stands. Stable sound with good sense of depth and power	22 x 20.6 44cm		58
Origin Live Three Leg £89	3 leg Good	An unusual tripod stand devoid of top plate and taking up more floor space than normal, subjective and technical performance was exemplary.	(support area) 22 x 17.5cm 52cm	R	58
Partington PP4 £60	1 leg Good	The PP4 offers a rather mixed performance, though when damped with sand infill it was less ready to embellish the overall sound and low frequencies became tauter and quicker.	18 x 16.5cm 48cm		83 Supp.
QED TS22 Tristand £60	3 leg Very Good	Most tracks sounded uplifted or buoyant, never thick nor coloured. It worked well with most of the speakers tried and encouraged a fluid and revealing midband.	19 x 17cm 45/50/58cm	BB	58
Stand Design Z20 £70	1 leg Excellent	Well built and finished with optional sand in-fill. Ideally suited to Wharfedale 505.2's	16.5 x 19 50cm	R	83 Supp.
Target HJ15/3 £107	3 leg Very Good	Sound quality was basically very good though without the sand infill some loudspeakers may sound a little unbalanced as both bass and treble regions are subjectively exaggerated.	28 x 28cm 40cm	R	58
Target HS20 £64	1 leg Excellent	This monopod stand can be used either filled or unfilled and encourages different characteristics in the speakers sound accordingly	19 x 16.5cm 53cm		58
Target T-40 £51	2 leg Very Good	Not very stable, tends to infer a slightly forward, ragged sound with diluted pitch	19 x 19 40cm		83 Supp.

EQUIPMENT SUPPORTS

MODEL PRICE	LAB SOUND	COMMENTS	SIZE (H x W x D)	VALUE	ISSUE
Alphason R444 £120	Rack Good	A heavyweight structure with stressed MDF shelves, ideally suited to the Sonata turntable	82 x 60 x 39.5cm	R	83
Audioquest Sorbothane Feet £40 for four	Feet Good	These large gumdrops are very useful for damping vibrations in amplifiers and especially CD players.	6.5 x 2.5cm (circular)	R	57
Cornflake TCS6 £60	Shelf Good	A squat and rigid frame supports a Medite top board with four adjustable spikes, better suited to suspended sub-chassis turntables.	43 x 23 x 33cm		83 Supp.
Foundation Stable Table £100 (with Supe	Table Good	Similar to Stand Design's table though less well finished and certainly less stable	64 x 46.5 x 36cm		58
Origin Live Skyline Super £100	Table Good	An asymmetric table that helps provide a quick, lucid and solid sound with most decks	41 x 50 x 40cm	R	83
Roksan Equipment Table £169	Rack Good	An upgradable/expandable system suited to Roksan's Xerxes if not other competing turntables	65 x 52 x 38cm		58
Sound Organisation Table £55	Table Very Good	A deceptively simple structure that just happens to be engineered in a thoughtful, and ultimately successful manner.	37 x 45 x 35cm	BB	57
Sound Organisation Wall Stand £40	Shelf Very Good	The first of its ilk and still amongst the best, this simple framework represents a vast improvement over standard furniture shelves.	27.5 x 43 x 35cm	BB	57
Sound Organisation Z022 £97	Table Excellent	A small but costly table made from thin steel tubing. Suited to the LP12 but not other decks	49 x 45.5 x 36cm		58
Stand Design Duplex £75	Table Very Good	Well made and nicely finished, this table is broadly compatible with most heavy turntables	63.5 x 46.5 x 36cm	R	83
Target TT2 £64	Table Very Good	Standing up to the best in most areas, the TT2's only real foible concerns a slight loss of bass 'slam'. Design was updated in 1990	52 x 46.5 x 35.5cm	BB	57

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TELEVISIONS

The standalone television set is rapidly evolving into a key component in integrated home entertainment systems.

NICAM digital stereo sound is now being broadcast for many hours every week, although you will have to check to see what is available in your area. The IBA are quite open about it, but the BBC tend to be more secretive.

Most up-market stereo CTVs are now equipped with NICAM decoding and rather more attention is being paid to the built-in amplifier

and speakers.

NICAM is also available on Hi-fi stereo videorecorders (see above), and this is usually the more practical route for hi-fi system integration, as well as allowing favourite musical events to be saved on tape. To both watch and record with stereo sound will require NICAM on each of course, but the decision to update one or the other first will probably have as much to do with the age of the respective components than the convenience of the interconnections.

The ten CTVs tested so far are all luxury stereo models with 'flatter squarer' 59cms tubes of various kinds. Best suited to a viewing distance of about 7ft, these are one size up from the most popular 51cms size sets and take about 23 per cent of the top 30 per cent of the market.

All have remote control as well as Fastext (enhanced teletext), and many have on-screen graphics and flexible in/out socketry.

MODEL PRICE	LAB SOUND	COMMENTS	SCREEN SIZE, FEATURES	VALUE	ISSUE
Ferguson 51L5 £499	Average Good	This nicely (monitor) styled set delivers a fine all round performance at a very competitive price. Ergonomics are better than most thanks to good on-screen graphics	51cm MP FST, NICAM, Fastext, OSG	R	86 Supp
Grundig ST-63-460TT £649	Average - Average +	Bulky set's shape resembles a square-rigged sail; screen tilts back slightly, so might suit floor mounting, though beware room reflections. Picture quality is good, if a touch bland, but ergonomics are fairly impenetrable - no on-screen graphics either. Halfway respectable sound quality is over-enriched by cabinet drone.	59cm FST, NICAM, Fastext		76
ITT Nokia £629	Average + Average -	Bulky square-rigged shape helps deliver a respectable standalone sound quality at a modest enough price. A versatile set with good handset but no on-screen graphics, the picture quality of our sample lacked fine detail resolution, lending a 'soft focus' effect	59cm FST, NICAM, Fastext		76
JVC AVS250 £500	Average + Average -	This compact and delightfully versatile non-NICAM set has respectable on-board stereo sound and lovely screen graphics, along with an infernal handset. Our sample suffered a tuner problem which marred a picture quality which was pretty good when monitoring baseband signals off tape.	59cm FST, Fastext, o/s graphics		76
Panasonic Prism TK-24 W1 £699	Average + Average -	Handsome but bulky set delivers serious standalone sound quality. Lovely ergonomics but off-air picture quality marred by tuner section noise on our sample (works fine as a monitor.) Good NICAM (SCART) output.	59cm FST, NICAM, Fastext, o/s graphics		76
Philips 9752 £500	Average Average +	Detachable speakers ought to be an asset, but those supplied are too cheap'n'cheerful. Picture quality is nicely balanced, if a shade 'soft', the handset is nice, but the on-screen graphics are a bad joke	51cm FST, NICAM, Fastext, OSG, S-VHS socket		86 Supp.
Pioneer SD-21AV1 £599	Average + Good +	The set that can do anything if you've the patience to find out how to drive it: fine picture, decent sound and good flexibility in a neat compact monitor package, plus a handset that deserves its own instruction manual	51cm FST, NICAM, Fastext, OSG/LED	R	86 Supp
Sony KVX 2132U £530	Average - Average +	This is an attractive, ergonomic and competitive package, trading picture resolution in favour of stability. The on-set sound is naff, so Trinitron fanciers should use it as a monitor alongside a hi-fi system	51cm Trinitron FST, NICAM, Fastext, OSG	R	86 Supp.
Toshiba 217D9B £480	Average Average -	A superficially impressive looking package for the price, picture quality was disappointing on our sample	51cm FST, NICAM, text, OSG		86 Supp.

VIDEO RECORDERS

For some time there's been a move to improve both the video and the audio quality of video recorders and TV sets alike as a necessary prelude to a proper integration between the two. Hi-fi video is obviously an important element in the story, and so is Dolby Stereo, the ambient 'surround sound' system.

The weak link of course is on the broadcast side. Although TV sound is well up to normal hi-fi standards, it has always been in mono and unjustly or otherwise has rarely attracted much audiophile interest. But TV sound is - or shortly will be - freed of the shackles of mono by the introduction of NICAM stereo. NICAM - an

acronym for Near Instantaneous Companding and Modulating - is the missing link that will help facilitate the much feted integration of video with audio. And then we have S-VHS, a system which does for picture quality what the other developments promise to do for the sound

MODEL PRICE	LAB SOUND	COMMENTS	SCREEN SIZE, FEATURES	VALUE	ISSUE
Akai VS-75EK £550	Average Good	Excellent performance and a slick set of controls make this recorder a pleasure to use. Good price is a bonus	Hi-fi, NICAM, programmable remote	BB	71
Akai VS-967EK £500	Average Good	Many well implemented facilities, but unsuitable for dedicated audio use due to lack of LP mode, manual record levels or audio input	Hi-fi, NICAM, on-screen programming	R	86 Supp.
Grundig VS680 £1250	Very Good Average	State of the art technology gives top notch sound with tremendous flexibility but somewhat disappointing picture quality. It's also very hard to drive	Hi-fi, NICAM, LP/SP, teletext programming, on-screen titling & graphics		86 Supp.
Nordmende V4405K £549	Good Good	Fine basic sound and picture quality, but the RF converter introduced significant losses. An excellent model, but configured for German home market. The recorder lacks NICAM	Hi-fi, transmitter handset, digital FX	BB	71
Panasonic NV-F65 £500	Good Average	Uninspired but competent and well made deck. Plenty of features, decent sound and reasonable video ensure recommendation	Hi-fi, NICAM, LP audio only, bar code programming	R	86 Supp.
Panasonic NV-FS1 £1000	Poor Good	The control system is poorly organised, with cramped legends and some strange machine logic. Bar code programming is hardly a great achievement either. Picture and sound quality are good, but not state of the art	S-VHS, Hi-fi, NICAM, bar code programming	R	71
Philips VR-6585 £500	Average Average	Fine middle-ranking deck with full LP operation and easy controls and displays	Hi-fi, NICAM, transmitter LCD remote, LP/SP		86 Supp.
Sanyo VHR-D4890E £1000	Poor Excellent	High grade S-VHS recorder with digital effects which gives first rate screen-based results but relatively poor sound recording	Hi-fi, NICAM, S-VHS, PIP etc		86 Supp.
Sharp VC-S1000H £1000	Good Poor	Clean, accurate and stable off air and from tape, and LP modes are satisfactory - but on-screen S-VHS results are well below par	Hi-fi, NICAM, LP, S-VHS, titling		86 Supp.

Personal Messages

This month Paul concentrates on the effects of high volume levels. Is he the man who put the LOUD into loudspeakers?

Coincidence is a wonderful device for focusing the attention. On four separate recent occasions I've been confronted by the concept of loudness per se, something that becomes more intriguing, more important yet also more opaque the closer the scrutiny.

The little active loudspeakers that are normally attached to B&O's pretty new 2500 personal stereo system seemed to go indecently loud for their size, so I dug out an old sound level meter to see what figures came up. Those quoted are not absolutes, but represent best guesstimates based on averaging and comparisons.

These confirm the B&Os do go impressively loud for three litre enclosures, delivering peak levels of around 102-103dB (stereo pair, 2m). Nevertheless, a pair of (seven litre) Royd Sintras driven conventionally from a 70watt Naim NAP250 amplifier managed to beat them by two or three decibels (which is a significant amount).

However, neither achieves its maximum without some untidiness nor manages to pack any serious low end wallop. Which couldn't be said of the Naim DBL experience (see *Statements*, page 27). High sensitivity, considerable composure and an easy amplifier load help the big Naims churn out 110+dB without breaking sweat, with peaks above 115dB on occasions.

Around the same time I was fitting out the car with a hi-fi system. From the above, and mindful of the background noise factors, I reckoned I ought to be setting a loudness target at 105-110dB. Such was achieved (though it sounds shatteringly loud when the vehicle is stationary).

So, how loud should a hi-fi system go? There are two schools of thought. The first starts from the basis that the ear is not very sensitive to absolute loudness, merely responding to changes in

relative loudness. It therefore follows that all the hi-fi needs to be able to do is reproduce the dynamic range of the original above whatever background noise exists.

This target is at least practical and achievable, and also takes account of mundanities like money, neighbours and family. In a quietish residential area, peak levels of as little as 90dB - well within the capabilities of most midi systems, never mind serious hi-fi - will give a quite adequate dynamic range of 50dB.

However, relying on relative loudness is a compromise. Even if the ear has mechanisms that equalise for changes, the body itself responds directly to absolute loudness, above a certain

105dB in room. The one speaker in my last batch of 25 (issue 94) that really started to get there was the Tannoy J95; the combination of 90dB/W sensitivity and my 70watt amplifiers adding up nicely.

Indeed, I reckon it's no accident that today's average (87-88dB/W) loudspeaker and 70watt amplifier will give about 103dB. Which is just about enough to irritate the neighbours and make rock music sound interesting, even though it falls well short of the live experience.

Having got some sort of handle on my own loudness preferences, I was intrigued to read Richard Black's comments in his 'second opinion' *Statements* review of the ATC SCM20 loudspeaker (issue 94).

However, to get even a taste of the visceral impact that's such an essential part of the rock vocabulary, I reckon it's necessary to generate levels of at least 105dB in room.

level. Anyone who's ever attended a rock concert will be aware that the overall physical impact of the sound plays a significant part in the overall experience.

Idealistically then, hi-fi that's attempting to mimic reality should be trying to match 'real' levels within the home environment. Spoken word probably only needs about 80dB or thereabouts, so no problem there, but the rock concert or the control room of the recording studio regularly operate in the 110-120dB range, which again brings up those practical problems about quiet neighbourhoods and so on.

However, to get even a taste of the visceral impact that's such an essential part of the rock vocabulary, I reckon it's necessary to generate levels of at least

Richard was much more impressed by this massively engineered compact than I, attributing our divergence to the very different aspirations of our respective driving systems. That's certainly one factor, but my attention was particularly drawn to his comment: "Maximum loudness is pretty loud".

Of course it all comes down to what an individual means by loud. Richard found he rarely felt the need for an amplifier bigger than his own 70 watter, whereas my own keenest recollection of the low sensitivity (82dB/W) SCM20 was frustration at often finding myself both short of power and unable to bi-amp them (an often preferable alternative to a bigger amplifier).

The obvious inference is that our respective preferred

listening levels differ markedly, probably by at least 6dB, and maybe as much as 10dB. Why this should be the case is probably a matter of personality, personal circumstances and taste in music. However, I suspect it's the most likely reason why our preferences in equipment - and perspectives on hi-fi itself - are very different.

I'd always assumed that the reason I often find myself agreeing with Malcolm Steward's subjective judgements was because we used very similar systems. Now I suspect it may well be because he's the only reviewer I know who likes listening at consistently louder levels than I, and only in consequence uses similar equipment.

The 'preferred sound level' of each individual reviewer could well partly explain the inconsistencies that occur throughout hi-fi reviewing. Indeed, the loudness factor could well explain much of the differences of opinion that exist the world over between enthusiasts, dealers and manufacturers alike. Perhaps it's time we all examined our collective SPLs more closely!

Perversely, of course, some of the sweetest and most interesting sounding loudspeakers around are low sensitivity types. Besides the compact ATCs, irrefutable classics like the BBC LS3/5A, the original Quad *Electrostatic* and the Spendor BC1 all fall into the group, as do Celestion SL700s, Linn Kans and a couple of others I tested around the same time as the ATCs, the Roksan *Darius* and Townshend *Glastonbury Tor*.

At least the ATC and Roksan have the power handling to get close (providing you can find a powerful enough amplifier you like the sound of), but for the most part, for all the many remarkable qualities that these various very different loudspeakers possess, the genuine rock experience must remain off the agenda. That's physics.

SOUND AND STYLE



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